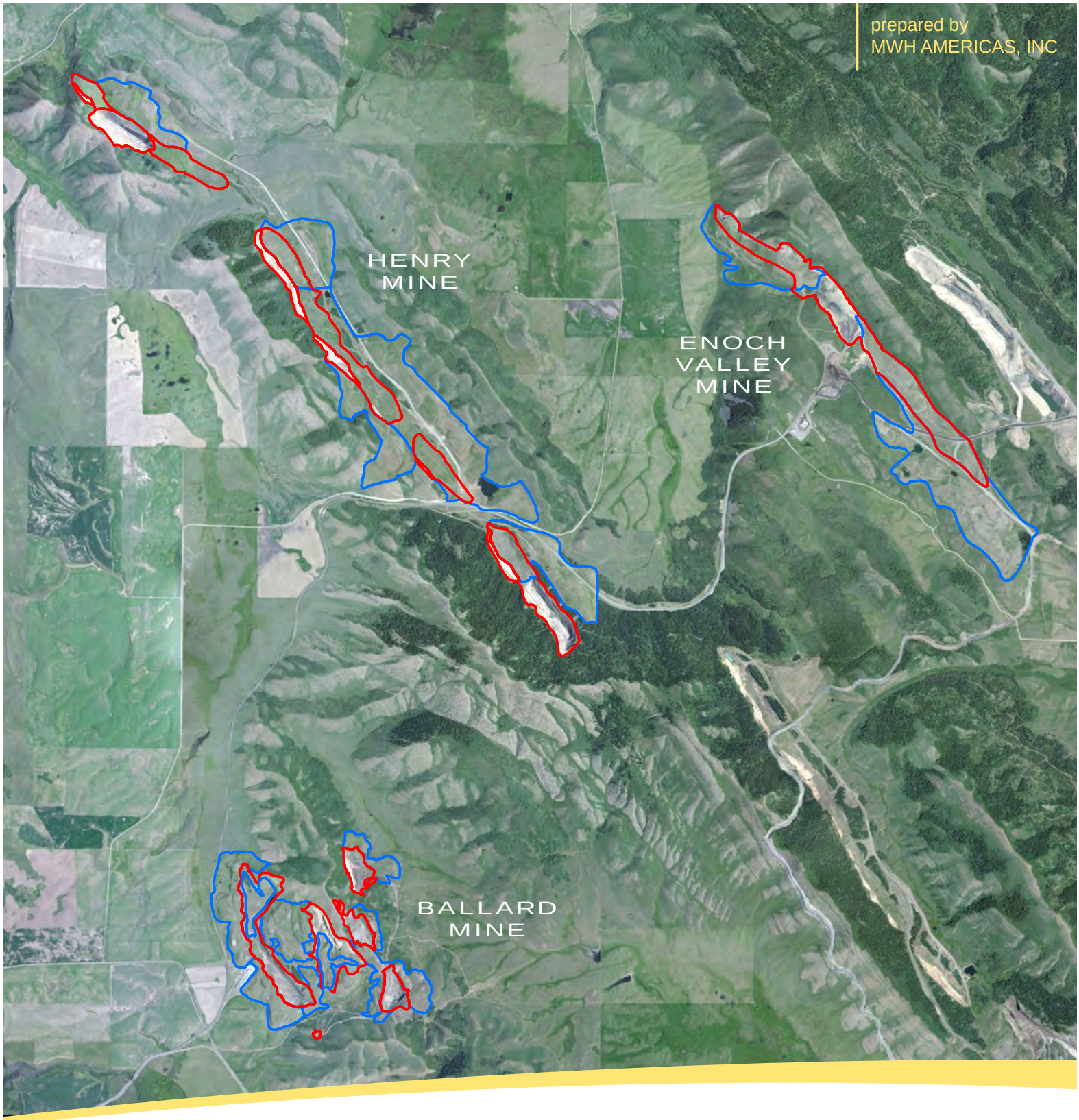

2010 AND 2012 DATA SUMMARY REPORT

Ballard, Enoch Valley, and Henry Mines
Remedial Investigation Activities

FINAL
Revision 0

July 2013

prepared for
P4 PRODUCTION, LLC

MWH®
BUILDING A BETTER WORLD

2010 AND 2012 DATA SUMMARY REPORT

BALLARD, ENOCH VALLEY, AND HENRY MINES REMEDIAL INVESTIGATION ACTIVITIES

FINAL

Revision 0

JULY 2013

Prepared by:

MWH AMERICAS, INC.

Prepared for:

P4 PRODUCTION, LLC

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ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order of Consent
A/T	Agencies and Tribes
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CO	Consent Order
COPC	Contaminant of Potential Concern
CVS	calibration verification standards
DOI	Department of the Interior
DQO	Data Quality Objectives
DSR	Data Summary Report
e.g.	exempli gratia (Latin, for example)
EPA	(U.S.) Environmental Protection Agency
ft bgs	feet below ground surface
ft	Feet
FSP	Field Sampling Plan
U.S. FWS	U.S. Fish and Wildlife Service
HHERA	human health and ecological risk assessments
HSP	Health and Safety Plan
ICAL	initial calibration
ICV	initial calibration verification
IDEQ	Idaho Department of Environmental Quality
IDWR	Idaho Department of Water Resources
IS	Internal standard
LCD	laboratory control duplicate
LCS	laboratory control sample
LDC	Laboratory Data Consultants
MCL	maximum contaminant level
mg/L	Milligram per Liter
MWH	MWH, Inc. (formerly Montgomery Watson Harza, Inc.)
MS/MSD	matrix spike / matrix spike duplicate
P4	P4 Production L.L.C.
QAPP	Quality Assurance Project Plan
QC	Quality Control

RI/FS	Remedial Investigation / Feasibility Study
RLs	Reporting Limits
SAP	Sampling and Analysis Plan
SEGW	Surface Expression of Groundwater
SOW	Statement of Work
SOP	Standard Operating Procedure
Tribes	The Shoshone-Bannock tribes

1.0 INTRODUCTION

This Data Summary Report (DSR) was prepared by MWH Americas, Inc. (MWH) on behalf of P4 Production, LLC (P4), in accordance with the requirements of the Administrative Settlement Agreement and Order on Consent/Consent Order for Remedial Investigation/Feasibility Study (2009 CO/AOC; USEPA, 2009). The 2009 CO/AOC is a voluntary agreement between P4 and the United States Environmental Protection Agency (EPA), the Idaho Department of Environmental Quality (IDEQ), the United States Department of Agriculture, Forest Service (Forest Service), the U.S. Fish and Wildlife Service (U.S FWS), the United States Department of the Interior (DOI), Bureau of Land Management (BLM), the Shoshone-Bannock tribes (Tribes), collectively referred to as the Agencies and Tribes or A/Ts. This DSR supports the comprehensive mine-specific Remedial Investigation/Feasibility Study (RI/FS) that is being conducted at P4's three historic phosphate mines: Ballard, Henry and Enoch Valley mines, collectively known as the "Sites". Within this DSR, data are presented with little to no interpretation as the combined data set for each Site will be evaluated later in the individual Ballard, Henry, and Enoch Valley Mine Site RI Reports.

This DSR documents the most recent sampling rounds conducted at P4 in 2010/2012 and includes descriptions of the field activities conducted and summarizes the results from those sampling efforts. Figure 1-1, *General Location Map*, depicts the footprint of each Site and its geographic relationship with the other Sites. Summarized field activities include surface water and groundwater sampling rounds for 2010 and 2012 along with several other investigations that were completed in 2010 to address identified data gaps.

The 2010 activities included installation of monitoring well MMW037, installation and sampling of direct-push boreholes, and sediment and riparian soil sampling in conjunction with select surface water sampling along riparian corridors throughout the Sites. The only activity conducted in 2011 was an investigation conducted at the Ballard Mine in the "shop" area. This investigation and its results are presented in a stand-alone report that will be attached to the Ballard Mine RI Report when it is submitted later in 2013.

1.1 Report Description and Objectives

This report is intended to fulfill the requirements for reporting data consistent with a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) RI and Task 3c of the Statement of Work (SOW) attached to the 2009 CO/AOC. Consistent with the SOW, this DSR documents the investigative activities that were conducted during the 2010 and 2012 field seasons in Section 2, provides site summary data in Section 3, and complete data packages and field forms (in the appendices). The purpose and objectives of the 2010/2012 RI activities are further discussed below.

1.1.1 2010 Surface Water and Groundwater Sampling

The objectives, methods, and procedures for surface water monitoring conducted in 2010, and reported herein, are presented in the *Final Revision 2 - 2009 and 2010 Surface Water Monitoring Sampling and Analysis Plan* (*2009/2010 Surface Water SAP*; MWH, 2009a). The purpose of the *2009/2010 Surface Water SAP* was to define the network of relevant surface water stations and analytical

parameters for an interim monitoring plan that would provide an annual assessment of surface water conditions downstream of potential sources associated with the Sites. The surface water data collected under this plan also supported the ongoing groundwater characterization and refinement of the hydrogeologic conceptual models for the Sites.

Characterization of groundwater at the Sites has been conducted in a phased approach since 2004. The objectives, methods, and procedures for groundwater monitoring conducted in 2010, and reported herein, are presented in the *Final Revision 2 - 2010 Groundwater Monitoring Memorandum (2010 Groundwater Memo*; MWH, 2010a). Ongoing monitoring of contaminants of potential concern (COPC) concentrations and piezometric conditions in monitoring wells and specific Site seeps and springs was needed to complete characterization of the nature and extent of COPCs in groundwater. The groundwater data collected under the *2010 Groundwater Memo* supports the RI/FS evaluation and refinement of the hydrogeologic conceptual models of the Sites. Because substantive components of the 2010 groundwater monitoring program (including the Data Quality Objectives (DQOs) and methods and procedures) were the same as the 2009 groundwater monitoring program, the 2010 Groundwater Memo referenced the *Final Revision 3 - 2009 Groundwater Monitoring Sampling and Analysis Plan* (*2009 Groundwater SAP;* MWH, 2009b) for:

- Specific DQOs as well as the
- Field sampling plan (FSP),
- Quality assurance project plan (QAPP), and
- Health and safety plan (HSP).

1.1.2 2010 Monitoring Well and Direct-Push Borehole Installation Program

The objectives, methods, and procedures for the monitoring well and direct-push boreholes installed in 2010, and reported herein, are presented in the *Final Revision 1 - 2010 Monitoring Well and Direct-Push Borehole Installation Program Sampling and Analysis Plan Addendum (Direct-Push SAP*; MWH, 2010b). This Direct-Push SAP Addendum was prepared in conjunction with, and was attached as Appendix D3, to the *Final Revision 2 - Remedial Investigation/Feasibility Study Work Plan for P4's Ballard, Henry and Enoch Valley Mines* (*P4's RI/FS Work Plan*; MWH, 2011). The well and direct-push borehole locations were selected to address identified data gaps at the Sites. Table 1-1, *Data Gap Action Summary*, summarizes the data gaps discussed above and the associated actions and outcomes as originally documented in Tables 4-11 through 4-13 and Sections 4.4.1.1, 4.4.1.2, and 4.4.1.3 of the *P4's RI/FS Work Plan*.

Direct-Push Borehole Investigation - The main objective of the 2010 direct-push investigation was to complete the nature and extent delineation of COPCs in the shallow alluvial aquifer adjacent to the Sites. This activity specifically focused on sampling shallow alluvial groundwater at two of the Sites – two areas at the Ballard Mine and at a single area at the Henry Mine.

Monitoring Well Activities - The main objective of the monitoring well installation activity was to install a single monitoring well (MMW0037) at a key location within the Dinwoody Formation, at the Enoch Valley Mine. The Dinwoody Formation is assumed to be located stratigraphically beneath the basalt and so would be found underlying the basalt in this location. The data gap is related to the possible lateral transport of COPCs from the mine waste rock into the Dinwoody Formation, which is found beneath the waste rock dump at the Enoch Valley Mine. In addition, the conceptual hydrogeologic contaminant transport model suggests that an upward gradient from the Dinwoody Formation into the overlying basalt may be present which would limit the vertical transport of COPCs from the basalt into the Dinwoody. The new monitoring well addressed both of these data gaps which were identified in *P4's RI/FS Work Plan.*

1.1.3 2010 Riparian Soil / Sediment / Surface Water Investigation

The objectives, methods, and procedures for the sediment and riparian soil sampling and collection of surface water samples in select locations along the riparian corridors in 2010 and reported herein, are presented the *Final Revision 1 - Supplemental Sediment and Riparian Soil Sampling and Analysis Plan* (*Riparian SAP*; MWH, 2010c). This SAP was prepared in conjunction with, and was attached in Appendix D1 of *P4's RI/FS Work Plan*. The *Riparian Field Sampling Plan (Riparian FSP)* is an attachment to the *Riparian SAP*. Results reported in this DSR address data gaps identified during the preparation of the *P4's RI/FS Work Plan*. Much of the work completed prior to 2010 focused on upland soil and sediment sampling; however, several of the metal analytes that were detected in soils throughout the Sites were not analyzed in sediment during those earlier investigations (refer to Table 1-1 in the *Riparian SAP*). Therefore, the primary reason for the proposed 2010 supplemental sediment and riparian soil sampling was to fill these data gaps based on lack of specific metals data (e.g., arsenic). Table 1-1, *Data Gap Action Summary*, summarizes the data gaps discussed above and the associated actions and outcomes as originally documented in Tables 4-11 through 4-13 and Sections 4.4.1.1, 4.4.1.2, and 4.4.1.3 of P4's *RI/FS Work Plan*.

1.1.4 2012 Surface Water and Groundwater Sampling

The objectives, methods, and procedures for surface water and groundwater sampling conducted in 2010, and reported herein, are presented in the A/T-approved technical memorandum entitled *2012 Surface and Groundwater Monitoring Programs - Final Revision 2* (*2012 Surface Water and Groundwater Memo*; MWH, 2012). The objectives of the 2012 water monitoring program were the same as the 2010 monitoring programs, described above in Section 1.1.1, with a few changes that are detailed in Section 2.2.

1.2 Report Organization

The content of this DSR is as follows:

- Section 1 – Introduction
- Section 2 – Summary of 2010 and 2012 Field Activities

- Section 3 – Summary of 2010 and 2012 Analytical Results by Mine Site
- Section 4 – References

2.0 SUMMARY OF 2010 AND 2012 FIELD ACTIVITIES

This section discusses investigation and data collection activities during the 2010 and 2012 field programs. As presented in Section 1, these investigations include:

1) Surface water and groundwater sampling,
2) Monitoring well and direct-push borehole installation and sampling,
3) Riparian soil and sediment sampling in addition to collection of surface water samples in select locations along riparian corridors.

Detailed evaluation of the data is reserved for the individual Site RI Reports and not presented herein. A summary of analyte exceedances in each program, organized by individual mine Site, is provided in Section 3.0. All field activity forms (including soil boring logs, monitoring well installation and development forms, field sampling forms, chains of custody, sampling field note book copies, sampling parameter measurements and any other relevant field data) and field notes are provided in Appendix A.

2.1 2010 Surface Water and Groundwater Sampling

Surface water and groundwater monitoring was conducted during the spring and fall of 2010. The surface water and groundwater sample locations for each of the mine sites are shown on Figure 2-1 (*Media Sample Locations Ballard Mine Site*), Figure 2-2 (*Media Sample Locations Enoch Valley Mine Site*) and Figure 2-3 (*Media Sample Locations Henry Mine Site*).

The total number of surface water and groundwater samples collected during the Spring 2010 sampling event (between May 13 and May 25, 2010) were:

- Ballard Mine: 12 surface water and 27 groundwater samples
- Enoch Valley Mine: six surface water and 13 groundwater samples
- Henry Mine: four surface water and seven groundwater samples

Fall 2010 (September 14 and September 17, 2010) surface water and groundwater sampling totals were:

- Ballard Mine: three surface water and four groundwater samples
- Enoch Valley Mine: no surface water and three groundwater samples
- Henry Mine: two surface water and one groundwater samples

Surface water samples were collected using the protocols outlined in SOP-NW-9.1, *Collection of Surface Water Samples*. Surface water flow measurements were collected according to the methods presented in SOP-NW-9.2a, *Surface Water Flow Measurements Using Man-Made Portable Devices or*

Estimation Techniques. Both of these Standard Operating Procedures (SOPs) are included in the *2009/2010 Surface Water SAP*.

Groundwater samples were collected using the protocols outlined in SOP-NW-5.3, *Collection Groundwater Quality Samples and the SOP Low Stress Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells*. Both of these SOPs are included in the 2009 Groundwater SAP. There were no significant deviations from the 2009/2010 Surface Water SAP and the 2010 Groundwater Memo that occurred during the 2010 field program.

Summaries of groundwater and surface water COPC exceedances based on the appropriate regulatory standards for the 2010 program are provided in sections 3.3 and 3.4.

2.2 2012 Surface Water and Groundwater Sampling

Surface water and groundwater monitoring also was conducted in the spring and fall of 2012.

The surface water and groundwater sample locations for each of the mine sites are shown on Figures 2-1 (Ballard), 2-2 (Enoch Valley) and 2-3 (Henry).

The total number of surface water and groundwater samples collected during the Spring 2012 sampling event (between May 8 and May 16, 2012) were:

- Ballard mine: 14 surface water and 22 groundwater samples
- Enoch Valley mine: six surface water and 14 groundwater samples
- Henry mine: four surface water and six groundwater samples
- Select background locations: four surface water and one production well groundwater sample

All groundwater locations sampled in the fall were agricultural or domestic wells. The total number of surface water and groundwater samples collected during the Fall 2012 sampling event (between September 17 and September 19, 2012) were:

- Ballard mine: one surface water and no groundwater samples
- Enoch Valley mine: no surface water or groundwater samples
- Henry mine: two surface water and no groundwater samples
- Select background locations: nine agricultural and domestic well groundwater samples

Surface water samples were collected using the protocols outlined in SOP-NW-9.1, *Collection of Surface Water Samples*. Surface water flow measurements were collected according to the methods presented in SOP-NW-9.2a, *Surface Water Flow Measurements Using Man-Made Portable Devices or Estimation Techniques*. Both of these SOPs are included in the *2009/2010 Surface Water SAP*.

Groundwater samples were collected using the protocols outlined in the *2009 Groundwater SAP* and the SOP-NW-5.3, *Collection Groundwater Quality Samples* and the SOP *Low Stress Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells*. Both of these SOPs are included in the *2009 Groundwater SAP*.

Summaries of groundwater and surface water COPC exceedances based on the appropriate regulatory standards for the 2012 program are provided in sections 3.3 and 3.4.

Surface Water - The 2012 surface water monitoring program mimicked the 2009/2010 program described above in Section 2.1 with the following differences:

- Headwater streams, seeps, and springs (Surface Expressions of Groundwater [SEGW]) were included in the 2012 surface water monitoring program. Sample locations characterized as SEGW locations originally were included as groundwater locations in the *2010 Groundwater Memo*. Because the sampling methodologies for the SEGW locations are very similar to the surface water locations, all SEGW locations from the *2010 Groundwater Memo* were included in the list of surface water stations.
- For the SEGW stations discussed in bullet #1 above, the primary difference in the analyte lists between the 2010 groundwater monitoring program and the 2012 surface water monitoring program was the analysis of total and dissolved cadmium and vanadium. In 2010, these SEGW stations were in the groundwater program and were sampled for total fraction for cadmium and vanadium. Groundwater samples typically are analyzed for total metals because the screening criteria (e.g., maximum contaminant levels [MCLs]) use total (unfiltered) metals analysis. However, for the 2012 samples collected from these locations (now in the surface water program) were analyzed for dissolved constituents. Surface water screening criteria are based on the dissolved fraction and as a result, it was necessary to analyze for dissolved cadmium and vanadium in 2012. Analyte tables from applicable 2010 and 2012 work plans are provided in Appendix B for comparison.
- Dissolved iron and chloride were removed from 2012 list of surface water analytes because sufficient data for these analytes existed to support geochemical characterization of water types without the collection of additional data for these two constituents. The 2012 surface water analyte list table, from the *2012 Surface Water and Groundwater Memo,* is provided in Appendix B.
- Select background stations (MST048, MST093, MST226, MST274, and MST275) were included in the 2012 surface water monitoring program. The data from these stations initially were evaluated as background locations as presented in the *Background Level Development Technical Memorandum* (MWH, 2013). Stations MST226, MST274, and MST275 later were removed from the list of background sampling locations following a field trip conducted on June 27, 2011 during which these locations were evaluated and later dropped as background stations.

Groundwater - The 2012 groundwater monitoring program mimicked the 2009/2010 program described above in Section 2.1 with the following exceptions:

- SEGW (i.e., headwater streams, seeps, and springs) were moved in 2012 from the groundwater program to the 2012 Surface Water Monitoring Program as discussed above.
- In 2010, groundwater collected from wells was analyzed following a primary, regular, or expanded list of analytes (see Table 2 of the *2010 Groundwater Memo*). With the exception of MMW037, installed in 2010, groundwater monitoring wells (2009 and older) and direct-push borehole wells were sampled for the primary analyte list in spring 2012, as they had been sampled and analyzed at least once for the expanded and regular list of analytes (see Sections 3.1 and 3.2 of the *2010 Groundwater Memo*). Please note MMW037, based on 2012 analytical results (i.e., detections below the regulatory standards) will be sampled for the primary list only during the 2013 sampling event.
- In addition in 2012, total manganese was added to the primary list, but was re-evaluated in 2013 based on the 2012 sampling results and has been included in the 2013 long-term monitoring program. However, analysis for total manganese will be re-evaluated based on future sampling results to determine if continued monitoring of total manganese is warranted.
- MMW024 and MMW026 at the Enoch Valley Mine were added back to the list of monitoring wells sampled as part of the *2010 Groundwater Memo*. MMW026 currently is proposed as a background well location and MMW024 is needed to monitor possible constituents in the Dinwoody Formation.
- Agricultural, domestic, and production wells that have been proposed as background wells were sampled once in the fall of 2012 (MAW001 - MAW007 and MDW001- MDW006). These wells were sampled for the regular analyte list. The P4 production well MPW019, also was sampled in spring 2012.

2.3 2010 Monitoring Well and Direct-Push Borehole Installation Program

This program consisted of two field activities, the direct-push groundwater sampling at Ballard and Henry Mines and the installation of a single monitoring well (i.e., MMW037) at a key location within the Dinwoody Formation at the Enoch Valley Mine.

For each of these programs, the data collected and any significant deviations from the planned work are described in this section. Evaluation of the data will be conducted in association with adjacent relevant data in the RI Reports for the individual Sites.

2.3.1 Direct-Push Groundwater Sampling

A total of 14 direct-push boreholes were advanced in the alluvial deposits underlying surface soils at the Ballard and Henry mines between August 17 and August 19, 2010 to collect shallow

groundwater. Groundwater in the areas covered by these direct-push boreholes had not been characterized to a level satisfactory for decision making as identified in *P4's RI/FS Work Plan*. Nine (9) of the direct-push boreholes, BH159-166 and BH172, were installed at Ballard Mine and five (5) direct-push boreholes, BH167-171, were installed at Henry Mine.

The boring locations are on the northwest and southwest corner of Ballard Mine, and at Henry Mine near the south Henry mine pit and waste rock dump MWD090. Because only small areas of the alluvial systems within Ballard and Henry Mines required further delineation, it was not necessary to install pre-packed or "microwells" which had been installed during previous P4 direct-push programs. The locations of these boreholes are shown on Figures 2-1 and 2-3.

The equipment used for the activity was a Geoprobe™ 6620DT operated by Earth Probe Environmental of Bountiful, Utah. Boreholes were cored and logged down to sample depth (between 10 and 30 feet below ground surface [ft bgs]) using the dual-tube sampling method (ASTM, 2005) where samples were extracted in an inner core tube while an outer tube was left in place. Groundwater samples then were collected by extracting the inner sampling tube and allowing the outer tube to fill with water. The groundwater samples were collected, almost immediately after exposing the groundwater bearing zone, using "one-time use" polyethylene tubing lowered into the hole and a peristaltic pump at the surface to lift the groundwater.

All of the groundwater samples were field filtered as the groundwater was extracted from the borehole using the peristaltic pump mentioned above and an in-line disposable 0.45 micron filter. The filter was placed on the pump discharge line, prior to filling the sample containers. The only exception to these procedures was at boring BH162 where a temporary well screen and riser were installed and left in the borehole overnight to allow for a sufficient water volume to collect in the temporary well. A groundwater sample then was collected the following day using the method described above. Of the 14 direct-push boreholes, four were dry (BH163, BH165, BH168, and BH170) and BH162 was slow to fill prior to sampling.

A field geologist prepared geologic and well completion logs, observed and documented the drilling, and collected groundwater samples and select soils from the saturated zone of each core sample, which then were stored in a secure location provided by P4. These soil samples were collected so that if hydraulic characteristics or grain size of the shallow aquifer in these locations were needed at a later date they can be evaluated.

After drilling and sampling were completed, each borehole was filled with granular bentonite to above the water table and the ground surface around each borehole was restored to grade.

Table A-1 in Appendix A presents the direct-push borehole drilling location details. The direct-push soil boring logs completed in the field also are located in Appendix A. A summary of the direct-push groundwater sampling results for each Site is provided in Section 3.5.1.

2.3.2 Monitoring Well Installation and Groundwater Sampling

One new monitoring well, MMW037, was installed at Enoch Valley Mine between September 15 and September 20, 2010. MMW037 was drilled adjacent to MMW036, which is installed in the basalt, to create a well pair for monitoring the vertical gradient in the aquifer. Drilling and installation of the new well was conducted by A.K. Drilling, Inc. using a dual-rotary drill rig. The locations of the existing MMW036 and new MMW037 are shown on Figure 2-2. A summary of MMW037 installation and sampling results is provided in Section 3.5.2.

2.3.2.1 Well Installation and Development Procedures

A MWH field geologist supervised the drilling operations and prepared drilling logs noting lithology, sampling interval, and other pertinent information. Chip samples were collected approximately every five feet and stored in chip boxes. Large chip collections of approximately one pound were collected at first groundwater and every ten feet thereafter until the bottom of the boring was reached. These large samples were archived for possible future testing. The groundwater monitoring well installed during this investigation was constructed according to the Idaho Department of Water Resources (IDWR) guidelines and as described below.

A field geologist monitored all well installation procedures performed by the drilling company and recorded dates and times of the drilling events (e.g., first indication of groundwater, changes in rock type). Monitoring well MMW037 was installed by drilling an 8-inch diameter borehole while advancing temporary 8-inch steel surface or conductor casing to a depth of 15.5 ft bgs. As the borehole was advanced beyond the bottom of the conductor casing and towards the target depth, the rock type being drilled through was logged and the water bearing intervals were identified. The well was screened in the targeted Dinwoody Formation at a depth of 302-292 ft bgs, and completed using 4-inch diameter, flush-threaded PVC casing that extends to approximately four feet above the ground surface. Centralizers were placed at 302 and 289 ft bgs. Schedule 40 PVC was used for the 0.010 machine-slotted well screen and riser pipe. Carmeuse™ 20/40 silica sand and Cetco ® Puregold Medium bentonite chips were added to the annular space as needed to properly complete the well. A twenty foot section of 8-inch-diameter steel casing was left in the ground, with approximately four and a half feet remaining above ground as a protective monument. Table A-2 in Appendix A presents well construction details. The drilling log, development log, and well completion diagram also are in Appendix A.

Well MMW037 was developed on September 23, 2010 by A.K. Drilling, Inc. with oversight provided by AMEC. Because the final depth of MMW037 was too deep to allow use of manually deployed equipment, the well was developed using air lift methods with a tremmie pipe following the standard development procedures.

2.3.3 Work Plan Deviations

Deviations from the *Direct-Push SAP* that occurred during the 2010 field program are discussed below. These deviations were due to equipment availability or schedule limitations. None of the deviations are believed to have any effect on data quality or the project objectives.

2.3.3.1 In-House Well Development and Sampling

MWH did not oversee the development or initial sampling of MMW037, which was completed by A.K. Drilling, Inc. with oversight provided by AMEC and Monsanto Personnel on September 23, 2010. Because of scheduling, Monsanto had the development oversight completed by Monsanto Personnel and AMEC, who were on-site for other drilling activities. The development and sampling were completed using the standard sampling and development procedures.

2.3.3.2 Hydraulic Conductivity Testing

The hydraulic conductivity testing for MMW037 was not completed because of personnel and equipment availability. This testing will be conducted before the Enoch Valley RI Report is completed.

2.4 2010 Riparian Soil / Sediment / Surface Water Investigation

Stream sediment, pond sediment, riparian soil, and steam and pond surface water samples were collected at 22 unique sampling locations. Not all sample media (i.e. riparian soil, stream and pond sediment, and stream and pond surface water) were collected at each location. The rationale for samples type and number that were collected at each location is discussed in Section 3.1 of the *Riparian FSP* and Table 2-2 of the *Riparian SAP*. This program, the data collected from it, and any significant deviations from the planned work are described below. A summary of sampling locations, media collected, and number of samples collected at each location is provided in Table 2-1, *2010 Riparian Soil, Sediment and Surface Water Sample Count Summary*. A summary of riparian surface water sampling exceedances of COPC screening levels are provided in Section 3.6.

2.4.1 Riparian Soil Sampling

Thirty five (35) riparian soil samples were collected within and adjacent to the Ballard, Enoch Valley, and Henry mines between September 28 and October 6, 2010 (see Table 2-1). The following riparian soil samples were collected:

- Fifteen (15) samples were collected along seven stream locations at Ballard Mine (MST066, MST067, MST089, MST092, MST095, MST272, and MST273).
- Two samples were collected along one stream channel at Enoch Valley Mine (MST131).
- Two samples were collected along one stream channel at Henry Mine (MST053).
- Sixteen (16) samples were collected along four stream locations at select background areas (MST093, MST274, MST275, and MST277).

Riparian soils are defined as sediments deposited within the riparian zone (interface between the adjacent land surface and the stream) and are often deposited during higher water/flood conditions in the spring of the year. Where sediment samples were collected (detailed in Section 2.4.2), riparian soil samples also were collected from each stream bank. The locations of these riparian soil samples are shown on Figures 2-1 (Ballard), 2-2 (Enoch Valley), and 2-3 (Henry).

The riparian soil samples were collected from each bank (e.g., the depositional bank and the erosional bank) regardless of whether the defined stream channel was greater than or less than 5 feet in width. A composite sample from each bank was collected perpendicular to the channel along a minimum 2-foot span beginning at the bank and continuing at 1-foot intervals until three sample increments had been collected for compositing. Each sample increment was collected from 0–6 inches below ground surface. If there was an obvious bench at a stream sample location; the three individual samples for compositing were spaced evenly across the bench.

Individual riparian grab samples (for the three part composite sample) were collected by carefully removing the top layer of soil to the desired sample depth (i.e., six inches) using a decontaminated stainless steel spoon. Compositing of the three riparian soil grab samples was similar to the sediment samples as described below in Section 2.4.2. Larger debris were removed from each sample that was collected prior to mixing. The composite riparian soil was mixed in a decontaminated stainless steel bowl, and then placed in a heavy duty, 1-gallon Ziploc® storage bag. Soil samples were collected using the protocols outlined in SOP-NW-7.2, *Collection of Soil Samples*. This SOP is located in Appendix A of the *Riparian FSP*.

The MWH field team collected the samples, decontaminated sampling equipment, labeled all samples and corresponding paper work, and prepared sample containers and coolers as outlined in Section 3.0 and 4.0 of the *Riparian FSP*.

A summary of the 2010 riparian soil sampling results, by Site, is provided in Section 3.6.

2.4.2 Stream and Pond Sediment Sampling

Fifty-six (56) sediment samples were collected within and adjacent to the Ballard, Enoch Valley, and Henry mines between September 28 and October 6, 2010 (see Table 2-1). The following sediment samples were collected:

- Eight samples were collected from seven stream stations at or near Ballard Mine (MST066, MST067, MST089, MST092, MST095, MST272, and MST273).
- Twenty-five (25) samples were collected from one stream channel and six pond locations at or near Enoch Valley Mine (MST131, MSP017, MSP018, MSP020, MSP021 MSP023, and MSP031).
- Fifteen (15) samples were collected from one stream channel and three pond locations at or near Henry Mine (MST053, MSP014, MSP015, and MSP016).
- Eight samples were collected along four stream channels at select background areas (MST093, MST274, MST275, and MST277).

Sediment samples were collected within stream channels or pond locations and their results will be used during the RI report to evaluate nature and extent of COPCs, and for the ecological and

human health risk assessments at each Site. The locations of these stream and pond sediment samples are shown on Figures 2-1 (Ballard), 2-2 (Enoch Valley), and 2-3 (Henry).

The stream sediment and pond sediment sampling procedures vary from each other and the descriptions of how these samples types were collected during the 2010 field investigation are detailed below.

- **Stream Sediment**: Three-point composite sediment samples were collected at the specified stream monitoring stations listed on Table 2-1. Samples of sediment were collected along transects located perpendicular to the stream channel and individual grab samples that were used for compositing were collected from 0-4 inches below the surface of the sediment. One three-point composite sediment sample was collected per transect in headwater locations, where the stream channel is narrow (less than 5 feet wide) and the riparian zone is marginal to non-existent. However, in downstream locations, where a defined stream channel greater than 5 feet wide and riparian corridor exists along the stream, two composite sediment samples were collected per transect, depending on the physical conditions at each location.

  The three sediment samples for compositing were collected approximately from the mid-point of the narrow channels (i.e., less than 5 feet wide). Where the channels were wider than five feet, the channel was divided in half, and two composite sediment samples were collected from each half of the stream channel. These samples were collected by grabbing three equally spaced samples from the stream bottom in each stream segment for compositing. The three sample increments were collected using a decontaminated stainless steel spoon. To help prevent bags from ripping, large debris were removed and shaken lightly to dislodge sediment that had adhered to the surface of the debris, and then discarded before the remaining sediment was placed into the decontaminated stainless steel bowl for mixing.

  After mixing, each composite sediment sample was placed in a heavy duty, 1-gallon Ziploc® storage bag. These composite samples were double-bagged to prevent leakage and excess air was purged from the bags to prevent bursting during transport. Sediment samples were labeled and handled following the sample handling protocols described in Section 4.0 of the *Riparian FSP*. The protocols were outlined in the SOP-NW-9.3, *Collection of Sediment Samples* and as described above. This SOP is located in Appendix A of the *Riparian FSP*.

- **Pond Sediment**: Pond sediment samples were collected at the specified pond monitoring stations listed on Table 2-1. At each sediment sample location, sediment was collected from the top approximately four inches of the sediment column. Three to five composite sediment samples were collected at each pond location depending on the size of the pond as described below.

  - ✓ Ponds <0.5 acres – 3 sediment samples were collected
  - ✓ Ponds between 0.5 and 3 acres – 4 sediment samples were collected

- ✓ Ponds > 3 acres – 5 sediment samples were collected

The ponds were accessed by wading and sampled using a Widco® 2424 Hand Corer sampling apparatus. Pond inlets, areas adjoining mine waste dumps, etc. were targeted for the initial sample in each pond, in an attempt to collect sediment from the most impacted portion of the selected ponds. The other sediment samples were distributed at approximately equal intervals across the pond. The approximately top four inches of each sample was removed from the corer and placed in a decontaminated stainless steel bowl. Each pond sediment sample was a composite of three increments, if possible (e.g., three discrete grab samples). The larger debris were removed from each sample that was collected and were shaken lightly to dislodge adhered sediments (that have adhered to the surface of the debris) into the bowl, and then discarded before the sediment was composited using a decontaminated stainless steel spoon. Once compositing was complete, the sediment was placed into heavy duty, 1-gallon Ziploc® storage bags. These samples were double bagged to prevent leakage and excess air was purged from the bags to prevent bursting during transport. Samples were labeled and handled following the sample handling protocols described in the Section 4.0 of the *Riparian FSP*. Sediment samples were collected using the protocols for collection of sediments in ponds as outlined in SOP-NW-9.3, *Collection of Sediment Samples* and as described above. This SOP is located in Appendix A of the *Riparian FSP*.

In addition, the MWH field team decontaminated sampling equipment, labeled all samples and corresponding paper work, prepared sample containers and coolers for shipment, and shipped these stream and pond sediment samples as outlined in the Sections 3.0 and 4.0 of the *Riparian FSP*.

A summary of the 2010 stream and pond sediment sampling results, by Site, is provided in Section 3.6.

2.4.3 Stream and Pond Surface Water Sampling

Sixteen (16) surface water samples were collected within and adjacent to the Ballard, Enoch Valley, and Henry mines between September 28 and October 6, 2010 (see Table 2-1). The following surface water samples were collected:

- Two samples were collected from one stream location at Ballard Mine - MST066. Six proposed stream water sample locations were dry (MST067, MST089, MST092, MST095, MST272, and MST273).
- Six samples were collected from one stream and four pond locations in Enoch Valley Mine (MST131, MSP017, MSP018, MSP020, and MSP021). Two proposed pond sample locations were dry (MSP023 and MSP031).
- Four samples were collected from one stream and three pond locations at Henry Mine (MST053, MSP014, MSP015, and MSP016). No proposed sample locations were dry.

- Four samples were collected from two stream locations at select background areas (MST274 and MST275). Two proposed stream sample locations were dry (MST093 and MST277).

The main objective of the stream and pond surface water sampling was to collect a representative water sample at the time the associated sediment sample was collected as described in Section 2.4.2. The pond sampling also targeted those water bodies that support aquatic habitat based on the 2004 Interagency Surface Water Inspection at mine sites (also known as, a functional use survey; IDEQ, 2004) or have the potential for use as a source of water by livestock and may be impacted by surface water runoff from P4 Site operations. The locations of these surface water samples are shown on Figures 2-1 (Ballard), 2-2 (Enoch Valley), and 2-3 (Henry).

One surface water sample was collected from each pond, if water was present, (co-located with one of the sediment locations) and if flowing water was present, a surface water sample was collected from each stream location. Surface water samples were collected using the protocols outlined in the SOP-NW-9.1, *Collection of Surface Water Samples*. Surface water flow measurements were collected according to the methods presented in SOP-NW-9.2a, *Surface Water Flow Measurements Using Man-Made Portable Devices or Estimation Techniques*. Both of these SOPs are included in the *2009/2010 Surface Water SAP*.

In addition, the MWH field team decontaminated sampling equipment, labeled all stream and pond samples and corresponding paper work, and prepared sample containers and coolers as outlined in the Sections 3.0 and 4.0 of the *Riparian FSP*.

A summary of the 2010 stream and pond surface water sampling results, by Site, is provided in Section 3.6.

2.4.4 Work Plan Deviations

There were no deviations from the *Riparian FSP* that occurred during the 2010 field program.

3.0 SUMMARY OF 2010 AND 2012 ANALYTICAL RESULTS BY MINE SITE

This section presents the exceedances of appropriate COPC screening levels in the results from analyses of surface water, groundwater, soil, and sediment samples collected during the 2010 and 2012 field activities. A comprehensive discussion of screening level development is found in Section 3.2 and Table 3-1 of the *RI/FS Work Plan*. A detailed evaluation of these data is reserved for the individual Site RI Reports and is not provided herein. Comprehensive results for all 2010 and 2012 COPCs data are provided in Appendices B through D.

3.1 Revised Screening Levels

Screening levels presented in Table 3-1 of *P4's RI/FS Work Plan* were revised for use in this DSR and the forthcoming RI Reports based on changes in these levels noted since that work plan was submitted. The procedures utilized for development of screening levels in the *P4's RI/FS Work Plan* also were used for the revision process (i.e. for each primary medium, preliminary screening levels are a combination of the most conservative of promulgated standards used in human and ecological risk assessment, as well as study-specific background values). These screening levels then are used to evaluate the concentration of each constituent in each medium presented in the following sections. The screening levels presented in Table 3-1, *Revised July 2013 Screening Level Summary by Media*, that have changed are bolded.

Conservative levels of both human health and ecological standards are used in the screening of these medium-specific data. For example, the cadmium standard for human health in surface water is the EPA Regional Screening standard of 0.018 milligram per liter (mg/L), but in Table 3-1 below the ecological standard of 0.0006 mg/L (State of Idaho Surface Water for Aquatic Life Chronic Criteria) is used for surface water screening because it is more conservative.

Note that these screening levels are used to indicate elevated constituents. However, these elevated constituents will be evaluated in the exposure scenarios presented in the human health and ecological risk assessments (HHERA) for each mine. These HHERA will more clearly convey the risks posed by individual constituents and combined constituent exposures.

3.2 Third Party Data Validation

Third party data validation was performed on all laboratory analyses from the 2010 and 2012 field programs. Data validation is the process of evaluating the quality control (QC) parameters against the criteria established in the QAPP and qualifying those data points where the QC criteria is outside the established criteria. Level III data validation evaluates the following QC parameters:

- QAPP compliance
- Sample preservation and extraction and analytical holding times

- Method, trip, diffusion bag, and equipment rinseate blank sample results
- Reporting limits (RLs)
- Field duplicate sample results
- Tune standard results
- Initial calibration (ICAL), initial calibration verification (ICV), and continuing calibration verification standards (CVS) results
- Surrogate spike recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) sample results
- Laboratory control sample (LCS) and laboratory control duplicate (LCD) results
- Internal standard (IS) results.

In addition to the Level III data validation process, Level IV validation was conducted for 10 percent of the data in accordance with the QAPP. In addition to the QC parameters reviewed during the Level III validation process, the following data review was conducted as part of the Level IV validation: Review of raw data from the instrument (i.e. chromatograms, quantitation reports, spectra)

- Back check of all calculations
- Review of sample preparation and analytical logs.

A qualitative assessment also was conducted to evaluate whether the validated data were of sufficient quality to support the project objective (i.e., end use). The validation is summarized in the reports from Laboratory Data Consultants (LDC) which are included as Appendix E.

3.3 Groundwater Sampling – 2010 and 2012 Analytical Results

Tables 3-2 (Ballard), 3-3 (Enoch Valley), 3-4 (Henry), and 3-5 (Background) present the exceedances of screening levels by mine Site in groundwater for the 2010 and 2012 events. The comprehensive results for all 2010 and 2012 groundwater constituents are provided in Appendix B

3.4 Surface Water Sampling – 2010 and 2012 Analytical Results

Tables 3-6 (Ballard), 3-7 (Enoch Valley), 3-8 (Henry) and 3-9 (Background) present the exceedances of screening levels, by mine Site, in surface water for the 2010 and 2012 events. The comprehensive results for all 2010 and 2012 surface water constituents are provided in Appendix B.

3.5 2010 Monitoring Well and Direct-Push Borehole Installation Analytical Results

3.5.1 Direct-Push Borehole Installation Results

There were no exceedances of screening levels for the borehole program. Table 3-10, *2010 Borehole Groundwater Dissolved Selenium*, presents the dissolved selenium results in groundwater, which was used as an indicator parameter for this program, by mine site for the 2010 direct-push borehole installation and sampling event. In addition, Figures 3-1 and 3-2 present the selenium concentrations as well as isocontours for the west side of Ballard Mine. Figure 3-3 presents the selenium concentrations for Henry Mine. An isocontour map was not developed for Henry Mine based on the limited data. The comprehensive results for all 2010 direct-push constituents are provided in Appendix C.

3.5.2 Monitoring Well MMW037 Installation Results

The boring of monitoring Well MMW037 was drilled to a depth of 302 ft bgs. The first 70 feet (ft) of the boring was drilled through alluvium consisting of primarily clayey gravels. From 70-263 ft bgs the boring was comprised of basalt with intermittent clay seams. The remaining 39 ft of drilling was in the Dinwoody Formation comprised of olive gray to brownish-gray siltstone and minor sandstone and limestone.

The well was completed on September 20, 2010. Groundwater flow was estimated at rate of 200 gallons per minute (gpm) during drilling with a static water level of 114.3 ft bgs. A 0.010 slotted, schedule 40 PVC, well screen was set at 292 to 302 ft bgs in the Dinwoody Formation. The 20X40 sand filter pack extends from 286 to 302 ft bgs and the bentonite chip seal from 286 to the surface. During the fall 2010 and spring 2012 sampling events, total selenium was detected at 0.00876 mg/L and 0.0188 mg/L respectively. The comprehensive results for all MMW037 constituents are provided in Appendix B.

3.6 2010 Riparian Soil / Sediment / Surface Water Investigation Analytical Results

Tables 3-11 (Ballard), 3-12 (Enoch Valley), 3-13 (Henry) and 3-14 (Background) present the exceedances of screening levels, by mine Site, in riparian soil for the 2010 riparian event. Tables 3-15 (Ballard), 3-16 (Enoch Valley), 3-17 (Henry) and 3-18 (Background) present the exceedances of screening levels, by mine Site, in riparian sediment for the 2010 riparian event. Tables 3-19 (Ballard), 3-20 (Enoch Valley), 3-21 (Henry) and 3-22 (Background) present the exceedances of screening levels, by mine Site, in riparian surface water for the 2010 riparian event. The comprehensive results for all 2010 Riparian soil, sediment, and surface water constituents are provided in Appendix D.

3.7 Conclusions

This DSR has presented data collected in 2010 and 2012 to address identified data gaps as well as general site characterization. The data and information presented in this DSR will eventually be

combined with other site characterization data to complete the evaluation of conceptual models, source areas, pathways, and receptors in the RI Reports.

4.0 REFERENCES

ASTM International (ASTM), 2005. *Standard Guide for Direct-push Sampling for Environmental Site Characterizations*. Designation: D 6282-98 (Re approved 2005), 18p.

IDEQ, 2004. *Memorandum for the Record - Interagency Non-Regulated Surface Water Inspection Results for P4 Production's Ballard, Henry and Enoch Valley Mine Sites.* From Rick Clegg, IDEQ, to Robert Geddes, P4, June 23, 2004, 14 p.

MWH, 2009a. *Final - 2009 and 2010 Surface Water Monitoring Sampling and Analysis Plan*. Revision 2, prepared for P4 Production L.L.C., May 2009.

MWH, 2009b. *Final - 2009 Groundwater Monitoring Sampling and Analysis Plan* . Revision 3, prepared for P4 Production L.L.C., August 2009.

MWH, 2010a. *Final - 2010 Groundwater Monitoring Memorandum.* Revision 2, prepared for P4 Production L.L.C., May 2010.

MWH, 2010b. *Final - 2010 Monitoring Well and Direct-Push Borehole Installation Program Sampling and Analysis Plan Addendum.* Revision 1, prepared for P4 Production L.L.C., July 2010.

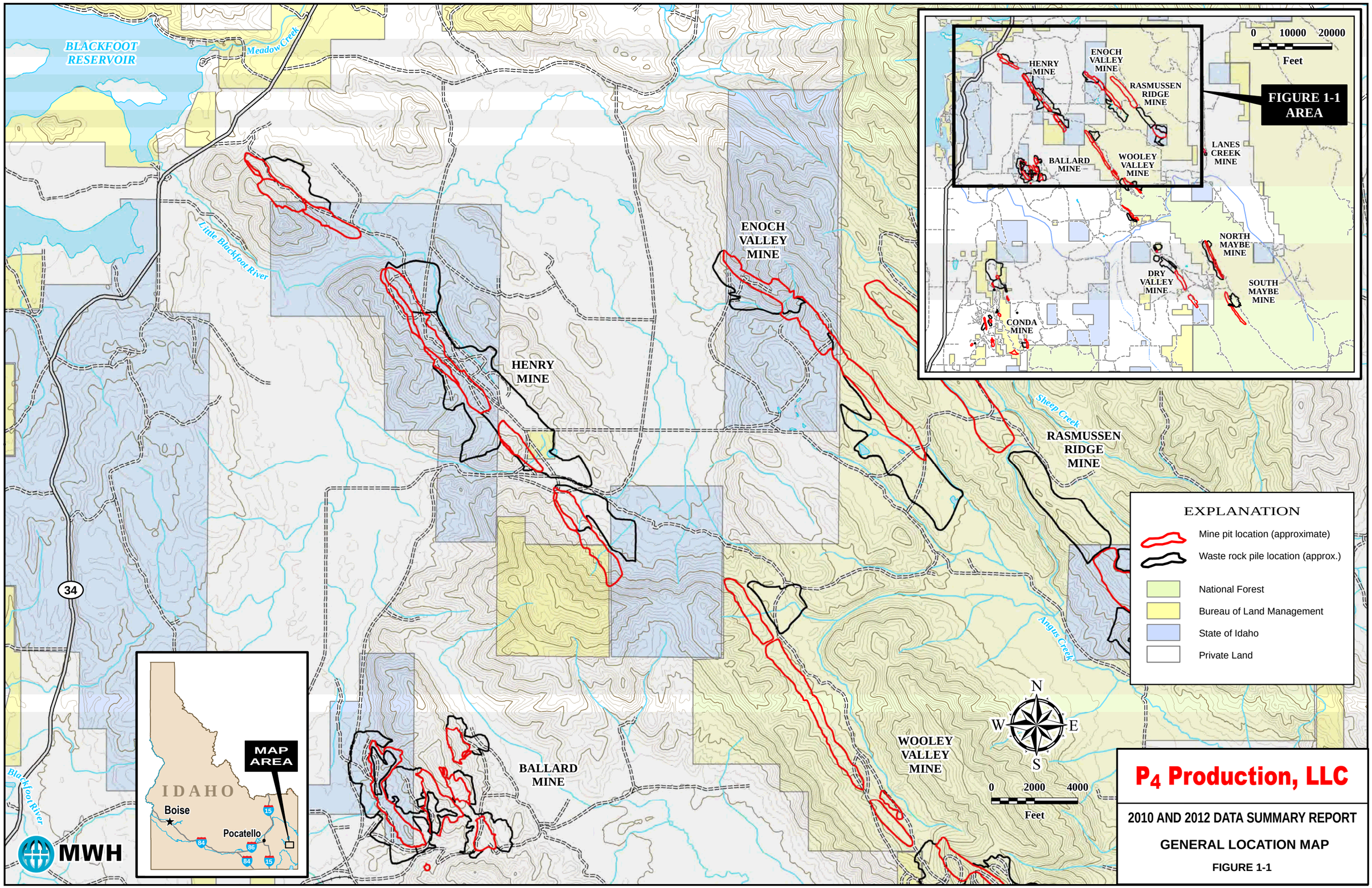
MWH, 2010c. *Final - 2010 Supplemental Sediment and Riparian Soil Sampling and Analysis Plan. Revision 1,* prepared for P4 Production L.L.C., September 2010.

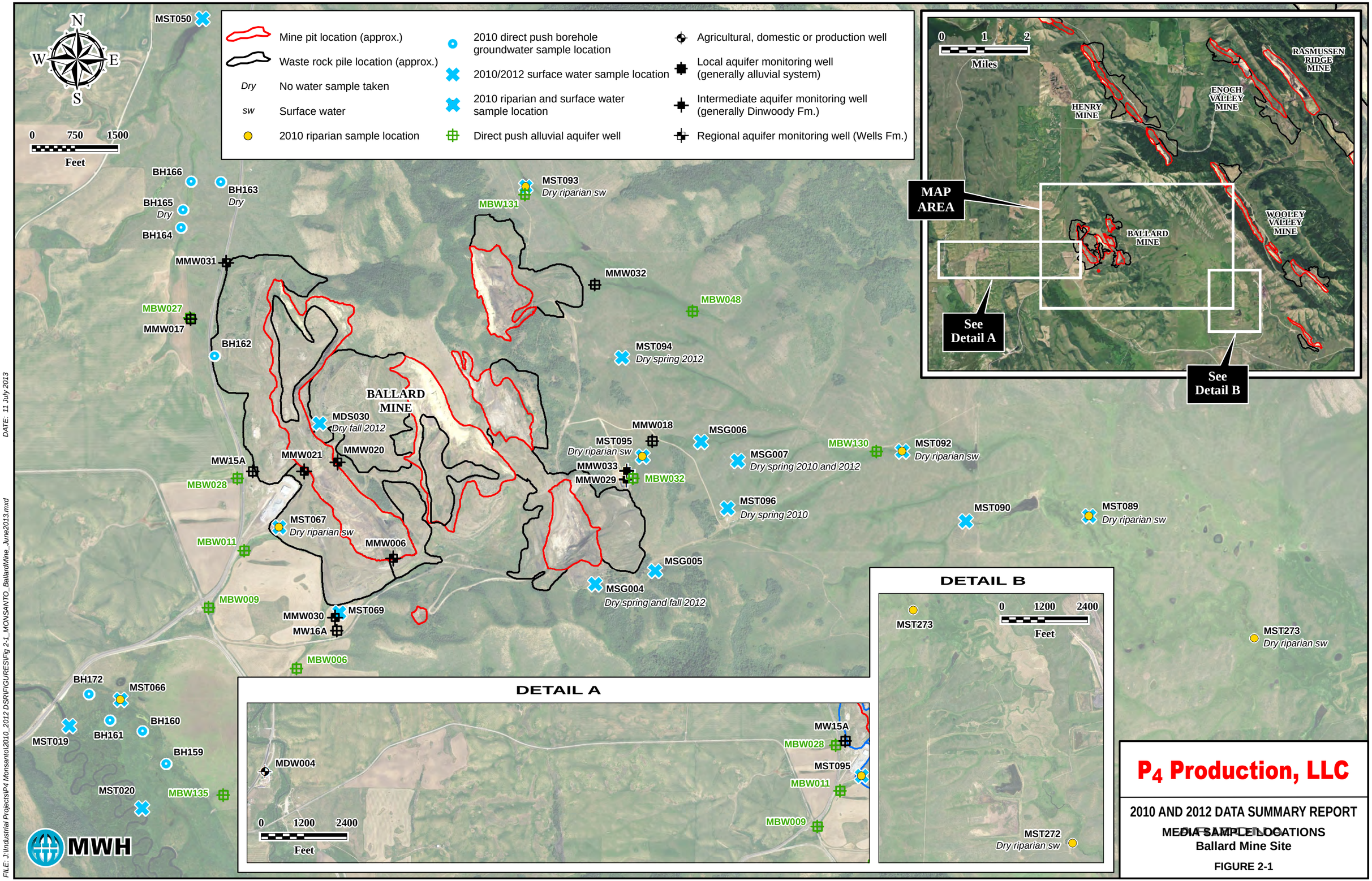
MWH, 2011. *Final - 2011 Remedial Investigation/Feasibility Study Work Plan for P4's Ballard, Henry and Enoch Valley Mines. Revision 2,* prepared for P4 Production L.L.C., May 2011.

MWH, 2012. *Final - 2012 Surface and Groundwater Monitoring Programs.* Revision 2, prepared for P4 Production L.L.C., May 2012.

MWH, 2013. 2013 *Background Technical Memorandum,* prepared for P4 Production L.L.C., March 2013.

FIGURES


BLACKFOOT RESERVOIR
Meadow Creek
Little Blackfoot River
ENOCH VALLEY MINE
HENRY MINE
RASMUSSEN RIDGE MINE
Sheep Creek
Angus Creek
BALLARD MINE
WOOLEY VALLEY MINE
34
Blackfoot River
MAP AREA
IDAHO
Boise
Pocatello
15
84
86
MWH
0 10000 20000
Feet
FIGURE 1-1 AREA
HENRY MINE
ENOCH VALLEY MINE
RASMUSSEN RIDGE MINE
LANES CREEK MINE
BALLARD MINE
WOOLEY VALLEY MINE
NORTH MAYBE MINE
DRY VALLEY MINE
SOUTH MAYBE MINE
CONDA MINE
EXPLANATION
Mine pit location (approximate)
Waste rock pile location (approx.)
National Forest
Bureau of Land Management
State of Idaho
Private Land
N
W
E
S
0 2000 4000
Feet
P4 Production, LLC
2010 AND 2012 DATA SUMMARY REPORT
GENERAL LOCATION MAP
FIGURE 1-1
12 July 2013
FILE J:\Industrial Projects\P4 Monsanto\2010_2012 DSR\Draft\FIGURES\Fig 1-1_MONSANTO_General Location Map_June2013.mxd

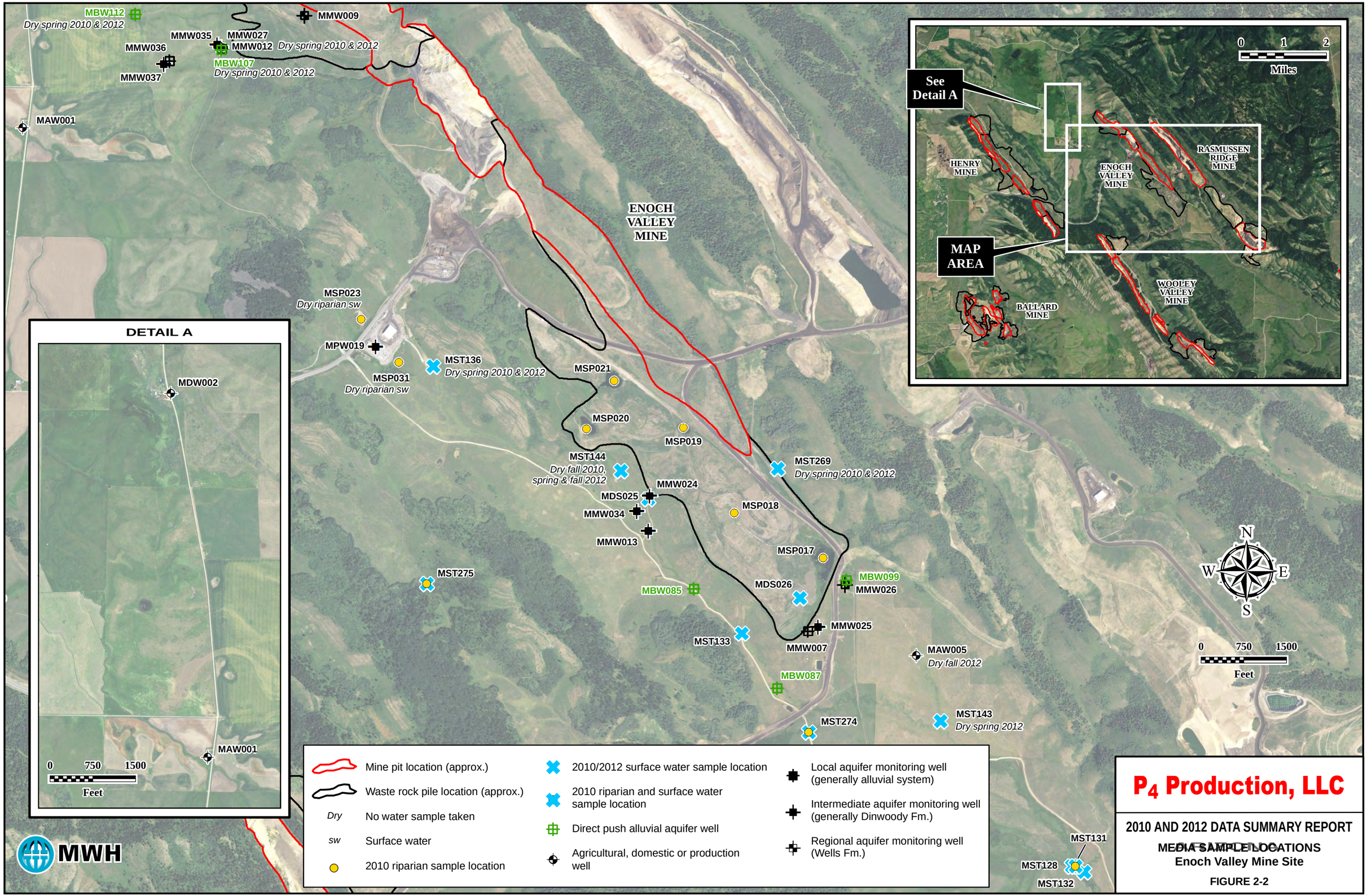


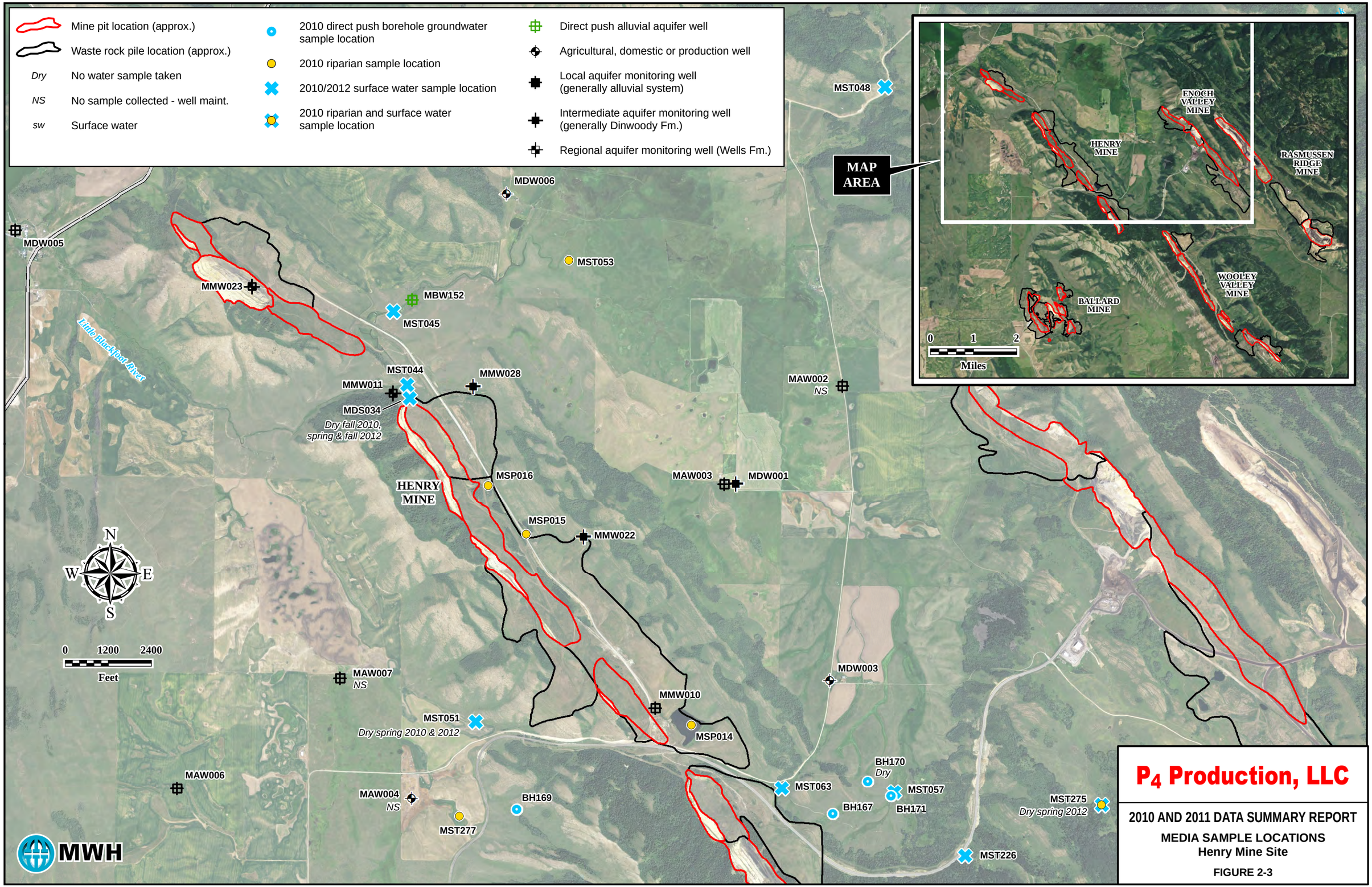
P_4 Production, LLC

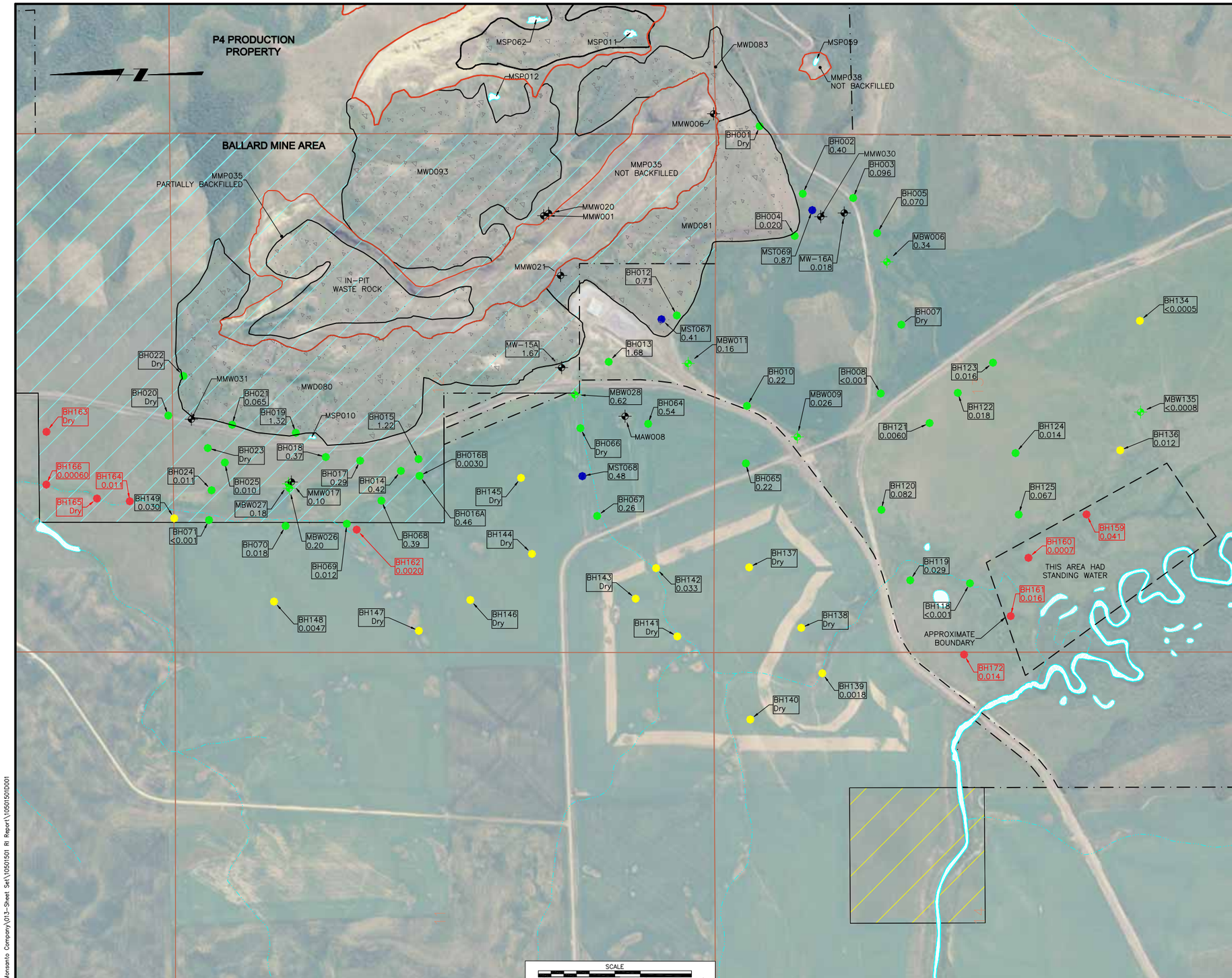
2010 AND 2012 DATA SUMMARY REPORT

MEDIA SAMPLE LOCATIONS
Ballard Mine Site

FIGURE 2-1


MBW112
Dry spring 2010 & 2012
MMW009
MMW035
MMW027
MMW036
MMW012
Dry spring 2010 & 2012
MBW107
Dry spring 2010 & 2012
MMW037
MAW001
ENOCH VALLEY MINE
MSP023
Dry riparian sw
MPW019
MST136
Dry spring 2010 & 2012
MSP031
Dry riparian sw
MSP021
MSP020
MSP019
MST144
Dry fall 2010, spring & fall 2012
MST269
Dry spring 2010 & 2012
MMW024
MDS025
MSP018
MMW034
MMW013
MSP017
MST275
MBW085
MDS026
MBW099
MMW026
MMW025
MST133
MMW007
MAW005
Dry fall 2012
MBW087
MST143
Dry spring 2012
MST274
MST131
MST128
MST132
DETAIL A
MDW002
MAW001
0 750 1500
Feet
See Detail A
MAP AREA
HENRY MINE
ENOCH VALLEY MINE
RASMUSSEN RIDGE MINE
BALLARD MINE
WOOLEY VALLEY MINE
0 1 2
Miles
N
W
E
S
0 750 1500
Feet
Mine pit location (approx.)
Waste rock pile location (approx.)
Dry No water sample taken
sw Surface water
2010 riparian sample location
2010/2012 surface water sample location
2010 riparian and surface water sample location
Direct push alluvial aquifer well
Agricultural, domestic or production well
Local aquifer monitoring well (generally alluvial system)
Intermediate aquifer monitoring well (generally Dinwoody Fm.)
Regional aquifer monitoring well (Wells Fm.)
MWH
P4 Production, LLC
2010 AND 2012 DATA SUMMARY REPORT
MEDIA SAMPLE LOCATIONS
Enoch Valley Mine Site
FIGURE 2-2
DATE: 11 July 2013
FILE: J:\Industrial Projects\P4 Monsanto\2010_2012 DSR\FIGURES\Fig 2-2_MONSANTO_EnochValleyMine_June2013.mxd


Mine pit location (approx.)
Waste rock pile location (approx.)
Dry No water sample taken
NS No sample collected - well maint.
sw Surface water
2010 direct push borehole groundwater sample location
2010 riparian sample location
2010/2012 surface water sample location
2010 riparian and surface water sample location
Direct push alluvial aquifer well
Agricultural, domestic or production well
Local aquifer monitoring well (generally alluvial system)
Intermediate aquifer monitoring well (generally Dinwoody Fm.)
Regional aquifer monitoring well (Wells Fm.)
MAP AREA
ENOCH VALLEY MINE
HENRY MINE
RASMUSSEN RIDGE MINE
WOOLEY VALLEY MINE
BALLARD MINE
0 1 2
Miles
MST048
MDW006
MDW005
MST053
MMW023
MBW152
MST045
Little Blackfoot River
MST044
MMW028
MMW011
MDS034
Dry fall 2010, spring & fall 2012
MAW002
NS
HENRY MINE
MSP016
MAW003
MDW001
MSP015
MMW022
N
W
E
S
0 1200 2400
Feet
MAW007
NS
MDW003
MMW010
MST051
Dry spring 2010 & 2012
MSP014
BH170
Dry
MAW006
MAW004
NS
BH169
MST063
MST057
BH167
BH171
MST275
Dry spring 2012
MST277
MST226
MWH
P4 Production, LLC
2010 AND 2011 DATA SUMMARY REPORT
MEDIA SAMPLE LOCATIONS
Henry Mine Site
FIGURE 2-3
DATE: 11 July 2013
FILE: J:\Industrial Projects\P4 Monsanto\2010_2012 DSR\FIGURES\Fig 2-3_MONSANTO_HenryMine_June2013.mxd



LEGEND:

- MINE PIT LOCATION (APPROXIMATE WHERE COVERED BY BACKFILL)
- WASTE ROCK DUMP LOCATION (APPROXIMATE)
- WASTE ROCK DUMP LOCATION OR PIT BACKFILL (APPROXIMATE)
- POND OR LAKE
- P4 PRODUCTION PROPERTY BOUNDARY (APPROXIMATE)
- SECTION LINES
- 8 SECTION NUMBER
- BLM LANDS
- US NATIONAL FORESTS
- STATE LANDS
- NON FEDERAL LANDS

STATION TYPE:

- MSG = SPRING STATION
- MST = STREAM STATION
- MMW = GROUND WATER MONITORING WELL
- MAW = AGRICULTURAL WELL
- MBW = DIRECT PUSH MONITORING WELL
- BH = 2008 DIRECT PUSH BOREHOLE
- BH = 2009 DIRECT PUSH BOREHOLE
- BH = 2010 DIRECT PUSH BOREHOLE

KEY:

MMP = MINE PIT
MWD = WASTE ROCK DUMP
MSP = POND

BH043 0.01 — 2008 AND 2009 DIRECT PUSH BOREHOLE ID AND DISSOLVED SELENIUM CONCENTRATION

BH164 0.011 — 2010 DIRECT PUSH BOREHOLE ID AND DISSOLVED SELENIUM CONCENTRATION

<0.001 — CONCENTRATION LESS THAN THE METHOD DETECTION LIMIT

NOTES:

1. DIRECT PUSH RESULTS ARE FOR GRAB GROUNDWATER SAMPLES AND ARE DISSOLVED CONCENTRATIONS OF SELENIUM IN MG/L.
2. SPRING 2008 TOTAL SELENIUM CONCENTRATIONS ARE USED FOR MONITORING WELLS, SPRINGS AND HEADWATER STREAMS WHERE APPROPRIATE.
3. BEDROCK WELLS ARE SHOWN FOR REFERENCE. SELENIUM CONCENTRATIONS ARE NOT SHOWN FOR THESE WELLS.

ISSUE REV	DESCRIPTION	TECH	ENG	DATE
A	DRAFT	CHF	LWM	05/29/13

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DRAWING REFERENCE(S):
1. POST-MINE TOPOGRAPHY GENERATED FROM:
- USGS DIGITAL ELEVATION MODELS (DEM)-24K.
- SURVEY DATA FOR BALLARD MINE PROVIDED BY OLYMPUS AERIAL SURVEYS, INC. DATED: JUNE 2005.
- SURVEY DATA FOR HENRY MINE AREA PROVIDED BY OLYMPUS AERIAL SURVEYS, INC. DATED: NOVEMBER 2008.
- SURVEY DATA FOR ENOCH VALLEY MINE AREA PROVIDED BY P4 PRODUCTION DATED: DECEMBER 2007.
- US CENSUS BUREAU 2007 TIGER LINE DATA

PROJECTION: STATE PLANE COORDINATE SYSTEM
ZONE: IDAHO EAST
HORIZONTAL DATUM: NAD27
VERTICAL DATUM: NGVD29
UNITS: U.S. FEET

DESIGNED BY	C FOULK	05/29/13
DRAWN BY	C FOWLER	05/29/13
CHECKED BY	C FOULK	05/29/13
APPROVED BY	C FOULK	05/29/13
PROJECT MANAGER		
CLIENT APPROVAL		
CLIENT REFERENCE NO.		

P4 Production, LLC

PROJECT LOCATION: BALLARD, HENRY AND ENOCH VALLEY MINES
PROJECT: 2010 AND 2012 DATA SUMMARY REPORT
TITLE: BALLARD MINE AREA WEST DIRECT PUSH BOREHOLE LOCATIONS

MWH

FIGURE: 3 -1
REVISION: A
FILE NAME: 10501501D001

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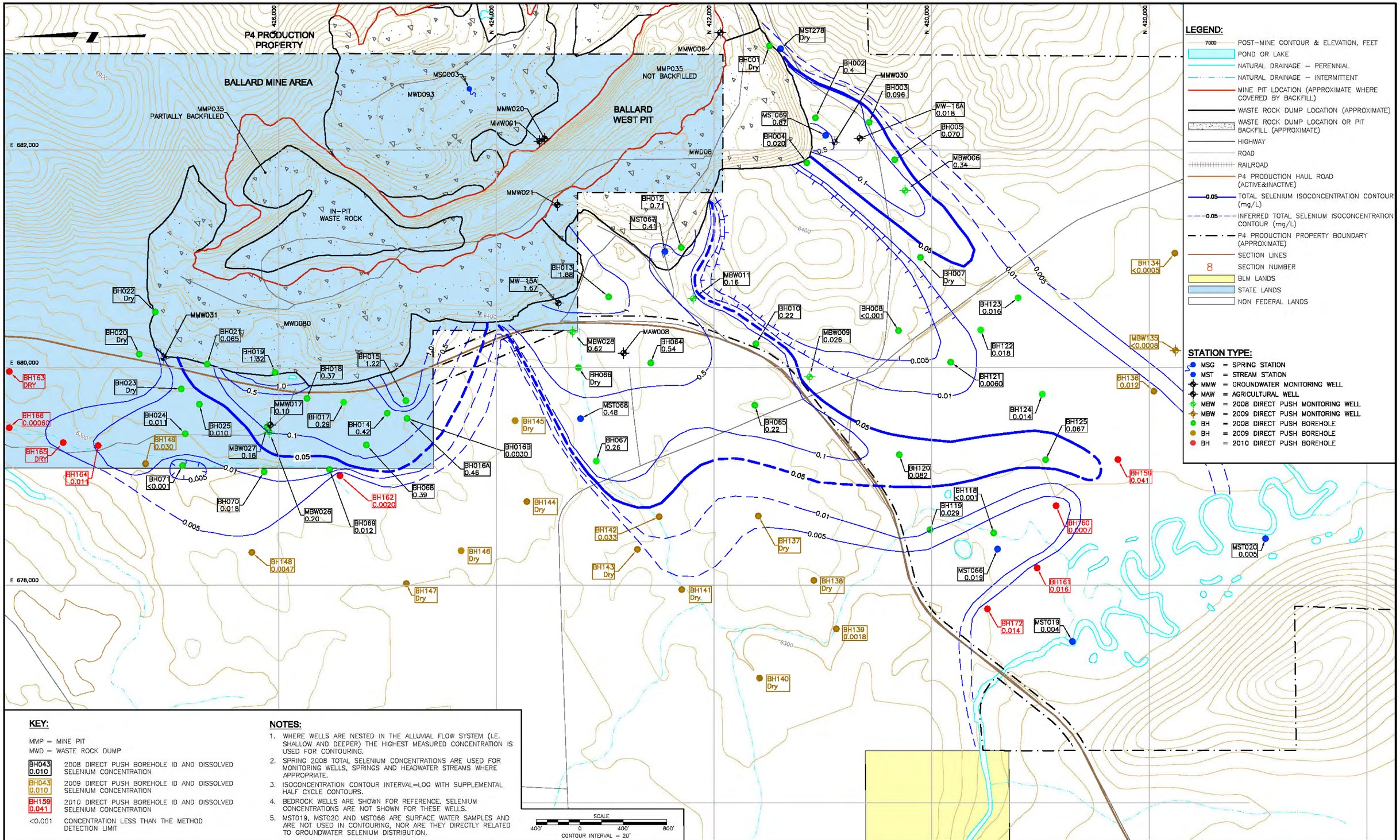

KEY:

MMP = MINE PIT
MWD = WASTE ROCK DUMP

BH043 0.010	2008 DIRECT PUSH BOREHOLE ID AND DISSOLVED SELENIUM CONCENTRATION
BH043 0.010	2009 DIRECT PUSH BOREHOLE ID AND DISSOLVED SELENIUM CONCENTRATION
BH159 0.041	2010 DIRECT PUSH BOREHOLE ID AND DISSOLVED SELENIUM CONCENTRATION
<0.001	CONCENTRATION LESS THAN THE METHOD DETECTION LIMIT

NOTES:

1. WHERE WELLS ARE NESTED IN THE ALLUVIAL FLOW SYSTEM (I.E. SHALLOW AND DEEPER) THE HIGHEST MEASURED CONCENTRATION IS USED FOR CONTOURING.
2. SPRING 2008 TOTAL SELENIUM CONCENTRATIONS ARE USED FOR MONITORING WELLS, SPRINGS AND HEADWATER STREAMS WHERE APPROPRIATE.
3. ISOCONCENTRATION CONTOUR INTERVAL=LOG WITH SUPPLEMENTAL HALF CYCLE CONTOURS.
4. BEDROCK WELLS ARE SHOWN FOR REFERENCE. SELENIUM CONCENTRATIONS ARE NOT SHOWN FOR THESE WELLS.
5. MST019, MST020 AND MST066 ARE SURFACE WATER SAMPLES AND ARE NOT USED IN CONTOURING, NOR ARE THEY DIRECTLY RELATED TO GROUNDWATER SELENIUM DISTRIBUTION.

REV	DESCRIPTION	TECH	ENG	DATE
A	DRAFT	CHF	LWM	05/29/13

DISCLAIMER: THIS DRAWING WAS DEVELOPED THROUGH THE APPLICATION OF PROFESSIONAL ENGINEERING SKILL AND PROPRIETARY METHODOLOGIES, PROCESSES AND KNOW HOW OF MWH AS AUTHOR ALL PURSUANT TO THE TERMS OF A CONTRACTUAL SCOPE OF WORK GOVERNING ITS PREPARATION. THIS DRAWING MAY NOT BE USED OR MODIFIED OTHER THAN IN STRICT ACCORDANCE WITH THE TERMS OF THE GOVERNING CONTRACT AND SCOPE OF WORK OR OTHERWISE ABSENT THE INVOLVEMENT AND CONSENT OF THE AUTHOR. ANY ALTERATION OR ADAPTATION OF THIS DRAWING SHALL BE CONSISTENT WITH THE AUTHOR'S CONTRACTUAL AND PROPRIETARY RIGHTS AND BE AT USER'S SOLE RISK AND WITHOUT ANY LIABILITY OR LEGAL RESPONSIBILITY OF MWH.

DRAWING REFERENCE(S):
1. POST-MINE TOPOGRAPHY GENERATED FROM:
- USGS DIGITAL ELEVATION MODELS (DEM)–24K.
- SURVEY DATA FOR BALLARD MINE PROVIDED BY OLYMPUS AERIAL SURVEYS, INC. DATED: JUNE 2005.
- SURVEY DATA FOR HENRY MINE AREA PROVIDED BY OLYMPUS AERIAL SURVEYS, INC. DATED: NOVEMBER 2008.
- SURVEY DATA FOR ENOCH VALLEY MINE AREA PROVIDED BY P4 PRODUCTION DATED: DECEMBER 2007.
- US CENSUS BUREAU 2007 TIGER LINE DATA

PROJECTION: STATE PLANE COORDINATE SYSTEM
ZONE: IDAHO EAST
HORIZONTAL DATUM: NAD27
VERTICAL DATUM: NGVD29
UNITS: U.S. FEET

DESIGNED BY	C FOULK	05/29/13
DRAWN BY	C FOWLER	05/29/13
CHECKED BY	C FOULK	05/29/13
APPROVED BY	C FOULK	05/29/13
PROJECT MANAGER		
CLIENT APPROVAL		
CLIENT REFERENCE NO.		

P4 Production, LLC

PROJECT LOCATION: BALLARD, HENRY AND ENOCH VALLEY MINES
PROJECT: 2010 AND 2012 DATA SUMMARY REPORT
TITLE: BALLARD MINE AREA WEST DIRECT PUSH SELENIUM ISOCONTOUR MAP

MWH

FIGURE 2 | REVISION A
FILE NAME 10501501D003

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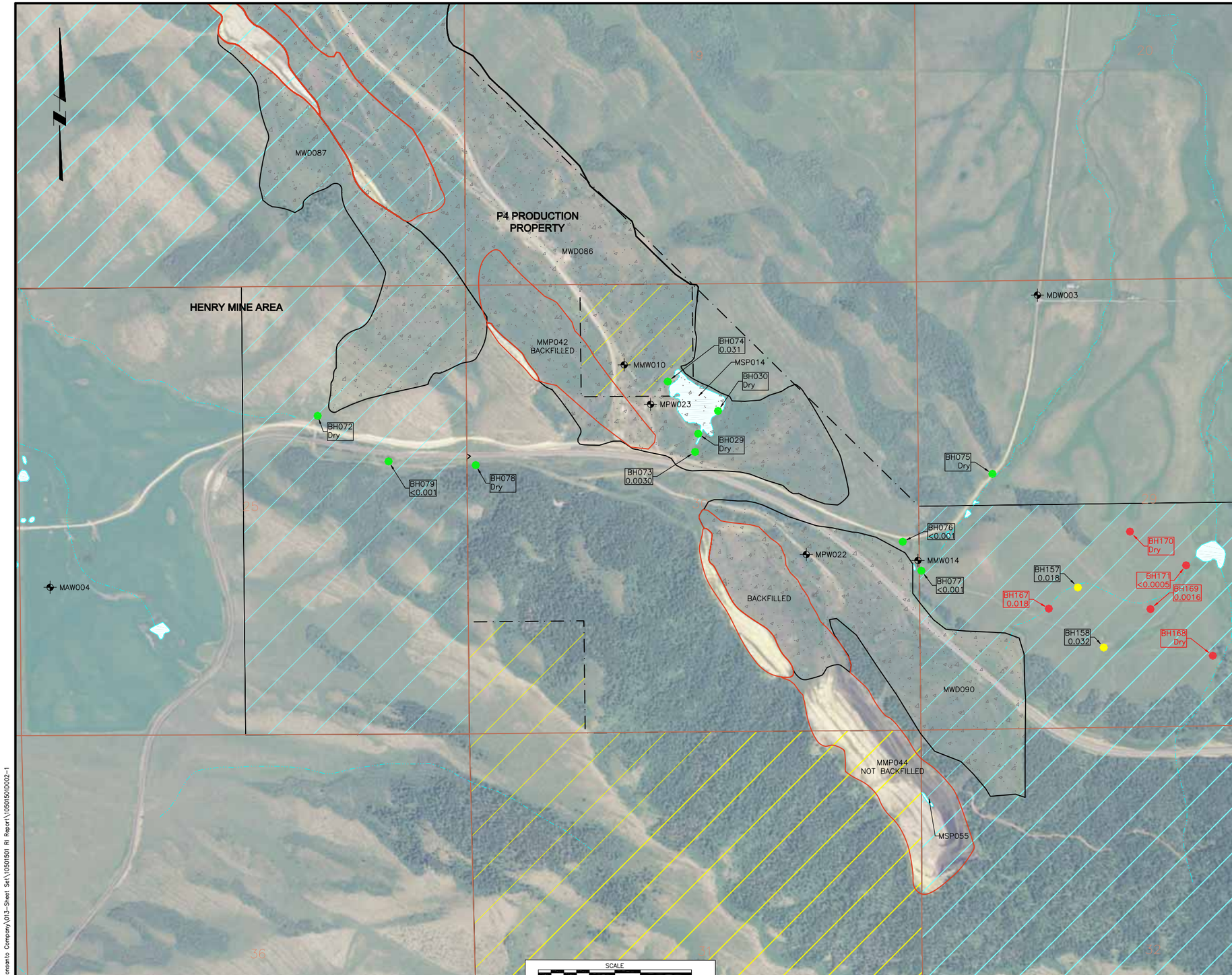

LEGEND:

- MINE PIT LOCATION (APPROXIMATE WHERE COVERED BY BACKFILL)
- WASTE ROCK DUMP LOCATION (APPROXIMATE)
- WASTE ROCK DUMP LOCATION OR PIT BACKFILL (APPROXIMATE)
- POND OR LAKE
- P4 PRODUCTION PROPERTY BOUNDARY (APPROXIMATE)
- SECTION LINES
- 8 SECTION NUMBER
- BLM LANDS
- US NATIONAL FORESTS
- STATE LANDS
- NON FEDERAL LANDS

STATION TYPE:

- MSG = SPRING STATION
- MST = STREAM STATION
- MMW = GROUND WATER MONITORING WELL
- MAW = AGRICULTURAL WELL
- MBW = DIRECT PUSH MONITORING WELL
- BH = 2008 DIRECT PUSH BOREHOLE
- BH = 2009 DIRECT PUSH BOREHOLE
- BH = 2010 DIRECT PUSH BOREHOLE

KEY:

MMP = MINE PIT
MWD = WASTE ROCK DUMP
MSP = POND

BH043 0.01	2008 AND 2009 DIRECT PUSH BOREHOLE ID AND DISSOLVED SELENIUM CONCENTRATION
BH164 0.011	2010 DIRECT PUSH BOREHOLE ID AND DISSOLVED SELENIUM CONCENTRATION
<0.001	CONCENTRATION LESS THAN THE METHOD DETECTION LIMIT

NOTES:

1. DIRECT PUSH RESULTS ARE FOR GRAB GROUNDWATER SAMPLES AND ARE DISSOLVED CONCENTRATIONS OF SELENIUM IN MG/L.
2. SPRING 2008 TOTAL SELENIUM CONCENTRATIONS ARE USED FOR MONITORING WELLS, SPRINGS AND HEADWATER STREAMS WHERE APPROPRIATE.
3. BEDROCK WELLS ARE SHOWN FOR REFERENCE. SELENIUM CONCENTRATIONS ARE NOT SHOWN FOR THESE WELLS.

ISSUE REV	DESCRIPTION	TECH	ENG	DATE
A	DRAFT	CHF	LWM	05/29/13

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DRAWING REFERENCE(S):
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- SURVEY DATA FOR ENOCH VALLEY MINE AREA PROVIDED BY P4 PRODUCTION DATED: DECEMBER 2007.
- US CENSUS BUREAU 2007 TIGER LINE DATA

PROJECTION: STATE PLANE COORDINATE SYSTEM
ZONE: IDAHO EAST
HORIZONTAL DATUM: NAD27
VERTICAL DATUM: NGVD29
UNITS: U.S. FEET

DESIGNED BY	C FOULK	05/29/13
DRAWN BY	C FOWLER	05/29/13
CHECKED BY	C FOULK	05/29/13
APPROVED BY	C FOULK	05/29/13
PROJECT MANAGER		
CLIENT APPROVAL		
CLIENT REFERENCE NO.		

P4 Production, LLC

PROJECT LOCATION: BALLARD, HENRY AND ENOCH VALLEY MINES
PROJECT: 2010 AND 2012 DATA SUMMARY REPORT
TITLE: HENRY MINE AREA SOUTH DIRECT PUSH BOREHOLE LOCATIONS

MWH

FIGURE: 3 - 3
REVISION: A
FILE NAME: 10501501D002-1

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TABLES

TABLE 1-1
DATA GAP ACTION SUMMARY
(Page 1 of 1)

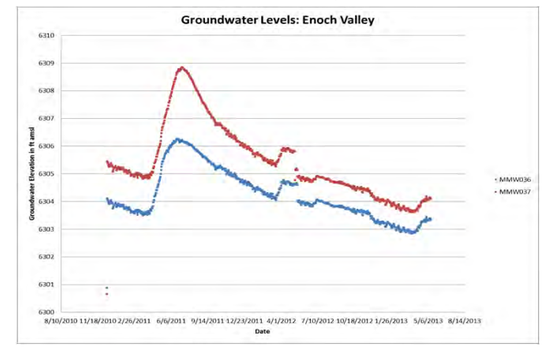
Mine Area	Data Gap	Proposed Action to Address Data Gap	Action(s) Completed	Completed Action(s) Results
Ballard – Southwest Corner Mine Area	Extent of the plume has been defined in this area except at the downgradient-most end adjacent to the Blackfoot River channel in the shallow alluvial groundwater system.	Direct-push program utilized to characterize extent of alluvial impacts.	4 direct-push borings were advanced, 4 direct-push groundwater samples collected.	There were no exceedences of groundwater screening levels in direct push boreholes (BH159, -160, -161-, and -172) located in the southwest corner of Ballard Mine. Dissolved selenium concentrations from samples collected in 2010 were as follows: 0.0409 mg/L (BH159), 0.000676 J mg/L (BH160), 0.0164 mg/L (BH161), and 0.0144 mg/L (BH172). These sample results helped to better define the 0.005 mg/l and 0.05 mg/l selinium isocontors to the southwest. These samples close the data gaps addressed, for the extent of the alluvial impact, in this area.
Ballard – Northwest Corner Mine Area	The shallow alluvial groundwater data gap exists at the downgradient end of the area where the groundwater flow system appears to flow northward toward the Little Blackfoot River.	Direct-push program utilized to characterize extent of alluvial impacts.	5 direct-push borings were advanced, 3 direct-push groundwater samples were collected, and 2 locations were dry.	There were no exceedences of groundwater screening levels in direct push boreholes (BH162 [.00195 mg/L], and -166 [.0006 mg/L]) located outside of the northwest corner of the Ballard Mine 0.005mg/L selinium isocontour. However, BH164 dissolved selinium concentration of 0.011 mg/L is above the groundwater screening level. This data point helped to better define the 0.01 mg/L selinium isocontour in the northwest corner of Ballard Mine. These samples close the data gaps addressed, for the extent of the alluvial impact, in this area .
Henry Mine – Northeast of the Southern portion of Henry Mine	The shallow alluvial flow system data gap exists in the northeast area of waste rock dump MWD090. In this area there is the potential for impacts from another off-site mine not owned by P4. Follow-up characterization of a broad enough area is needed to determine whether COPC impacted water in this area originates from the Site or from the off-site mine.	Direct-push program utilized to characterize extent of alluvial impacts.	5 direct-push borings were advanced, 3 direct-push groundwater samples were collected, and 2 locations were dry.	There were no exceedences of groundwater screening levels in direct push boreholes (BH167, -169, and -171) located to the northeast of MDW090. Dissolved selenium concentrations from samples collected in 2010 were as follows: 0.018 mg/L (BH167), 0.0016 mg/L (BH169), and <0.001 mg/L (BH171). Results for BH167 are equal to or less than the 2008 and 2009 directpush results of BH157 (0.018 mg/L) and BH 158 (0.032 mg/L), both of which are located downgradient of BH167 and MDW090. These directpush results do not suggest there is a groundwater plume above regulatory screening levels in this area, regardless of whether or not impacted water originates from the Site or off-Site Mines. These samples close the data gaps addressed, for the extent of the alluvial impact, in this area.
Enoch Valley Mine – Northwest Area	It is unknown if an upward gradient between the Dinwoody Formation and the basalt exists, which is a data gap in the intermediate groundwater flow system.	Deeper Dinwoody Formation well installed near MMW036 through the basalt unit.	Monitoring well MMW037 was installed.	Plotted transducer data of MMW036 and MMW037, from 12/13/2010 through 5/14/2013, illustrate that MMW037 consistently has a higher head then MMW036 and that there is an upward gradient. These data confirm the conceptual model that an upward gradient exists between the Dinwoody Fomation and basalt unit. The installation of MMW037 closes the data gap of an unknown upward gradient between the Dinwood Formation and the basalt in the intermediate groundwater flow system. 
Ballard, Henry and Enoch Valley Mines	A limited data gap has been identified in sediment and riparian soils due to inadequate coverage of COPCs in sediments when compared to source area soils at all Sites. Some COPCs in source-area soil exceed screening criteria and these COPCs have not been characterized in sediment.	Sediment and riparian soil sampling is proposed to fill these data gaps based on lack of specific metals data. In addition, where possible, a surface water sample will be collected at each sediment location that has representative water at the time of sampling.	Riparian soil, sediment, and surface water samples were collected at 22 unique locations. Not all sample types were collected at each location. Sample collection includes: · 35 riparian soil samples at 13 locations · 56 sediment samples at 22 locations · 16 surface water samples at 12 locations.	The riparian, sediment, and surface water samples were collected for the same suite of COPCs. These COPCs were also collected for the 2009 upland soil and vegetation sampling. With this expanded analyte list in both sediment and riparian soils downstream of the dumps, this data gap has been fulfilled.

TABLE 2-1
2010 RIPARIAN SOIL, SEDIMENT AND SURFACE WATER SAMPLE COUNT SUMMARY
(Page 1 of 2)

			Ballard			Enoch Valley			Henry			Background		
			Riparian Soil	Stream and Pond Sediment	Stream and Pond Surface Water	Riparian Soil	Stream and Pond Sediment	Stream and Pond Surface Water	Riparian Soil	Stream and Pond Sediment	Stream and Pond Surface Water	Riparian Soil	Stream and Pond Sediment	Stream and Pond Surface Water
Sample ID	**Feature**	**Sampling Station**												
MSP014	Ponds	Henry Mine Henry Pond (5.8 acres)	--	--	--	--	--	--	NA	5	1	--	--	--
MSP015	Ponds	Henry Mine Henry Pond (1.28 acres)	--	--	--	--	--	--	NA	4	1	--	--	--
MSP016	Ponds	Henry Mine Center Henry Pond (0.71 acres)	--	--	--	--	--	--	NA	4	1	--	--	--
MSP017	Ponds	Enoch Valley Mine South Pond (2.69 acres)	--	--	--	NA	4	1	--	--	--	--	--	--
MSP018	Ponds	Enoch Valley Mine Keyhole Pond (<0.10 acres)	--	--	--	NA	3	1	--	--	--	--	--	--
MSP020	Ponds	Enoch Valley Mine (3.99 acres)	--	--	--	NA	5	1	--	--	--	--	--	--
MSP021	Ponds	Enoch Valley Mine Stock Pond (1.62 acres)	--	--	--	NA	4	2	--	--	--	--	--	--
MSP023	Ponds	Enoch Valley Mine (0.64 acres)	--	--	--	NA	4	Dry	--	--	--	--	--	--
MSP031	Ponds	Enoch Valley Mine Shop Pond (0.3 acres)	--	--	--	NA	3	Dry	--	--	--	--	--	--
MST053	Lone Pine Creek	Above Little Blackfoot River	--	--	--	--	--	--	2	2	1	--	--	--
MST066	Ephemeral tributary to Blackfoot River	Above Blackfoot River	3	2	2	--	--	--	--	--	--	--	--	--

TABLE 2-1
2010 RIPARIAN SOIL, SEDIMENT AND SURFACE WATER SAMPLE COUNT SUMMARY
(Page 2 of 2)

			Ballard			Enoch Valley			Henry			Background		
			Riparian Soil	Stream and Pond Sediment	Stream and Pond Surface Water	Riparian Soil	Stream and Pond Sediment	Stream and Pond Surface Water	Riparian Soil	Stream and Pond Sediment	Stream and Pond Surface Water	Riparian Soil	Stream and Pond Sediment	Stream and Pond Surface Water
Sample ID	**Feature**	**Sampling Station**												
MST067	Ephemeral tributary to Blackfoot River	Below Ballard Mine	2	1	Dry	--	--	--	--	--	--	--	--	--
MST089	Wooley Valley Creek	Below North Fork Wooley Valley Creek	2	1	Dry	--	--	--	--	--	--	--	--	--
MST092	Wooley Valley Creek	Above North Fork Wooley Valley Creek	2	1	Dry	--	--	--	--	--	--	--	--	--
MST093	Headwater of Wooley Valley Creek	Above Ballard Mine	--	--	--	--	--	--	--	--	--	4	2	Dry
MST095	Ephemeral trib. to Wooley Valley Creek	Below Ballard Mine	2	1	Dry	--	--	--	--	--	--	--	--	--
MST131	Rasmussen Creek	Above Angus Creek	--	--	--	2	2	1	--	--	--	--	--	--
MST272	Wooley Valley Creek	Above Loadout Creek at Road	2	1	Dry	--	--	--	--	--	--	--	--	--
MST273	Wooley Valley Creek	Above Ponding and Below MST089	2	1	Dry	--	--	--	--	--	--	--	--	--
MST274	Tributary to Rasmussen Creek	Above Rasmussen Creek	--	--	--	--	--	--	--	--	--	4	2	2
MST275	Tributary to Lone Pine Creek	Northeast and above East Fork Lone Pine Creek	--	--	--	--	--	--	--	--	--	4	2	2
MST277	Spring-fed tributary above Long Valley Creek	Northwest of the Henry Mine above Long Valley Creek	--	--	--	--	--	--	--	--	--	4	2	Dry

-- Sample ID not within Mine Site
NA = sample media not required for Sample ID

TABLE 3-1
REVISED JULY 2013
SCREENING LEVEL SUMMARY BY MEDIA
(Page 1 of 1)

Analyte	Soil Screening Value (mg/kg)	Vegetation Screening Value [b] (mg/kg)	Surface Water Screening Value (mg/l)	Sediment Screening Value (mg/kg)	Groundwater Screening Value (mg/l)
Aluminum	77000[a]	1,000	0.087[c]	**25,500[d]**	0.2[e]
Antimony	**0.27[m]**	--	**0.0056[f]**	**2.0[g]**	0.006[e]
Arsenic	0.39[a]	30	**0.01[f]**	**9.8[g]**	0.01[h]
Barium	15000[a]	--	**0.004[i]**	--	2[e]
Beryllium	160[a]	--	0.00066[i]	--	0.004[e]
Boron	**0.5[m]**	150	0.0016[i]	--	7.3[j]
Cadmium	**0.36[m]**	10	0.0006[f]	**0.99[g]**	0.005[e]
Chloride	--	--	--	--	250[e]
Chromium	**0.4[m]**	100	**0.000031[j]**	**43[g]**	0.1[e]
Cobalt	**13[m]**	25	**0.0047[j]**	50[g]	0.011[j]
Copper	**28[m]**	40	0.011[f]	**32[g]**	1.3[e]
Fluoride	--	--	--	--	4[e]
Iron	55000[a]	500	0.16[k]	**20,000[g]**	0.3[e]
Lead	400[a]	100	0.0025[f]	35.8[g]	0.015[e]
Manganese	**220[m]**	2,000	**0.05[c]**	460[g]	0.05[e]
Mercury	**0.1[m]**	--	0.00077[c]	**0.18[g]**	0.002[e]
Molybdenum	**2[m]**	5	**0.078[j]**	--	0.18[j]
Nickel	**38[m]**	100	0.052[f]	**23[g]**	0.73[j]
Nitrate	130000[a]	--	--	--	10[e]
Nitrite	7800[a]	--	--	--	1[e]
Selenium	**0.52[m]**	5	0.005[f]	**2.0[g]**	0.05[e]
Silver	**4.2[m]**	--	**0.0034[f]**	**1.0[g]**	0.1[e]
Sulfate	--	--	--	--	250[e]
TDS	--	--	--	--	500[e]
Thallium	**0.78**	--	**0.00024[f]**	--	0.002[e]
Uranium	**5[m]**	--	**0.0026[l]**	--	0.03[h]
Vanadium	**2[m]**	50	0.02[l]	**--**	0.26[j]
Zinc	**46[m]**	500	0.12[f]	**121[g]**	5[e]
pH	--	--	--	--	6.5-8.5[e]

Notes:
Bold indicates a screening value that was revised in 2013
mg/kg milligram per kilogram
mg/l milligram per liter

[a] USEPA Regional Screening Levels for Soil, Residential, Source: ORNL December 2009

http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm

[b] Mineral tolerance of animals, second revised edition, 2005 National Research Council, published by the National Academics
[c] National Recommended Water Quality Criteria (USEPA, 2009); Freshwater Standards for Chronic Criteria (CCC)
[d] The ARCS TEL for freshwater sediment in NOAA SQuiRT (Buchman, 2008)
[e] State of Idaho Ground Water Quality Rule (IDAPA 58.01.11). Note that secondary MCLs are listed for pH, aluminum,
[f] State of Idaho Surface Water Quality for Aquatic Life (IDAPA 58.01.02); Chronic Criteria (CCC) or Water & Organisms
[g]USEPA Region 3 BTAG freshwater sediment screening benchmarks(USEPA, 2012)
[h] USEPA primary and secondary Maximum Contaminant Level (MCL), National Primary Drinking Water Regulations, EPA.
[I] Chronic freshwater screening value in NOAA SQuiRT (Buchman, 2008)
[j] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Site
[k] Lowest Chronic Value (LCV) observed in freshwater daphnids. Source: ORNL, 1996a.
[l] Tier II Secondary Chronic Value. Source: ORNL, 1996.
[m]Sources of soil-based benchmarks for evaluating potential effects of COPECs on lower trophic-level organisms include:
1. USEPA Eco-SSLs (USEPA, various dates).
2. ORNL (ORNL, 1996a, 1996b, 1997a, 1997b, 1997c).
3. Environmental Residue Effects Database (ERED) (USACE, 2010).
4. USEPA Ecotox Database.
5. Aquatox.

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS
(Page 1 of 13)

	Location Identification	**MBW006**		**MBW006**		**MBW009**		**MBW009**	
	Well Type	**BW**		**BW**		**BW**		**BW**	
	Sample Type	**Normal**		**Normal**		**Normal**		**Normal**	
	Date Collected	**5/21/2010**		**5/15/2012**		**5/20/2010**		**5/15/2012**	
Analyte/Methods (Units)	**Screening Limits**								
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--
Cadmium	0.005	<0.0003	<0.0003	--	<0.0012 D	<0.0003	<0.0003	--	**0.000715 F,D**
Manganese	0.05	--	--	--	**0.0474 J+**	--	--	--	**0.371 J+**
Selenium	0.05	**0.243**	**0.328**	--	**0.456 D**	**0.00571**	**0.00495**	--	**0.00231 D**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**311**	--	**341 D**	--	**441**	--	**392 D**	--
Total dissolved solids (Residue, filterable)	500	--	**676**	--	**756**	--	**962**	--	**852**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
	Highlight indicates exceedance above screening value

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS
(Page 2 of 13)

	Location Identification	**MBW011**		**MBW011**		**MBW027**		**MBW027**	
	Well Type	**BW**		**BW**		**BW**		**BW**	
	Sample Type	**Normal**		**Normal**		**Normal**		**Normal**	
	Date Collected	**5/18/2010**		**5/15/2012**		**5/21/2010**		**5/13/2012**	
Analyte/Methods (Units)	**Screening Limits**								
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--
Cadmium	0.005	<0.0003	--	--	<0.0012 D	<0.0003	**0.000344 J**	--	<0.0012 D
Manganese	0.05	--	--	--	**0.0361 J+**	--	--	--	<0.004 D
Selenium	0.05	**0.459**	--	--	**0.474 D**	**0.198**	**0.198**	--	**0.36 D**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**157**	--	**175 D**	--	**322**	--	**282 J+**	--
Total dissolved solids (Residue, filterable)	500	--	**456**	--	**504**	--	**830**	--	**666**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
	Highlight indicates exceedance above screening value

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limits	MBW028		MBW028		MBW032		MBW032 Dup	
Location Identification		MBW028		MBW028		MBW032		MBW032 Dup	
Well Type		BW		BW		BW		BW	
Sample Type		Normal		Normal		Normal		Field Duplicate	
Date Collected		5/19/2010		5/13/2012		5/20/2010		5/20/2010	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--		--	--	--	--	--
Arsenic	0.01	--	--		--	--	--	--	--
Barium	2	--	--		--	--	--	--	--
Cadmium	0.005	**0.000513 J**	**0.000475 J**		<0.0012 D	**0.000899**	**0.00106**	<0.015	**0.00205**
Manganese	0.05	--	--		**0.0579 D**	--	--	--	--
Selenium	0.05	**0.891**	**0.888**		**0.916 D**	**0.756**	**0.723**	**0.776**	**0.634**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**499**	--	**549 J+**		**1110**	--	**1130**	--
Total dissolved solids (Residue, filterable)	500	--	**1040**		**998**	--	**2030**	--	**2000**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limits	MBW032		MBW032 Dup		MBW048		MBW048	
Location Identification		MBW032		MBW032 Dup		MBW048		MBW048	
Well Type		BW		BW		BW		BW	
Sample Type		Normal		Field Duplicate		Normal		Normal	
Date Collected		5/14/2012		5/14/2012		5/20/2010		5/14/2012	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--
Cadmium	0.005	--	**0.00108 F,D**	--	**0.000971 F,D**	<0.0003	<0.0003	--	<0.0012 D
Manganese	0.05	--	**0.00977 J+**	--	**0.00699 J+**	--	--	--	**0.362 J+**
Selenium	0.05	--	**1.01 D**	--	**1.01 D**	<0.0005	**0.000534 J**	--	<0.002 D
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**1280 D**	--	**1090 D**	--	**6.09**	--	**4.77**	--
Total dissolved solids (Residue, filterable)	500	--	**2010**	--	**2130**	--	**108**	--	**106**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
	Highlight indicates exceedance above screening value

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limits	MBW130		MBW130		MBW131		MBW131	
Location Identification		MBW130		MBW130		MBW131		MBW131	
Well Type		BW		BW		BW		BW	
Sample Type		Normal		Normal		Normal		Normal	
Date Collected		5/18/2010		5/15/2012		5/20/2010		5/15/2012	
Metals (mg/l)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Aluminum	0.2	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--
Cadmium	0.005	--	<0.0003	--	<0.0012 D	<0.0003	<0.0003	--	<0.0012 D
Manganese	0.05	--	--	--	**0.054 J+**	--	--	--	<0.004 D
Selenium	0.05	--	**0.000654 J**	--	**0.00127 F,D**	**0.00311**	**0.00299**	--	**0.00456 D**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**10.1**	--	**11.9**	--	**5.21**	--	**3.63**	--
Total dissolved solids (Residue, filterable)	500	--	**148**	--	**180**	--	**82**	--	**86**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
	Highlight indicates exceedance above screening value

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

	Location Identification	**MBW135**		**MBW135**		**MMW006**		**MMW006**	
	Well Type	**BW**		**BW**		**MW**		**MW**	
	Sample Type	**Normal**		**Normal**		**Normal**		**Normal**	
	Date Collected	**5/21/2010**		**5/14/2012**		**5/17/2010**		**5/10/2012**	
Analyte/Methods (Units)	**Screening Limits**								
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--
Cadmium	0.005	<0.0003	<0.0003	--	<0.0012 D	--	<0.0003	--	<0.0012 D
Manganese	0.05	--	--	--	**0.323 D**	--	--	--	<0.004 D
Selenium	0.05	**0.00061 J**	**0.000656 J**	--	<0.002 D	--	**0.0744**	--	**0.101 D**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**42.7**	--	**42.1**	--	**65.8**	--	**77.3**	--
Total dissolved solids (Residue, filterable)	500	--	**256**	--	**258**	--	**330**	--	**310**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limits	MMW017		MMW017		MMW018		MMW018	
Location Identification		**MMW017**		**MMW017**		**MMW018**		**MMW018**	
Well Type		**MW**		**MW**		**MW**		**MW**	
Sample Type		**Normal**		**Normal**		**Normal**		**Normal**	
Date Collected		**5/16/2010**		**5/13/2012**		**5/15/2010**		**5/15/2012**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--
Cadmium	0.005	--	**0.000596 J**	--	<0.0012 D	--	<0.0003	--	<0.0012
Manganese	0.05	--	--	--	**0.00841 D**	--	--	--	**0.0783 J+**
Selenium	0.05	--	**0.108**	--	**0.321 D**	--	**0.0256**	--	**0.0369**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**481**	--	**483 J+**	--	**44.9**	--	**42.8**	--
Total dissolved solids (Residue, filterable)	500	--	**1090**	--	**864**	--	**248**	--	**266**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limits	MMW018 Dup		MMW020		MMW020		MMW021	
Location Identification		**MMW018 Dup**		**MMW020**		**MMW020**		**MMW021**	
Well Type		**MW**		**MW**		**MW**		**MW**	
Sample Type		**Field Duplicate**		**Normal**		**Normal**		**Normal**	
Date Collected		**5/15/2010**		**5/17/2010**		**5/10/2012**		**5/18/2010**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--
Cadmium	0.005	--	<0.0003	--	**0.0106**	--	**0.0112 D**	--	<0.0003
Manganese	0.05	--	--	--	--	--	<0.004 D	--	--
Selenium	0.05	--	**0.0262**	--	**0.0491**	--	**0.439 D**	--	**0.0485**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**44.5**	--	**139**	--	**229 D**	--	**48.1**	--
Total dissolved solids (Residue, filterable)	500	--	**302**	--	**346 J-,B**	--	**458**	--	**406**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
	Highlight indicates exceedance above screening value

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limits	MMW021		MMW029		MMW029		MMW029 Dup	
Location Identification		MMW021		MMW029		MMW029		MMW029 Dup	
Well Type		MW		MW		MW		MW	
Sample Type		Normal		Normal		Normal		Field Duplicate	
Date Collected		5/10/2012		5/15/2010		9/17/2010		9/17/2010	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--
Cadmium	0.005	--	<0.0012 D	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05	--	<0.004 D	--	--	--	--	--	--
Selenium	0.05	--	**0.0467 D**	--	**0.724**	--	**0.71**	--	**0.629**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**52.6**	--	**592**	--	**601**	--	**597**	--
Total dissolved solids (Residue, filterable)	500	--	**296**	--	**1300**	--	**1060**	--	**1190**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limits	MMW029		MMW030		MMW030		MMW031	
Location Identification		**MMW029**		**MMW030**		**MMW030**		**MMW031**	
Well Type		**MW**		**MW**		**MW**		**MW**	
Sample Type		**Normal**		**Normal**		**Normal**		**Normal**	
Date Collected		**5/15/2012**		**5/19/2010**		**5/15/2012**		**5/17/2010**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--
Cadmium	0.005	--	<0.0012	--	<0.0003	--	<0.0012	--	<0.0003
Manganese	0.05	--	<0.004	--	--	--	**0.0404 J+**	--	--
Selenium	0.05	--	**0.783**	--	<0.0005	--	<0.002	--	**0.001**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**604 D**	--	**17.2**	--	**13.5**	--	**3.41**	--
Total dissolved solids (Residue, filterable)	500	--	**1210**	--	**232**	--	**208**	--	**172**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limits	MMW031		MMW032		MMW032		MMW033	
Location Identification		**MMW031**		**MMW032**		**MMW032**		**MMW033**	
Well Type		**MW**		**MW**		**MW**		**MW**	
Sample Type		**Normal**		**Normal**		**Normal**		**Normal**	
Date Collected		**5/14/2012**		**5/20/2010**		**5/16/2012**		**5/20/2010**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	**0.196**	--	--	--	**0.594**
Arsenic	0.01	--	--	--	**0.000815 J**	--	--	--	**0.0149**
Barium	2	--	--	--	**0.0509**	--	--	--	**0.0261**
Cadmium	0.005	--	<0.0012 D	--	**0.000315 J**	--	<0.0012 D	--	<0.0003
Manganese	0.05	--	<0.004 D	--	**0.0216**	--	**0.00493 D**	--	**0.0561**
Selenium	0.05	--	**0.00141 F,D**	--	**0.00133**	--	**0.00174 F,D**	--	**0.00101**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**3.01**	--	**5.16**	--	**1.18**	--	**37.9**	--
Total dissolved solids (Residue, filterable)	500	--	**148**	--	**226**	--	**206**	--	**324**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limits	MMW033		MW15A		MW15A		MW16A	
Location Identification		**MMW033**		**MW15A**		**MW15A**		**MW16A**	
Well Type		**MW**		**MW**		**MW**		**MW**	
Sample Type		**Normal**		**Normal**		**Normal**		**Normal**	
Date Collected		**5/14/2012**		**5/22/2010**		**5/15/2012**		**5/21/2010**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--
Cadmium	0.005	--	<0.0012 D	--	<0.0003	--	<0.0012	--	<0.0003
Manganese	0.05	--	**0.0578 D**	--	--	--	**0.00641 J+**	--	--
Selenium	0.05	--	<0.002 D	--	**2.46**	--	**3.2**	--	**0.0151**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**27.6**	--	**690**	--	**719 D**	--	**768**	--
Total dissolved solids (Residue, filterable)	500	--	**252**	--	**1410**	--	**1450**	--	**1350**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-2

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

	Location Identification		**MW16A**
	Well Type		**MW**
	Sample Type		**Normal**
	Date Collected		**5/15/2012**
Analyte/Methods (Units)			
	Screening Limits		
Metals (mg/l)		**Dissolved**	**Total**
Aluminum	0.2	--	--
Arsenic	0.01	--	--
Barium	2	--	--
Cadmium	0.005	--	<0.0012 D
Manganese	0.05	--	**0.82 J+**
Selenium	0.05	--	**0.0019 F,D**
Chemistry Parameters (mg/l)			
Sulfate (as SO_4)	250	**543 D**	--
Total dissolved solids (Residue, filterable)	500	--	**942**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
	Highlight indicates exceedance above screening value

TABLE 3-3

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 1 of 8)

	Location Identification	**MBW085**		**MBW085**		**MBW087**		**MBW087**	
	Well Type	**BW**		**BW**		**BW**		**BW**	
	Date Collected	**5/19/2010**		**5/12/2012**		**5/19/2010**		**5/11/2012**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--	--	--
Manganese	0.05	--	--	--	**0.03 D**	--	--	--	**0.0203 D**
Selenium	0.05	**0.00206**	**0.00209**	--	**0.00539 B**	--	**0.0034**	--	**0.00277**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**34.3**	--	**35.4 J+**	--	**43.3**	--	**25.2**	--
Total dissolved solids (Residue, filterable)	500	--	**222**	--	**164**	--	**254**	--	**234**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
BW	Borehole monitoring well
MW	Monitoring well
	Highlight indicates exceedance above screening value

TABLE 3-3

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 2 of 8)

	Location Identification	**MBW099**		**MBW099**		**MMW007**		**MMW007**	
	Well Type	**BW**		**BW**		**MW**		**MW**	
	Date Collected	**5/23/2010**		**5/14/2012**		**5/25/2010**		**5/13/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Total**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)									
Aluminum	0.2	--	--	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--	--	--
Manganese	0.05	--	--	--	**0.0116 D**	--	--	--	**0.0215 D**
Selenium	0.05	**0.00111**	--	--	**0.0013 F,D**	--	**0.00155**	--	**0.00176 F,B**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**31.9**	--	**26**	--	**22.3**	--	**15.8 J+**	--
Total dissolved solids (Residue, filterable)	500	--	**282**	--	**174**	--	**168**	--	**144 J**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
BW	Borehole monitoring well
MW	Monitoring well
	Highlight indicates exceedance above screening value

TABLE 3-3

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 3 of 8)

	Location Identification	**MMW009**		**MMW009**		**MMW013**		**MMW013**	
	Well Type	**MW**		**MW**		**MW**		**MW**	
	Date Collected	**5/19/2010**		**5/8/2012**		**5/20/2010**		**9/17/2010**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)									
Aluminum	0.2	--	--	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--	--	--
Manganese	0.05	--	--	--	**0.0885**	--	--	--	--
Selenium	0.05	--	<0.0005	--	**0.000521 F**	--	**0.109**	--	**0.108**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**57.2**	--	**65.3 J+**	--	**243**	--	**253**	--
Total dissolved solids (Residue, filterable)	500	--	**388**	--	**300**	--	**498**	--	**534**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
BW	Borehole monitoring well
MW	Monitoring well
	Highlight indicates exceedance above screening value

TABLE 3-3

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 4 of 8)

	Location Identification	**MMW013**		**MMW024**		**MMW025**		**MMW025**	
	Well Type	**MW**		**MW**		**MW**		**MW**	
	Date Collected	**5/12/2012**		**5/12/2012**		**6/17/2010**		**5/15/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)									
Aluminum	0.2	--	--	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--	--	--
Manganese	0.05	--	**0.0055 D**	--	<0.004 D	--	--	--	**0.00403 J+**
Selenium	0.05	--	**0.148 D**	--	**0.0818 D**	--	<0.0005	--	**0.0012 F**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**239 J+**	--	**302 J+**	--	**13**	--	**11.7**	--
Total dissolved solids (Residue, filterable)	500	--	**458**	--	**606**	--	**190**	--	**162**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
J- Data are estimated due to associated quality control data. Potential low bias.
UJ Potential low bias, possible false negative.
BW Borehole monitoring well
MW Monitoring well
Highlight indicates exceedance above screening value

TABLE 3-3

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 5 of 8)

	Location Identification	**MMW026**		**MMW027**		**MMW027**	
	Well Type	**MW**		**MW**		**MW**	
	Date Collected	**5/9/2012**		**5/17/2010**		**5/8/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)							
Aluminum	0.2	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--
Manganese	0.05	--	**0.00758**	--	--	--	<0.002
Selenium	0.05	--	**0.000841 F**	--	**0.319**	--	**0.888 D**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250	**21.9**	--	**247**	--	**427 J+**	--
Total dissolved solids (Residue, filterable)	500	--	**382**	--	**728 J-,B**	--	**986**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
BW	Borehole monitoring well
MW	Monitoring well
	Highlight indicates exceedance above screening value

TABLE 3-3

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 6 of 8)

	Location Identification	**MMW034**		**MMW034 Dup**		**MMW034**		**MMW034 Dup**	
	Well Type	**MW**		**MW**		**MW**		**MW**	
	Date Collected	**5/21/2010**		**5/21/2010**		**5/12/2012**		**5/12/2012**	
Analyte/Methods (Units)									
	Screening								
Metals (mg/l)	**Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	<0.05	--	<0.05	--	--	--	--
Iron	0.3	<0.025	<0.025	**0.0312 J**	**0.0305 J**	--	--	--	--
Manganese	0.05	--	**0.00123 J-**	--	**0.00146 J-**	--	<0.004 D	--	<0.004 D
Selenium	0.05	--	**0.0731**	--	**0.0709**	--	**0.13 D**	--	**0.139 D**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**179**	--	**180**	--	**184 J+**	--	**184 J+**	--
Total dissolved solids (Residue, filterable)	500	--	**432**	--	**428**	--	**394**	--	**392**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
BW	Borehole monitoring well
MW	Monitoring well
	Highlight indicates exceedance above screening value

TABLE 3-3

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 7 of 8)

	Location Identification	**MMW035**		**MMW035**		**MMW036**		**MMW036**	
	Well Type	**MW**		**MW**		**MW**		**MW**	
	Date Collected	**5/21/2010**		**5/9/2012**		**5/21/2010**		**5/8/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)									
Aluminum	0.2	--	**0.0579 J**	--	--	--	**0.0784 J**	--	--
Iron	0.3	<0.025	**21.4**	--	--	<0.025	**0.0679 J**	--	--
Manganese	0.05	--	**0.0789 J-**	--	**0.00471**	--	**0.00515 J-**	--	<0.002
Selenium	0.05	--	**0.835**	--	**1.29 D**	--	**0.00646**	--	**0.0151**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**422**	--	**537 D**	--	**39**	--	**27.4 J+**	--
Total dissolved solids (Residue, filterable)	500	--	**1030**	--	**1340**	--	**248**	--	**362**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
BW	Borehole monitoring well
MW	Monitoring well
	Highlight indicates exceedance above screening value

TABLE 3-3

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 8 of 8)

	Location Identification	**MMW037**		**MMW037**		**MMW037 Dup**	
	Well Type	**MW**		**MW**		**MW**	
	Date Collected	**9/23/2010**		**5/9/2012**		**5/9/2012**	
Analyte/Methods (Units)							
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	<0.05	--	**0.209**	--	**0.195**
Iron	0.3	<0.025	**0.0311 J**	--	**0.184**	<0.1	**0.17**
Manganese	0.05	--	**0.00675**	--	**0.0221**	--	**0.0217**
Selenium	0.05	--	**0.00876**	--	**0.0188**	--	**0.0185**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250	**21.1**	--	--	--	**25**	--
Total dissolved solids (Residue, filterable)	500	--	**244**	**264**	--	--	**374**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
BW	Borehole monitoring well
MW	Monitoring well
	Highlight indicates exceedance above screening value

TABLE 3-4

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
HENRY MINE SAMPLES, P4 RI/FS
(Page 1 of 4)

	Location Identification	**MBW152**		**MBW152**		**MMW010**		**MMW010**		**MMW010**	
	Well Type	**BW**		**BW**		**MW**		**MW**		**MW**	
	Date Collected	**5/24/2010**		**5/15/2012**		**5/23/2010**		**9/17/2010**		**5/14/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)											
Cadmium	0.005	<0.0003	<0.0003	--	<0.0012 D	--	**0.00448**	--	**0.00421**	--	**0.00628 D**
Manganese	0.05	--	--	--	**0.108 J+**	--	--	--	--	--	**0.133 D**
Selenium	0.05	**0.00199**	**0.00206**	--	**0.0023 D**	--	**0.105**	--	**0.0213**	--	**0.0976 D**
Chemistry Parameters (mg/l)											
Sulfate (as SO_4)	250	**128**	--	**111**	--	**599**	--	**674**	--	**782 D**	--
Total dissolved solids (Residue, filterable)	500	--	**510**	--	**434**	--	**1330**	--	**1280**	--	**1720**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
Highlight indicates exceedance above screening value

TABLE 3-4

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
HENRY MINE SAMPLES, P4 RI/FS
(Page 2 of 4)

	Location Identification	**MMW011**		**MMW011**		**MMW022**		**MMW022**	
	Well Type	**MW**		**MW**		**MW**		**MW**	
	Date Collected	**5/16/2010**		**5/13/2012**		**5/22/2010**		**5/16/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)									
Cadmium	0.005	--	**0.000569 J**	--	<0.0012 D	--	<0.0003	--	<0.0012 D
Manganese	0.05	--	--	--	**0.00339 F,D**	--	--	--	**0.128 D**
Selenium	0.05	--	**0.00153**	--	**0.00124 F,B**	--	**0.0215**	--	**0.041 D**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**87.7**	--	**69 J+**	--	**257**	--	**251 D**	--
Total dissolved solids (Residue, filterable)	500	--	**438**	--	**320**	--	**618**	--	**672**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
Highlight indicates exceedance above screening value

TABLE 3-4

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
HENRY MINE SAMPLES, P4 RI/FS
(Page 3 of 4)

	Location Identification	**MMW023**		**MMW023**		**MMW028**		**MMW028**	
	Well Type	**MW**		**MW**		**MW**		**MW**	
	Date Collected	**5/21/2010**		**5/13/2012**		**5/16/2010**		**5/13/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)									
Cadmium	0.005	--	<0.0003	--	<0.0012 D	--	<0.0003	--	<0.0012 D
Manganese	0.05	--	--	--	**0.448 D**	--	--	--	<0.004 D
Selenium	0.05	--	**0.0017**	--	**0.00256**	--	**0.00309**	--	**0.00936 D**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250	**198**	--	**217 J+**	--	**71.2**	--	**72.6 J+**	--
Total dissolved solids (Residue, filterable)	500	--	**670**	--	**634**	--	**380**	--	**294**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
Highlight indicates exceedance above screening value

TABLE 3-4

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
HENRY MINE SAMPLES, P4 RI/FS
(Page 4 of 4)

	Location Identification	**MMW028 Dup**	
	Well Type	**MW**	
	Date Collected	**5/13/2012**	
Analyte/Methods (Units)			
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**
Cadmium	0.005	--	<0.0012 D
Manganese	0.05	--	<0.004 D
Selenium	0.05	--	**0.0115 B**
Chemistry Parameters (mg/l)			
Sulfate (as SO_4)	250	**72.8 J+**	--
Total dissolved solids (Residue, filterable)	500	--	**312**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
	Highlight indicates exceedance above screening value

TABLE 3-5

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BACKGROUND SAMPLES, P4 RI/FS
(Page 1 of 3)

Location Identification		**MAW001**		**MAW003**		**MAW006**		**MDW001**	
Well Type		**AW**		**AW**		**AW**		**DW**	
Date Collected		**9/18/2012**		**9/18/2012**		**9/19/2012**		**9/18/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)									
Aluminum	0.2	--	<0.1	--	<0.1	--	**1.36**	--	<0.1
Iron	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	**1.18**	<0.1	<0.1
Manganese	0.05	--	**0.00431**	--	**0.00183 F**	--	**0.0797**	--	**0.00108 F**
Chemistry Parameters (mg/l)									
Total dissolved solids (Residue, filterable)	500	--	**236**	--	**244**	--	**224**	--	**282**

Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
	Highlight indicates exceedance above screening value
AW	Agricultural Well
DW	Domestic Well
PW	Production Well

TABLE 3-5

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BACKGROUND SAMPLES, P4 RI/FS
(Page 2 of 3)

Location Identification		**MDW002**		**MDW002 Dup**		**MDW003**		**MDW004**	
Well Type		**DW**		**DW**		**DW**		**DW**	
Date Collected		**9/18/2012**		**9/18/2012**		**9/18/2012**		**9/19/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)									
Aluminum	0.2	--	<0.1	--	<0.1	--	<0.1	--	<0.1
Iron	0.3	<0.1	**0.0737 F**	<0.1	**0.0728 F**	<0.1	<0.1	<0.1	<0.1
Manganese	0.05	--	**0.00821**	--	**0.00866**	--	**0.00196 F**	--	<0.002
Chemistry Parameters (mg/l)									
Total dissolved solids (Residue, filterable)	500	--	**258**	--	**256**	--	**222**	--	**338**

Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
	Highlight indicates exceedance above screening value
AW	Agricultural Well
DW	Domestic Well
PW	Production Well

TABLE 3-5

EXCEEDANCE SUMMARY OF 2010 AND 2012 GROUNDWATER RESULTS
BACKGROUND SAMPLES, P4 RI/FS
(Page 3 of 3)

Location Identification		**MDW005**		**MDW006**		**MPW019**		**MPW019 Dup**	
Well Type		**DW**		**DW**		**PW**		**PW**	
Date Collected		**9/18/2012**		**9/18/2012**		**5/16/2012**		**5/16/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)									
Aluminum	0.2	--	<0.1	--	<0.1	<0.1	--	<0.1	--
Iron	0.3	<0.1	<0.1	<0.1	<0.1	**0.427**	--	**0.583**	--
Manganese	0.05	--	<0.002	--	**0.00177 F**	--	**0.0792 D**	--	**0.0899 D**
Chemistry Parameters (mg/l)									
Total dissolved solids (Residue, filterable)	500	--	**516**	--	**368**	--	**236**	--	**232**

Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
	Highlight indicates exceedance above screening value
AW	Agricultural Well
DW	Domestic Well
PW	Production Well

TABLE 3-6

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS
(Page 1 of 9)

Location Identification		**MDS030**		**MDS030**		**MDS030 Dup**		**MDS030**	
Location Type		**Dump Seep**		**Dump Seep**		**Dump Seep**		**Dump Seep**	
Date Collected		**5/17/2010**		**9/14/2010**		**9/14/2010**		**5/11/2012**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Arsenic	0.01	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0003	<0.0003	<0.0015	<0.0015 UJ	<0.0015	<0.0015 UJ	<0.0012 D	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--
Manganese	0.05	--	--	--	--	--	--	--	--
Selenium	0.005	--	**0.65**	--	**0.833**	--	**0.866**	--	**0.849 D**
Uranium	0.0026	--	--	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

TABLE 3-6

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		**MDS030 Dup**		**MSG004**		**MSG004 Dup**		**MSG004**	
Location Type		**Dump Seep**		**Spring**		**Spring**		**Spring**	
Date Collected		**5/11/2012**		**5/17/2010**		**5/17/2010**		**9/14/2010**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Arsenic	0.01	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0012 D	--	<0.0003	<0.0003	<0.0003	<0.0003	<0.0006	**0.00277 J-,B**
Chromium, Total	0.000031	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--
Manganese	0.05	--	--	--	--	--	--	--	--
Selenium	0.005	--	**0.964 D**	--	**0.00898**	--	**0.00874**	--	**0.0124**
Uranium	0.0026	--	--	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

TABLE 3-6

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS
(Page 3 of 9)

Location Identification		**MSG005**		**MSG005**		**MSG006**		**MSG006**	
Location Type		**Spring**		**Spring**		**Spring**		**Spring**	
Date Collected		**5/17/2010**		**5/11/2012**		**5/17/2010**		**5/10/2012**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Arsenic	0.01	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0003	<0.0003	<0.0012 D	--	<0.0003	<0.0003	<0.0006	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--
Manganese	0.05	--	--	--	--	--	--	--	--
Selenium	0.005	--	**0.00741**	--	**0.00731 D**	--	**0.0964**	--	**0.212**
Uranium	0.0026	--	--	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

TABLE 3-6

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		**MST050**		**MST050**		**MST066**		**MST066**	
Location Type		**Stream**		**Stream**		**Stream**		**Stream**	
Date Collected		**5/14/2010**		**5/10/2012**		**5/14/2010**		**10/3/2010**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Arsenic	0.01	--	--	--	--	--	--	**0.0151**	--
Boron	0.0016	--	--	--	--	--	--	**0.0288**	--
Cadmium	0.0006	<0.0003	--	<0.0006	--	<0.0003	--	**0.000026 J**	--
Chromium, Total	0.000031	--	--	--	--	--	--	**0.00097**	--
Cobalt	0.004	--	--	--	--	--	--	**0.0075**	--
Manganese	0.05	--	--	--	--	--	--	**2.64**	--
Selenium	0.005	--	<0.0005	--	**0.0012**	--	**0.0146**	--	**0.0077 J+**
Uranium	0.0026	--	--	--	--	--	--	**0.00427**	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

TABLE 3-6

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS
(Page 5 of 9)

Location Identification		**MST066 Dup**		**MST066**		**MST067**		**MST067**	
Location Type		**Stream**		**Stream**		**Stream**		**Stream**	
Date Collected		**10/3/2010**		**5/12/2012**		**5/14/2010**		**5/11/2012**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Arsenic	0.01	**0.0148**	--	--	--	--	--	--	--
Boron	0.0016	**0.0284**	--	--	--	--	--	--	--
Cadmium	0.0006	**0.000044**	--	<0.0012 D	--	**0.000399 J**	--	<0.0012 D	
Chromium, Total	0.000031	**0.00131**	--	--	--	--	--	--	--
Cobalt	0.004	**0.00376**	--	--	--	--	--	--	--
Manganese	0.05	**2.62**	--	--	--	--	--	--	--
Selenium	0.005	--	**0.0065 J+**	--	**0.0257 D**	--	**0.099**	--	**0.681**
Uranium	0.0026	**0.0043**	--	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

TABLE 3-6

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS
(Page 6 of 9)

Location Identification		**MST069**		**MST069**		**MST069**		**MST069**	
Location Type		**Stream**		**Stream**		**Stream**		**Stream**	
Date Collected		**5/13/2010**		**5/17/2010**		**9/14/2010**		**5/8/2012**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Arsenic	0.01	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--
Cadmium	0.0006	**0.000779**	--	**0.000816**	**0.00451**	<0.0015	**0.00973 J-,B**	**0.00145 D**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--
Manganese	0.05	--	--	--	--	--	--	--	--
Selenium	0.005	--	**2.84**	--	**1.15**	--	**1.17**	--	**1.43 J+**
Uranium	0.0026	--	--	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

TABLE 3-6

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		**MST069**		**MST089**		**MST089**		**MST090**	
Location Type		**Stream**		**Stream**		**Stream**		**Stream**	
Date Collected		**9/17/2012**		**5/13/2010**		**5/11/2012**		**5/13/2010**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Arsenic	0.01	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--
Cadmium	0.0006	**0.00143**	--	<0.0003	--	<0.0012 D	--	<0.0003	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--
Manganese	0.05	--	--	--	--	--	--	--	--
Selenium	0.005	--	**1.26 D**	--	**0.000758 J**	--	**0.00165 F,D**	--	<0.0005
Uranium	0.0026	--	--	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

TABLE 3-6

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		**MST090**	**MST092**		**MST092**		**MST094**	
Location Type		**Stream**	**Stream**		**Stream**		**Stream**	
Date Collected		**5/11/2012**	**5/13/2010**		**5/11/2012**		**5/13/2010**	
Analyte/Methods (Units)								
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Arsenic	0.01	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0012 D	<0.0003	--	<0.0012 D	--	<0.0003	--
Chromium, Total	0.000031	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--
Manganese	0.05	--	--	--	--	--	--	--
Selenium	0.005	--	--	**0.00272**	--	**0.00209**	--	**0.000842 J**
Uranium	0.0026	--	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

TABLE 3-6

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		**MST095**		**MST095**		**MST096**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/13/2010**		**5/10/2012**		**5/10/2012**	
Analyte/Methods (Units)							
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Arsenic	0.01	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--
Cadmium	0.0006	<0.0003	--	<0.0006	--	<0.0006	--
Chromium, Total	0.000031	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--
Manganese	0.05	--	--	--	--	--	--
Selenium	0.005	--	**0.2**	--	**0.0772**	--	**0.071**
Uranium	0.0026	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

TABLE 3-7

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 1 of 6)

	Location Identification	**MDS025**		**MDS025**		**MDS025**		**MDS025**	
	Location Type	**Dump Seep**		**Dump Seep**		**Dump Seep**		**Dump Seep**	
	Date Collected	**5/15/2010**		**5/16/2010**		**9/15/2010**		**5/12/2012**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Boron	0.0016	--	--	--	--	--	--	--	--
Cadmium	0.0006	**0.000347 J**	--	**0.000594 J**	**0.00175**	<0.0006	<0.0006	<0.0012 D	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--
Iron	0.16	**1.41**	--	--	--	--	--	--	--
Selenium	0.005	--	**0.00434**	--	**0.00422**	--	**0.00159 J**	--	**0.00718 D**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
UB	Analyte considered not detected based on associated blank data.
	Highlight indicates exceedance above screening value

TABLE 3-7

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 2 of 6)

	Location Identification	**MDS026**		**MDS026**		**MDS026**		**MST128**	
	Location Type	**Dump Seep**		**Dump Seep**		**Dump Seep**		**Stream**	
	Date Collected	**5/16/2010**		**9/15/2010**		**5/11/2012**		**5/16/2010**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Boron	0.0016	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0003	**0.000826**	<0.0006	**0.00148 J-,B**	<0.0012 D	--	<0.0003	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--
Iron	0.16	--	--	--	--	--	--	<0.025	--
Selenium	0.005	--	**0.118**	--	**0.0949**	--	**0.368 D**	--	**0.00157**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
UB	Analyte considered not detected based on associated blank data.
	Highlight indicates exceedance above screening value

TABLE 3-7

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 3 of 6)

	Location Identification	**MST128**		**MST131**		**MST131**		**MST131**	
	Location Type	**Stream**		**Stream**		**Stream**		**Stream**	
	Date Collected	**5/12/2012**		**5/16/2010**		**10/2/2010**		**5/12/2012**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Boron	0.0016	--	--	--	--	**0.0225 B**	--	--	--
Cadmium	0.0006	<0.0012 D	--	<0.0003	--	**0.000024**	--	<0.0012 D	--
Chromium, Total	0.000031	--	--	--	--	**0.00046**	--	--	--
Iron	0.16	--	--	**0.271**	--	--	--	--	--
Selenium	0.005	--	**0.00246 D**	--	**0.00184**	--	**0.0008 J**	--	**0.00163 F,D**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
UB	Analyte considered not detected based on associated blank data.
	Highlight indicates exceedance above screening value

TABLE 3-7

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 4 of 6)

	Location Identification	**MST132**		**MST132 Dup**		**MST132 Triplicate**		**MST132**	
	Location Type	**Stream**		**Stream**		**Stream**		**Stream**	
	Date Collected	**5/16/2010**		**5/16/2010**		**5/16/2010**		**5/12/2012**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Boron	0.0016	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0003	--	<0.0003	--	<0.0003	--	<0.0012 D	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--
Iron	0.16	**0.0464 J**	--	**0.0319 J**	--	**0.0288 J**	--	--	--
Selenium	0.005	--	**0.0017**	--	**0.00148**	--	**0.00167**	--	**0.0023 D**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
UB	Analyte considered not detected based on associated blank data.
	Highlight indicates exceedance above screening value

TABLE 3-7

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 5 of 6)

	Location Identification	**MST132 Dup**		**MST133**		**MST133**		**MST143**	
	Location Type	**Stream**		**Stream**		**Stream**		**Stream**	
	Date Collected	**5/12/2012**		**5/15/2010**		**5/11/2012**		**5/15/2010**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Boron	0.0016	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0012 D	--	<0.0003	--	<0.0012 D	--	<0.0003	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--
Iron	0.16	--	--	**0.0702 J**	--	--	--	**0.0401 J**	--
Selenium	0.005	--	**0.00159 F,D**	--	**0.00146**	--	**0.00698 D**	--	**0.0024**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
UB	Analyte considered not detected based on associated blank data.
	Highlight indicates exceedance above screening value

TABLE 3-7

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS
(Page 6 of 6)

	Location Identification	**MST144**		**MST274**		**MST274**		**MST274**	
	Location Type	**Stream**		**Stream**		**Stream**		**Stream**	
	Date Collected	**5/16/2010**		**10/1/2010**		**10/1/2010**		**5/12/2012**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Boron	0.0016	--	--	**0.016 B**	--	**0.0153 B**	--	--	--
Cadmium	0.0006	<0.0003	<0.0003	**0.000012 J**	--	**0.000011 J**	--	<0.0012 D	--
Chromium, Total	0.000031	--	--	**0.00043**	--	**0.00039 B**	--	--	--
Iron	0.16	--	--	--	--	--	--	--	--
Selenium	0.005	--	**0.211**	--	**0.0041**	--	**0.0041**	--	**0.00393 D**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
UB	Analyte considered not detected based on associated blank data.
	Highlight indicates exceedance above screening value

TABLE 3-8

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
HENRY MINE SAMPLES, P4 RI/FS
(Page 1 of 5)

	Location Identification	**MDS034**		**MST044**		**MST044**		**MST044**	
	Location Type	**Dump Seep**		**Stream**		**Stream**		**Stream**	
	Date Collected	**5/16/2010**		**5/14/2010**		**9/16/2010**		**5/9/2012**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006	<0.0003	**0.000438 J**	<0.0003	--	<0.0006 UJ	--	<0.0012 D	--
Selenium	0.005	--	**0.0475**	--	**0.000901 J**	--	<0.001	--	**0.00114 F,J+**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
UB	Analyte considered not detected based on associated blank data.
UJ	Potential low bias, possible false negative.
	Highlight indicates exceedance above screening value

TABLE 3-8

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
HENRY MINE SAMPLES, P4 RI/FS
(Page 2 of 5)

	Location Identification	**MST044**		**MST044 Dup**		**MST045**		**MST045 Dup**	
	Location Type	**Stream**		**Stream**		**Stream**		**Stream**	
	Date Collected	**9/17/2012**		**9/17/2012**		**5/14/2010**		**5/14/2010**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006	<0.0006	--	<0.0006	--	<0.0003	--	<0.0003	--
Selenium	0.005	--	**0.00141**	--	**0.0013**	--	**0.000867 J**	--	**0.000824 J**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
UB	Analyte considered not detected based on associated blank data.
UJ	Potential low bias, possible false negative.
	Highlight indicates exceedance above screening value

TABLE 3-8

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
HENRY MINE SAMPLES, P4 RI/FS
(Page 3 of 5)

	Location Identification	**MST045 Triplicate**		**MST045**		**MST045 Duplicate**		**MST045 Triplicate**	
	Location Type	**Stream**		**Stream**		**Stream**		**Stream**	
	Date Collected	**5/14/2010**		**9/16/2010**		**9/16/2010**		**9/16/2010**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006	<0.0003	--	<0.0006 UJ	--	<0.0006 UJ	--	<0.0006 UJ	--
Selenium	0.005	--	**0.000698 J**	--	<0.001	--	<0.001	--	<0.005 UJ

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
UB	Analyte considered not detected based on associated blank data.
UJ	Potential low bias, possible false negative.
	Highlight indicates exceedance above screening value

TABLE 3-8

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
HENRY MINE SAMPLES, P4 RI/FS
(Page 4 of 5)

	Location Identification	**MST045**		**MST045 Dup**		**MST045**		**MST057**	
	Location Type	**Stream**		**Stream**		**Stream**		**Stream**	
	Date Collected	**5/9/2012**		**5/9/2012**		**9/17/2012**		**5/14/2010**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006	<0.0012 D	--	<0.0012 D	--	<0.0006	--	<0.0003	--
Selenium	0.005	--	**0.00121 F,J+**	--	**0.00196 F,J+**	--	**0.00166**	--	**0.00617**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
UB	Analyte considered not detected based on associated blank data.
UJ	Potential low bias, possible false negative.
	Highlight indicates exceedance above screening value

TABLE 3-8

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
HENRY MINE SAMPLES, P4 RI/FS
(Page 5 of 5)

	Location Identification	**MST057**		**MST063**		**MST063**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**5/9/2012**		**5/15/2010**		**5/9/2012**	
Analyte/Methods (Units)							
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006	<0.0012 D	--	<0.0003	--	**0.00373 D**	--
Selenium	0.005	--	<0.002 D	--	**0.00234**	--	**0.0052 J+**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
UB	Analyte considered not detected based on associated blank data.
UJ	Potential low bias, possible false negative.
	Highlight indicates exceedance above screening value

TABLE 3-9

EXCEEDANCE SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
BACKGROUND SAMPLES, P4 RI/FS

	Location Identification	**MST048**		**MST093**		**MST093**		**MST226***		**MST274***	
	Location Type	**Stream**		**Stream**		**Stream**		**Stream**		**Stream**	
	Date Collected	**5/10/2012**		**5/13/2010**		**5/10/2012**		**5/10/2012**		**5/12/2012**	
Analyte/Methods (Units)											
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Boron	0.0016	--	--	--	--	--	--	--	--	--	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	--	<0.001	--	**0.000544 J**	--	<0.001	--	**0.00833**	--	**0.00393 D**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
J Data are estimated due to associated quality control data.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value
* MST226 and MST274 are no longer considered background stations

TABLE 3-10
2010 BOREHOLE GROUNDWATER
DISSOLVED SELENIUM RESULTS (mg/l)
(Page 1 of 1)

Mine Site	Station ID	Result
Ballard	BH159	**0.0409**
	BH160	**0.000676J**
	BH161	**0.0164**
	BH162	**0.00195**
	BH163	Dry
	BH164	**0.0108**
	BH165	Dry
	BH166	**0.000567J**
	BH172	**0.0144**
Henry	BH167	**0.0183**
	BH168	Dry
	BH169	**0.00157**
	BH170	Dry
	BH171	<0.0005U

mg/l	milligrams per liter
Bold	Bolded result indicated positively identified compound.
J	Data are estimated due to associated quality control data
U	Not Detected

TABLE 3-11

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SOIL RESULTS
BALLARD MINE, P4 RI/FS
(Page 1 of 4)

	Location Identification	**MST066**	**MST066 Dup**	**MST066**	**MST067**
	Field Sample Identification	**1010-MST066-RS-001-1**	**1010-MST066-RS-001-2**	**1010-MST066-RS-002**	**1010-MST067-RS-001-1**
	Date Collected	**10/3/2010**	**10/3/2010**	**10/3/2010**	**10/3/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	0.27	**3.0 J-**	**4.5 J-**	**3.3 J-**	5.7 UB
Arsenic	0.39	**6.4**	**8.19**	**5.36**	**5.49**
Boron	0.5	**9.3 J**	**15.9**	**8.3 J**	**10.7**
Cadmium	0.36	**3.7**	**2.66**	**3.33**	**6.92**
Chromium, Total	0.4	**16.6**	**11.2**	**15.3**	**34.7**
Copper	28	**18.9**	**13.5**	**18**	**19.9**
Manganese	220	**268 J+**	**357 J+**	**255 J+**	**448**
Mercury	0.1	**0.049**	**0.073**	**0.052**	**0.051 J-**
Molybdenum	2	0.9 UB	**2.5 B**	0.9 UB	**2.6**
Nickel	38	**22.8**	**23.4**	**21.2**	**35.7**
Selenium	0.52	**3.1**	**3.4**	**2.7**	**30.4**
Uranium	5	**3.54**	**3.48**	**3.26**	**4.46**
Vanadium	2	**37.1**	**26.9**	**34.4**	**54.3**
Zinc	46	**94.4**	**61.7**	**87.3**	**209**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value

TABLE 3-11

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SOIL RESULTS
BALLARD MINE, P4 RI/FS
(Page 2 of 4)

	Location Identification	**MST067**	**MST089**	**MST089**	**MST092**
	Field Sample Identification	**1010-MST067-RS-002**	**1010-MST089-RS-001**	**1010-MST089-RS-002**	**1010-MST092-RS-001**
	Date Collected	**10/3/2010**	**10/5/2010**	**10/5/2010**	**10/4/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	0.27	7.1 UB	**3.0 J-,B**	**4.1 J-,B**	**6.4 J-,B**
Arsenic	0.39	**8.91**	**1.83**	**3.44**	**2.29**
Boron	0.5	**14.4**	**10.3**	**10.8**	**9.3 J**
Cadmium	0.36	**14.5**	**3.89**	**4.85**	**5.84**
Chromium, Total	0.4	**66.5**	**25.9**	**30.4**	**42.9**
Copper	28	**33.6**	**21.6**	**21.9**	**25.2**
Manganese	220	**239**	**161**	**123**	**67.6**
Mercury	0.1	**0.079 J-**	**0.054**	**0.068**	**0.06**
Molybdenum	2	**5.2**	<0.5	<0.5	0.8 UB
Nickel	38	**71.6**	**19.3**	**25.7**	**23.2**
Selenium	0.52	**100**	**4.7**	**7.6**	**7.6**
Uranium	5	**8.74**	**3.04**	**2.31**	**3.14**
Vanadium	2	**122**	**29.7**	**32.8**	**45.1**
Zinc	46	**424**	**136**	**162**	**206**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value

TABLE 3-11

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SOIL RESULTS
BALLARD MINE, P4 RI/FS
(Page 3 of 4)

	Location Identification	**MST092**	**MST095**	**MST095**	**MST272**
	Field Sample Identification	**1010-MST092-RS-002**	**1010-MST095-RS-001**	**1010-MST095-RS-002**	**1010-MST272-RS-001**
	Date Collected	**10/4/2010**	**10/4/2010**	**10/4/2010**	**10/5/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	0.27	**4.7 J-,B**	**6.0 J-,B**	**6.3 J-,B**	4.6 UB
Arsenic	0.39	**2.5**	**5.73**	**8.51**	**2.93**
Boron	0.5	**10.4**	**12.1**	**14.1**	**12.3**
Cadmium	0.36	**4.49**	**9.87**	**15.8**	**2.65**
Chromium, Total	0.4	**36.4**	**57.3**	**96.3**	**22.7**
Copper	28	**23.7**	**25.9**	**36.7**	**16.7**
Manganese	220	**52.4**	**854**	**876**	**736**
Mercury	0.1	**0.082**	**0.058**	**0.109**	**0.038**
Molybdenum	2	0.7 UB	**2.7 B**	**6.2**	<0.5
Nickel	38	**19.1**	**38.3**	**73.8**	**19.9**
Selenium	0.52	**5.5**	**3.4**	**5.9**	**1.8**
Uranium	5	**3.71**	**7.79**	**8.9**	**2.23**
Vanadium	2	**53.2**	**53**	**135**	**32.1**
Zinc	46	**147**	**270**	**459**	**123**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value

TABLE 3-11

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SOIL RESULTS
BALLARD MINE, P4 RI/FS
(Page 4 of 4)

	Location Identification	**MST272**	**MST273**	**MST273**
	Field Sample Identification	**1010-MST272-RS-002**	**1010-MST273-RS-001**	**1010-MST273-RS-002**
	Date Collected	**10/5/2010**	**10/5/2010**	**10/5/2010**
Analyte/Methods (Units)				
Metals (mg/kg)	**Screening Limits**			
Antimony	0.27	7.8 UB	<3.0	3.7 UB
Arsenic	0.39	**3.12**	**2.78**	**2.39**
Boron	0.5	**9.8 J**	**11.7**	**10**
Cadmium	0.36	**2.64**	**2.59**	**3.04**
Chromium, Total	0.4	**25.6**	**21**	**17.8**
Copper	28	**15.1**	**18.6**	**19.3**
Manganese	220	**721**	**769**	**294**
Mercury	0.1	**0.031**	**0.048**	**0.055**
Molybdenum	2	0.6 UB	<0.5	<0.5
Nickel	38	**21.1**	**18.3**	**16.2**
Selenium	0.52	**1.9**	**3.2**	**5.1**
Uranium	5	**2.67**	**2.82**	**3.56**
Vanadium	2	**36.2**	**25.8**	**22.2**
Zinc	46	**120**	**114**	**114**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value

TABLE 3-12

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SOIL RESULTS
ENOCH VALLEY SAMPLES, P4 RI/FS

	Location Identification	**MST131**	**MST131**
	Field Sample Identification	**1010-MST131-RS-001**	**1010-MST131-RS-002**
	Date Collected	**10/2/2010**	**10/2/2010**
Analyte/Methods (Units)			
Metals (mg/kg)	**Screening Limits**		
Antimony	0.27	**11 B**	6.3 UB
Arsenic	0.39	**4.23**	**4.43**
Boron	0.5	**10.1**	**11.3**
Cadmium	0.36	**1.22**	**1.65**
Chromium, Total	0.4	**22.7**	**23.7**
Manganese	220	**1660**	**2800**
Selenium	0.52	**1.6**	**1.4**
Vanadium	2	**25**	**25.7**
Zinc	46	**84**	**102**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value

TABLE 3-13

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SOIL RESULTS
HENRY MINE SAMPLES, P4 RI/FS
(Page 1 of 1)

	Location Identification	**MST053**	**MST053**
	Field Sample Identification	**1010-MST053-RS-001**	**1010-MST053-RS-002**
	Date Collected	**10/3/2010**	**10/3/2010**
Analyte/Methods (Units)			
Metals (mg/kg)	**Screening Limits**		
Antimony	0.27	<3.0	**7.0 J**
Arsenic	0.39	**1.12**	**1.3**
Boron	0.5	**5.7 J**	**3.5 J**
Cadmium	0.36	**1.3**	**0.392**
Chromium, Total	0.4	**16.5**	**21.5**
Selenium	0.52	**1.4**	**0.8 J**
Vanadium	2	**14.7**	**24.2**
Zinc	46	**65.4**	**64.3**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
J Data are estimated due to associated quality control data.
Highlight indicates exceedance above screening value

TABLE 3-14

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SOIL RESULTS
BACKGROUND SAMPLES, P4 RI/FS

Analyte/Methods (Units)	Screening Limits	MST093	MST093 Dup	MST093	MST093 Dup
Location Identification		**MST093**	**MST093 Dup**	**MST093**	**MST093 Dup**
Field Sample Identification		**1010-MST093A-RS-001-1**	**1010-MST093A-RS-001-2**	**1010-MST093A-RS-002-1**	**1010-MST093A-RS-002-2**
Date Collected		**10/4/2010**	**10/4/2010**	**10/4/2010**	**10/4/2010**
Metals (mg/kg)					
Antimony	0.27	**3.2 J-,B**	**6.1 J-,B**	**3.9 J-,B**	**4.8 J-,B**
Arsenic	0.39	**3.03**	**3.05**	**3.05**	**2.94**
Boron	0.5	**10.1**	**9.8 J**	**9.7 J**	**9.9 J**
Cadmium	0.36	**1.81**	**1.99**	**3.63**	**3.49**
Chromium, Total	0.4	**18.7**	**18.3**	**17**	**16.7**
Copper	28	**17.5**	**18**	**17.6**	**18.2**
Manganese	220	**543**	**922**	**337**	**351**
Selenium	0.52	**0.7 J**	**0.7 J**	**1.4**	**1.3**
Vanadium	2	**23.5**	**24.6**	**24.9**	**24.4**
Zinc	46	**105**	**105**	**122**	**120**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value
* MST274 and MST275 are no longer considered background stations

TABLE 3-14

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SOIL RESULTS
BACKGROUND SAMPLES, P4 RI/FS

	Location Identification	**MST093**	**MST093**	**MST274***	**MST274***
	Field Sample Identification	**1010-MST093B-RS-001**	**1010-MST093B-RS-002**	**1010-MST274A-RS-001**	**1010-MST274A-RS-002**
	Date Collected	**10/4/2010**	**10/4/2010**	**10/2/2010**	**10/2/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	0.27	**4.4 J-,B**	**3.6 J-,B**	6.7 UB	5.2 UB
Arsenic	0.39	**4.24**	**2.78**	**4.84**	**4.3**
Boron	0.5	**10**	**11.2**	**10.6**	**9.4 J**
Cadmium	0.36	**2.43**	**3.51**	**1.4**	**3.11**
Chromium, Total	0.4	**18.4**	**16.7**	**23.8**	**23.7**
Copper	28	**18.2**	**17.6**	**18**	**16.6**
Manganese	220	**1080**	**527**	**931**	**500**
Selenium	0.52	**1.0 J**	**1.5**	**2.3**	**3.4**
Vanadium	2	**32.2**	**24.3**	**25.4**	**30.6**
Zinc	46	**104**	**117**	**130**	**219**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value
* MST274 and MST275 are no longer considered background stations

TABLE 3-14

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SOIL RESULTS
BACKGROUND SAMPLES, P4 RI/FS

	Location Identification	**MST274***	**MST274***	**MST275***	**MST275***
	Field Sample Identification	**1010-MST274B-RS-001**	**1010-MST274B-RS-002**	**1010-MST275A-RS-001**	**1010-MST275A-RS-002**
	Date Collected	**10/2/2010**	**10/2/2010**	**10/1/2010**	**10/1/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	0.27	8.7 UB	5.0 UB	**4.6 J**	**5.8 J**
Arsenic	0.39	**4.37**	**4.99**	**3.47**	**4.23**
Boron	0.5	**10.3**	**10.1**	**4.8 J**	**5.5 J**
Cadmium	0.36	**1.37**	**2.31**	**0.57**	**0.729**
Chromium, Total	0.4	**23.7**	**23.2**	**16.9**	**14.6**
Copper	28	**16.8**	**18.1**	**10.5**	**11.9**
Manganese	220	**814**	**561**	**635**	**926**
Selenium	0.52	**2.0**	**2.9**	**0.8 J**	**0.8 J**
Vanadium	2	**25.4**	**29.8**	**25**	**22.6**
Zinc	46	**131**	**195**	**49.7**	**54.3**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value
* MST274 and MST275 are no longer considered background stations

TABLE 3-14

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SOIL RESULTS
BACKGROUND SAMPLES, P4 RI/FS

	Location Identification	**MST275***	**MST275***	**MST277**	**MST277**
	Field Sample Identification	**1010-MST275B-RS-001**	**1010-MST275B-RS-002**	**1010-MST277A-RS-001**	**1010-MST277A-RS-002**
	Date Collected	**10/1/2010**	**10/1/2010**	**10/3/2010**	**10/3/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	0.27	**4.5 J**	**5.3 J**	**4.6 J-**	**5.2 J-**
Arsenic	0.39	**2.69**	**4.99**	**2.9**	**3.0**
Boron	0.5	**5.9 J**	**5.1 J**	**6.1 J**	**5.6 J**
Cadmium	0.36	**0.542**	**0.812**	**2.02**	**1.73**
Chromium, Total	0.4	**14.4**	**15.1**	**18.6**	**18.5**
Copper	28	**10.6**	**10.9**	**21**	**18.8**
Manganese	220	**563**	**1080**	**124 J+**	**148 J+**
Selenium	0.52	**0.7 J**	**0.8 J**	**1.4**	**1.1**
Vanadium	2	**21.4**	**23.1**	**26**	**25.5**
Zinc	46	**52.4**	**51.6**	**87.7**	**84.5**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value
* MST274 and MST275 are no longer considered background stations

TABLE 3-14

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SOIL RESULTS
BACKGROUND SAMPLES, P4 RI/FS

	Location Identification	**MST277**	**MST277**
	Field Sample Identification	**1010-MST277B-RS-001**	**1010-MST277B-RS-002**
	Date Collected	**10/3/2010**	**10/3/2010**
Analyte/Methods (Units)			
Metals (mg/kg)	**Screening Limits**		
Antimony	0.27	**5.5 J-**	**5.3 J-**
Arsenic	0.39	**5.44**	**5.19**
Boron	0.5	**6.7 J**	**6.6 J**
Cadmium	0.36	**3.24**	**3.43**
Chromium, Total	0.4	**29.3**	**29.2**
Copper	28	**30**	**29.3**
Manganese	220	**323 J+**	**159 J+**
Selenium	0.52	**1.7**	**1.8**
Vanadium	2	**42**	**42.1**
Zinc	46	**144**	**142**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value
* MST274 and MST275 are no longer considered background stations

TABLE 3-15

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
BALLARD MINE, P4 RI/FS
(Page 1 of 2)

	Location Identification	**MST066**	**MST066 Dup**	**MST067**	**MST089**
	Field Sample Identification	**1010-MST066-SD-001-1**	**1010-MST066-SD-001-2**	**1010-MST067-SD-001-1**	**1010-MST089-SD-001**
	Date Collected	**10/3/2010**	**10/3/2010**	**10/3/2010**	**10/5/2010**
Analyte/Methods (Units)					
Metals (mg/kg)					
Antimony	2	**4.8 J-**	**4.4 J-**	**6.6 J-,B**	8.8 UB
Arsenic	0.39	**3.65 J**	**3.59 J**	**13.4**	**3.36**
Cadmium	0.99	**1.97 J**	**1.72 J**	**34.7 J-,B**	**3.39**
Chromium, Total	43	**19**	**17.4**	**105**	**28.7**
Copper	32	**15.1**	**14.4**	**45.7 J**	**14.6**
Manganese	460	**345 J+**	**338 J+**	**257**	**860**
Mercury	0.18	**0.02**	**0.021**	**0.176 J-**	**0.044**
Nickel	23	**13.9**	**13.9**	**134**	**19.8**
Selenium	2	**5.3**	**5.0**	**167 J-,B**	**4.6**
Silver	1	**0.161**	**0.142**	**2.27**	**0.308**
Zinc	121	**65.6**	**71.7**	**834**	**123**

mg/kg milligrams per kilogram
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias is unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value

TABLE 3-15

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
BALLARD MINE, P4 RI/FS
(Page 2 of 2)

	Location Identification	**MST092**	**MST095**	**MST272**	**MST273**
	Field Sample Identification	**1010-MST092-SD-001**	**1010-MST095-SD-001**	**1010-MST272-SD-001**	**1010-MST273-SD-001**
	Date Collected	**10/4/2010**	**10/4/2010**	**10/5/2010**	**10/5/2010**
Analyte/Methods (Units)					
Metals (mg/kg)					
Antimony	2	5.8 UB	8.2 UB	**6.1 J-,B**	**6.2 J-,B**
Arsenic	0.39	**4.19**	**10.9**	**3.59 J**	**3.33 J**
Cadmium	0.99	**6.39**	**44.9**	**5.35 J**	**2.05 J**
Chromium, Total	43	**43.7**	**269**	**35.4**	**19.4**
Copper	32	**26.1**	**70.6**	**18.1**	**13.2**
Manganese	460	**296**	**227**	**578**	**1640**
Mercury	0.18	**0.087**	**0.289**	**0.046**	**0.022**
Nickel	23	**32**	**198**	**33**	**18.7**
Selenium	2	**20.6**	**86.1**	**2.5**	**1.5**
Silver	1	**0.746**	**3.07**	**0.412**	**0.177**
Zinc	121	**231**	**1050**	**213**	**81.9**

mg/kg	milligrams per kilogram
Bold	Bolded result indicates positively identified compound.
B	Analyte detected in an associated blank.
J	Data are estimated due to associated quality control data. Bias is unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
J+	Data are estimated due to associated quality control data. Potential high bias.
UB	Analyte considered not detected based on associated blank data.
	Highlight indicates exceedance above screening value

TABLE 3-16

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
ENOCH VALLEY MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limit	MSP017	MSP017	MSP017	MSP017	MSP018
Location Identification		**MSP017**	**MSP017**	**MSP017**	**MSP017**	**MSP018**
Field Sample Identification		**1010-MSP017-SD-001**	**1010-MSP017-SD-002**	**1010-MSP017-SD-003**	**1010-MSP017-SD-004**	**1010-MSP018-SD-001**
Date Collected		**9/29/2010**	**9/29/2010**	**9/29/2010**	**9/29/2010**	**9/29/2010**
Metals (mg/kg)						
Antimony	2	**6.0 J-,B**	**6.0 J-,B**	**5.4 J-,B**	**8.6 J-,B**	**7.6 J-,B**
Arsenic	9.8	**5.58**	**4.61**	**8.0**	**9.49**	**10.4**
Cadmium	0.99	**4.82 J**	**3.86 J**	**7.0 J**	**23.8 J**	**141 J**
Chromium, Total	43	**27.8**	**29.2**	**30.1**	**147**	**77.6**
Copper	32	**28.6**	**44.8**	**24.9**	**38.9**	**47.1**
Manganese	460	**408**	**571**	**646**	**355**	**429**
Mercury	0.18	**0.032**	**0.044**	**0.04**	**0.136**	**0.109**
Nickel	23	**49.1**	**38.3**	**75.4**	**190**	**981**
Selenium	2	**58.9 J-,B**	**21.2 J-,B**	**152 J-,B**	**68.8 J-,B**	**129 J-,B**
Silver	1	**0.28**	**0.253**	**0.268**	**0.633**	**0.797**
Zinc	121	**225**	**183**	**365**	**1530**	**6180**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-16

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
ENOCH VALLEY MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limit	MSP018	MSP018	MSP020	MSP020	MSP020
Location Identification		MSP018	MSP018	MSP020	MSP020	MSP020
Field Sample Identification		1010-MSP018-SD-002	1010-MSP018-SD-003	1010-MSP020-SD-001	1010-MSP020-SD-002	1010-MSP020-SD-003
Date Collected		9/29/2010	9/29/2010	10/2/2010	10/2/2010	10/2/2010
Metals (mg/kg)						
Antimony	2	**5.1 J-,B**	**6.9 J-,B**	**6.3 J-,B**	**7.9 J-,B**	**6.3 J-,B**
Arsenic	9.8	**12**	**13.5**	**8.68 J**	**8.23 J**	**7.61 J**
Cadmium	0.99	**293 J**	**164 J**	**35.1 J-,B**	**34.6 J-,B**	**28.7 J-,B**
Chromium, Total	43	**58.3**	**126**	**126 J-**	**111 J-**	**157 J-**
Copper	32	**43.7**	**54.1**	**39.7**	**42.2**	**39.1**
Manganese	460	**393**	**369**	**177**	**189**	**161**
Mercury	0.18	**0.053**	**0.178**	**0.118**	**0.12**	**0.094**
Nickel	23	**1280**	**1280**	**162**	**166**	**112**
Selenium	2	**249 J-,B**	**201 J-,B**	**61.8 J**	**68.8 J**	**37.6 J**
Silver	1	**0.365**	**0.966**	**1.31 J**	**1.25 J**	**1.61 J**
Zinc	121	**13000**	**8580**	**1260**	**1390**	**809**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-16

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
ENOCH VALLEY MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limit	MSP020	MSP020	MSP021	MSP021	MSP021 Dup
Location Identification		**MSP020**	**MSP020**	**MSP021**	**MSP021**	**MSP021 Dup**
Field Sample Identification		**1010-MSP020-SD-004**	**1010-MSP020-SD-005**	**1010-MSP021-SD-001**	**1010-MSP021-SD-002-1**	**1010-MSP021-SD-002-2**
Date Collected		**10/2/2010**	**10/2/2010**	**10/2/2010**	**10/2/2010**	**10/2/2010**
Metals (mg/kg)						
Antimony	2	**4.2 J-,B**	**6.2 J-**	**5.7 J-**	**7.7 J-**	**6.4 J-,B**
Arsenic	9.8	**8.1 J**	**9.8 J**	**12.5 J**	**16.5 J**	**18.4 J**
Cadmium	0.99	**35.4 J-,B**	**37.5 J-,B**	**22.9 J-,B**	**88.9 J-,B**	**92.6 J-,B**
Chromium, Total	43	**142 J-**	**145 J-**	**78.4 J-**	**135 J-**	**133 J-**
Copper	32	**38.1**	**48.5**	**42.1**	**53**	**51.2**
Manganese	460	**167**	**221**	**402**	**131**	**128**
Mercury	0.18	**0.093**	**0.148**	**0.195**	**0.198**	**0.205**
Nickel	23	**124**	**168**	**171**	**353**	**330**
Selenium	2	**59.9 J**	**59.2 J**	**73.5 J**	**515 J**	**543 J**
Silver	1	**1.5 J**	**1.49 J**	**0.543 J**	**1.19 J**	**1.2 J**
Zinc	121	**992**	**1420**	**1020**	**3150**	**2950**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-16

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
ENOCH VALLEY MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limit	MSP021	MSP021	MSP023	MSP023	MSP023
Location Identification		**MSP021**	**MSP021**	**MSP023**	**MSP023**	**MSP023**
Field Sample Identification		**1010-MSP021-SD-003**	**1010-MSP021-SD-004**	**1010-MSP023-SD-001**	**1010-MSP023-SD-002**	**1010-MSP023-SD-003**
Date Collected		**10/2/2010**	**10/2/2010**	**9/28/2010**	**9/28/2010**	**9/28/2010**
Metals (mg/kg)						
Antimony	2	**9.7 J-,B**	**9.7 J-,B**	**5.9 J**	**8.1 J**	**6.8 J**
Arsenic	9.8	**12.1 J**	**13.9 J**	**8.53 J**	**12.9 J**	**15 J**
Cadmium	0.99	**50.6 J-,B**	**38.1 J-,B**	**21.3 J-,B**	**45.3 J-,B**	**35.2 J-,B**
Chromium, Total	43	**383 J-**	**329 J-**	**94.2**	**291**	**156**
Copper	32	**186**	**114**	**35.4**	**55.5**	**55.3**
Manganese	460	**181**	**195**	**859**	**982**	**1020**
Mercury	0.18	**0.684**	**0.502**	**0.119**	**0.217**	**0.198**
Nickel	23	**80.9**	**134**	**73.1**	**142**	**123**
Selenium	2	**58.2 J**	**73.6 J**	**10.9 J**	**26.4 J**	**18.2 J**
Silver	1	**4.14 J**	**2.17 J**	**1.13**	**2.88**	**1.77**
Zinc	121	**430**	**661**	**460**	**1020**	**790**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-16

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
ENOCH VALLEY MINE, P4 RI/FS

Analyte/Methods (Units)	Screening Limit	MSP031	MSP031 Dup	MSP031	MSP031	MSP023
Location Identification		**MSP031**	**MSP031 Dup**	**MSP031**	**MSP031**	**MSP023**
Field Sample Identification		**1010-MSP031-SD-001-1**	**1010-MSP031-SD-001-2**	**1010-MSP031-SD-002**	**1010-MSP031-SD-003**	**1010-MSP023-SD-004**
Date Collected		**9/28/2010**	**9/28/2010**	**9/28/2010**	**9/28/2010**	**9/28/2010**
Metals (mg/kg)						
Antimony	2	**12 J-,B**	**11 J-,B**	**5.8 J-,B**	**8.2 J-,B**	**11**
Arsenic	9.8	**24.5**	**23.5**	**8.54**	**11.7**	**20.3 J**
Cadmium	0.99	**53.6 J**	**52 J**	**6.7 J**	**16.8 J**	**56.9 J-,B**
Chromium, Total	43	**407**	**384**	**40.7**	**75.4**	**309**
Copper	32	**106**	**102**	**40.1**	**51.6**	**83**
Manganese	460	**887**	**926**	**436**	**861**	**1250**
Mercury	0.18	**0.42**	**0.378**	**0.098**	**0.148**	**0.327**
Nickel	23	**320**	**314**	**45.6**	**82.2**	**244**
Selenium	2	**91.4 J-,B**	**86 J-,B**	**4.8 J-,B**	**13.1 J-,B**	**45.1 J**
Silver	1	**3.3**	**3.3**	**0.321**	**0.777**	**3.73**
Zinc	121	**2240**	**2200**	**250**	**508**	**1840**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-16

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
ENOCH VALLEY MINE, P4 RI/FS

	Location Identification	**MST131**	**MST131**	**MST274**	**MST274**
	Field Sample Identification	**1010-MST131-SD-001**	**1010-MST131-SD-002**	**1010-MST274B-SD-001**	**1010-MST274A-SD-001**
	Date Collected	**10/2/2010**	**10/2/2010**	**10/2/2010**	**10/2/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limit**				
Antimony	2	**12 J-,B**	**6.1 J-,B**	**7.9 J-,B**	**8.0 J-,B**
Arsenic	9.8	**14.7**	**9.24**	**4.84**	**4.65**
Cadmium	0.99	**3.67 J-,B**	**1.63 J-,B**	**2.21 J-,B**	**3.12 J-,B**
Chromium, Total	43	**35.6**	**24.6**	**23.5**	**23.5**
Copper	32	**16.7 J**	**16.2 J**	**16.1 J**	**16.8 J**
Manganese	460	**3580**	**4490**	**290**	**251**
Mercury	0.18	**0.016 J-**	**0.02 J-**	**0.03 J-**	**0.036 J-**
Nickel	23	**34.2**	**29.4**	**29.9**	**36.6**
Selenium	2	**2.6 J-,B**	**1.5 J-,B**	**3.9 J-,B**	**4.5 J-,B**
Silver	1	**0.234**	**0.116**	**0.109**	**0.115**
Zinc	121	**107**	**95.3**	**174**	**226**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
Highlight indicates exceedance above screening value

TABLE 3-17

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
HENRY MINE, P4 RI/FS
(Page 1 of 4)

Location Identification Field Sample Identification Date Collected Analyte/Methods (Units)	Screening Limit	MSP014 1010-MSP014-SD-001-1 9/29/2010	MSP014 Dup 1010-MSP014-SD-001-2 9/29/2010	MSP014 1010-MSP014-SD-002 9/29/2010	MSP014 1010-MSP014-SD-003 9/29/2010	MSP014 1010-MSP014-SD-004 9/29/2010
Metals (mg/kg)						
Antimony	2	**5.5 J-,B**	**3.1 J-,B**	**3.6 J-,B**	**8.5 J-,B**	**5.3 J-,B**
Arsenic	9.8	**8.73**	**8.66**	**4.66**	**6.69**	**6.83**
Cadmium	0.99	**21.2 J**	**24.6 J**	**2.63 J**	**19.5 J**	**16.2 J**
Chromium, Total	43	**75.9**	**80**	**23.1**	**144**	**92.3**
Copper	32	**42.4**	**50.7**	**28.1**	**35.4**	**27.5**
Lead	35.8	**0.01**	**0.012**	**0.007**	**0.008**	**0.009**
Manganese	460	**382**	**395**	**300**	**661**	**827**
Mercury	0.18	**0.099**	**0.119**	**0.025**	**0.13**	**0.12**
Nickel	23	**75.1**	**72.5**	**27.5**	**75.2**	**96.1**
Selenium	2	**13.9 J-,B**	**14.5 J-,B**	**4.9 J-,B**	**12.8 J-,B**	**24 J-,B**
Silver	1	**0.886**	**1.01**	**0.184**	**0.938**	**0.872**
Zinc	121	**447**	**416**	**126**	**456**	**500**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE 3-17

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
HENRY MINE, P4 RI/FS
(Page 2 of 4)

Location Identification		**MSP014**	**MSP015**	**MSP015**	**MSP015**	**MSP015**
Field Sample Identification		**1010-MSP014-SD-005**	**1010-MSP015-SD-001**	**1010-MSP015-SD-002**	**1010-MSP015-SD-003**	**1010-MSP015-SD-004**
Date Collected		**9/29/2010**	**9/30/2010**	**9/30/2010**	**9/30/2010**	**9/30/2010**
Analyte/Methods (Units)						
Metals (mg/kg)	**Screening Limit**					
Antimony	2	**8.4 J**	**5.5 J-,B**	**7.5 J-,B**	**7.0 J-,B**	**7.9 J-,B**
Arsenic	9.8	**8.8 J**	**8.82**	**6.7**	**7.7**	**8.4**
Cadmium	0.99	**28.1 J-,B**	**19.7 J**	**11.9 J**	**18.4 J**	**22.9 J**
Chromium, Total	43	**116**	**72.3**	**52.2**	**77.4**	**77.4**
Copper	32	**37.6**	**34.2**	**33.5**	**32.9**	**68.8**
Lead	35.8	**0.01**	**0.012**	**0.009**	**0.007**	**0.008**
Manganese	460	**788**	**2580**	**1350**	**1770**	**1810**
Mercury	0.18	**0.118**	**0.107**	**0.07**	**0.109**	**0.109**
Nickel	23	**148**	**159**	**95.2**	**141**	**165**
Selenium	2	**46.2 J**	**43.4 J-,B**	**26.5 J-,B**	**35.6 J-,B**	**40.1 J-,B**
Silver	1	**0.887**	**0.711**	**0.535**	**0.645**	**0.736**
Zinc	121	**979**	**1210**	**663**	**1030**	**1380**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE 3-17

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
HENRY MINE, P4 RI/FS
(Page 3 of 4)

Location Identification Field Sample Identification Date Collected Analyte/Methods (Units)	Screening Limit	MSP016 1010-MSP016-SD-001 9/30/2010	MSP016 1010-MSP016-SD-002 9/30/2010	MSP016 1010-MSP016-SD-003 9/30/2010	MSP016 1010-MSP016-SD-004-1 9/30/2010	MSP016 Dup 1010-MSP016-SD-004-2 9/30/2010
Metals (mg/kg)						
Antimony	2	7.4 UB	4.7 UB	9.5 UB	5.4 UB	4.7 UB
Arsenic	9.8	**7.36 J**	**5.6 J**	**10.6 J**	**6.48 J**	**5.83 J**
Cadmium	0.99	**5.18 J-,B**	**54.9 J-,B**	**39.7 J-,B**	**6.77 J-,B**	**6.47 J-,B**
Chromium, Total	43	**55**	**215**	**320**	**48.3**	**47**
Copper	32	**27.2**	**43.6**	**57.3**	**30.2**	**31.8**
Lead	35.8	**0.009**	**0.007**	**0.009**	**0.006**	**0.011**
Manganese	460	**506**	**335**	**119**	**208**	**187**
Mercury	0.18	**0.061**	**0.13**	**0.236**	**0.067**	**0.072**
Nickel	23	**41.4**	**48**	**88.8**	**54.2**	**51.8**
Selenium	2	**21.3 J**	**28.9 J**	**82.5 J**	**97.4 J**	**96.3 J**
Silver	1	**0.485 J**	**1.9 J**	**2.16 J**	**0.438 J**	**0.444 J**
Zinc	121	**171**	**490**	**608**	**279**	**274**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE 3-17

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
HENRY MINE, P4 RI/FS
(Page 4 of 4)

Location Identification		**MST053**	**MST053**	**MST275**	**MST275**
Field Sample Identification		**1010-MST053-SD-001**	**1010-MST053-SD-002**	**1010-MST275A-SD-001**	**1010-MST275B-SD-001**
Date Collected		**10/3/2010**	**10/3/2010**	**10/1/2010**	**10/1/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limit**				
Antimony	2	4.2 UB	**4.7 J**	**5.9 J**	**4.7 J**
Arsenic	9.8	**1.53 J**	**1.99 J**	**2.99 J**	**3.36 J**
Cadmium	0.99	**1.27 J-,B**	**1.19 J-,B**	**0.481 J-,B**	**0.488 J-,B**
Chromium, Total	43	**17.5**	**17.7**	**21.4**	**23**
Copper	32	**10.6**	**12.8**	**51.3**	**16.8**
Lead	35.8	**0.007**	**0.004**	**0.004**	**0.004**
Manganese	460	**316**	**262**	**580**	**620**
Mercury	0.18	**0.02**	**0.02**	**0.021**	**0.023**
Nickel	23	**11.5**	**12**	**16.6**	**18.9**
Selenium	2	**1.3 J**	**1.3 J**	**1.1 J**	**1.4 J**
Silver	1	**0.119 J**	**0.117 J**	**0.161 J**	**0.16 J**
Zinc	121	**59.9**	**68.3**	**67.9**	**56.3**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE 3-18

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
BACKGROUND SAMPLES, P4 RI/FS
(Page 1 of 2)

Location Identification		**MST093**	**MST093 Dup**	**MST093**	**MST274**	**MST274**
Field Sample Identification		**1010-MST093A-SD-001-1**	**1010-MST093A-SD-001-2**	**1010-MST093B-SD-001**	**1010-MST274B-SD-001**	**1010-MST274A-SD-002**
Date Collected		**10/4/2010**	**10/4/2010**	**10/4/2010**	**10/2/2010**	**10/2/2010**
Analyte/Methods (Units)						
Metals (mg/kg)	**Screening Limits**					
Antimony	2	4.5 UB	4.8 UB	3.2 UB	**7.9 J-,B**	**8.0 J-,B**
Cadmium	0.99	**1.88**	**1.94**	**2.21**	**2.21 J-,B**	**3.12 J-,B**
Copper	32	**14.5**	**14.3**	**14.9**	**16.1 J**	**16.8 J**
Manganese	460	**401**	**400**	**405**	**290**	**251**
Nickel	23	**15.2**	**16.2**	**17.2**	**29.9**	**36.6**
Selenium	2	**1.0**	**0.9 J**	**1.0 J**	**3.9 J-,B**	**4.5 J-,B**
Zinc	121	**92**	**94.8**	**107**	**174**	**226**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value

TABLE 3-18

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SEDIMENT RESULTS
BACKGROUND SAMPLES, P4 RI/FS
(Page 2 of 2)

	Location Identification	**MST275**	**MST275**	**MST277**	**MST277**
	Field Sample Identification	**1010-MST275A-SD-001**	**1010-MST275B-SD-001**	**1010-MST277A-SD-001**	**1010-MST277B-SD-002**
	Date Collected	**10/1/2010**	**10/1/2010**	**10/3/2010**	**10/3/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	2	**5.9 J**	**4.7 J**	**5.0 J-**	**4.8 J-**
Cadmium	0.99	**0.481 J-,B**	**0.488 J-,B**	**1.92 J**	**2.95 J**
Copper	32	**51.3**	**16.8**	**20.6**	**25.5**
Manganese	460	**580**	**620**	**194 J+**	**200 J+**
Nickel	23	**16.6**	**18.9**	**13.1**	**20.7**
Selenium	2	**1.1 J**	**1.4 J**	**1.2**	**1.6**
Zinc	121	**67.9**	**56.3**	**89.9**	**125**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value

TABLE 3-19

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SURFACE WATER RESULTS
BALLARD MINE SAMPLES, P4 RI/FS

	Location Identification	**MST066**		**MST066**	
	Location Type	**Stream**		**Stream**	
	Date Collected	**10/3/2010**		**10/3/2010**	
Analyte/Methods (Units)					
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**
Arsenic	0.01	**0.0151**	--	**0.0148**	--
Boron	0.0016	**0.0288**	--	**0.0284**	--
Chromium, Total	0.000031	**0.00097**	--	**0.00131**	--
Cobalt	0.004	**0.0075**	--	**0.00376**	--
Manganese	0.05	**2.64**	--	**2.62**	--
Selenium	0.005	--	**0.0077 J+**	--	**0.0065 J+**
Thallium	0.00024	<0.000004	--	**0.000039 J**	--
Uranium	0.0026	**0.00427**	--	**0.0043**	--

Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
	Highlight indicates exceedance above screening value

TABLE 3-20

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SURFACE WATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS

	Location Identification	**MSP017**		**MSP018**		**MSP020**		**MSP021**	
	Location Type	**Pond**		**Pond**		**Pond**		**Pond**	
	Date Collected	**9/29/2010**		**9/29/2010**		**10/2/2010**		**10/2/2010**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Boron	0.0016	<0.002	--	**0.0195**	--	**0.0182**	--	**0.116**	--
Chromium, Total	0.000031	**0.00099**	--	**0.0008**	--	**0.00085**	--	**0.00038**	--
Iron	0.16	--	--	--	--	--	--	--	--
Manganese	0.05	**0.268**	--	**0.334**	--	**0.0042**	--	**0.0421**	--
Nickel	0.052	**0.0128**	--	**0.511**	--	**0.0107**	--	**0.0156**	--
Selenium	0.005	**0.058**	**0.0593**	**0.0688**	**0.0493**	**0.0278 J+**	**0.0282**	**0.0785 J+**	**0.0844**
Uranium	0.0026	**0.00463**	--	**0.0162**	--	**0.00559**	--	**0.00437**	--
Vanadium	0.02	**0.00156**	--	**0.0341**	--	**0.0192**	--	**0.0121**	--
Zinc	0.12	**0.0026**	--	**0.231**	--	**0.0019 J**	--	**0.0023**	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE 3-20

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SURFACE WATER RESULTS
ENOCH VALLEY MINE SAMPLES, P4 RI/FS

	Location Identification	**MSP021 Dup**		**MST131**	
	Location Type	**Pond**		**Stream**	
	Date Collected	**10/2/2010**		**10/2/2010**	
Analyte/Methods (Units)					
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**
Boron	0.0016	**0.116**	--	**0.0225 B**	--
Chromium, Total	0.000031	**0.00099**	--	**0.00046**	--
Iron	0.16	--	--	--	--
Manganese	0.05	**0.0414**	--	**0.0387**	--
Nickel	0.052	**0.019**	--	**0.00216 J**	--
Selenium	0.005	**0.0821 J+**	**0.0839**	--	**0.0008 J**
Uranium	0.0026	**0.00429**	--	**0.000556**	--
Vanadium	0.02	**0.0125**	--	**0.00097**	--
Zinc	0.12	**0.0014 J**	--	**0.0036**	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration i than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE 3-21

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SURFACE WATER RESULTS
HENRY MINE SAMPLES, P4 RI/FS
(Page 1 of 1)

	Location Identification	**MSP014**		**MSP015**		**MSP016**		**MST053**	
	Location Type	**Pond**		**Pond**		**Pond**		**Stream**	
	Date Collected	**9/29/2010**		**9/30/2010**		**9/30/2010**		**10/3/2010**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limit**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Boron	0.0016	**0.028**	--	**0.0402**	--	0.0084 UB	--	**0.0146 B**	--
Cadmium	0.0006	**0.000018 J**	--	**0.000077**	--	**0.000027**	**0.00128**	**0.000012 J**	--
Chromium, Total	0.000031	**0.00078**	--	**0.00051**	--	**0.00053**	**0.00414**	**0.00059**	--
Manganese	0.05	**0.0204**	--	**2.44**	--	**0.106**	--	**0.0087**	--
Selenium	0.005	**0.005**	**0.0053**	**0.0176**	**0.0225**	--	**0.0105**	--	**0.0007 J**

Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
UB	Analyte considered not detected based on associated blank data.
UJ	Potential low bias, possible false negative.
	Highlight indicates exceedance above screening value

TABLE 3-22

EXCEEDANCE SUMMARY OF 2010 RIPARIAN SURFACE WATER RESULTS
BACKGROUND SAMPLES, P4 RI/FS
(Page 1 of 1)

Location Identification		**MST274***		**MST274***		**MST275***		**MST275***	
Location Type		**Stream**		**Stream**		**Stream**		**Stream**	
Date Collected		**10/1/2010**		**10/1/2010**		**10/1/2010**		**10/1/2010**	
Analyte/Methods (Units)									
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Arsenic	0.01	**0.00057**	--	**0.00054**	--	**0.0194**	--	**0.0224**	--
Boron	0.0016	**0.016 B**	--	**0.0153 B**	--	**0.121**	--	**0.116**	--
Chromium, Total	0.000031	**0.00043**	--	**0.00039 B**	--	**0.00272**	--	**0.00343**	--
Cobalt	0.004	**0.000462**	--	**0.00101**	--	**0.0132**	--	**0.0141**	--
Manganese	0.05	**0.0099**	--	**0.0109**	--	**1.74**	--	**2.33**	--
Selenium	0.005	--	**0.0041**	--	**0.0041**	--	**0.006**	--	**0.0047**
Thallium	0.00024	0.000004 UB	--	0.000004 UB	--	**0.000348**	--	**0.000059**	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
J Data are estimated due to associated quality control data.
UB Analyte considered not detected based on associated blank data.
Highlight indicates exceedance above screening value
* MST274 and MST275 are no longer considered background stations.

APPENDICES

APPENDIX A – FIELD NOTES AND FIELD FORMS

A-1 2010 Monitoring Well and Direct Push Borehole Installation Sampling Field Notes and Field Forms

A-2 2010 Riparian Soil, Sediment, and Surface Water Sampling

A-3 2010 Spring and Fall Groundwater and Surface Water Sampling

A-4 2012 Spring and Fall Groundwater and Surface Water Sampling

A-1 2010 Monitoring Well and Direct Push Borehole Installation Sampling Field Notes and Field Forms

TABLE A-1
DIRECT PUSH BORING LOCATION INFORMATION

P4 MONSANTO, IDAHO
(Page 1 of 1)

Borehole ID	Borehole Location	Total Boring Depth (ft bgs)	Water Sample Collected	Water Sample Interval (ft bgs)	Easting	Northing	pH	Specific Conductivity (µS/cm)
BH159	Ballard South	10	yes	6-10	679154.3	418287.5	6.86	784
BH160	Ballard South	10	yes	6-10	678729.3	418856.1	6.65	764
BH161	Ballard South	10	yes	6-10	678157.9	419029.9	6.69	564
BH162	Ballard West	10	yes, also MS/MSD	6-10	679898.4	425437.3	8.20*	2.0*
BH163	Ballard West	30	dry	NA	679963.3	428475.5	NA	NA
BH164	Ballard West	20	yes	16-20	679282.9	427659.4	6.81	567
BH165	Ballard West	30	dry	NA	679309.7	427980.2	NA	NA
BH166	Ballard West	20	yes, also field dup	15-19	679446.3	428476.6	5.56*	351
BH167	Henry	15	yes	8-12	693285.2	437462.8	6.52	1320
BH168	Henry	30	dry	NA	695228	436866	NA	NA
BH169	Henry	13	yes	9-13	684480.7	437458.2	7.07	625
BH170	Henry	30	dry	NA	694239.7	438369.2	NA	NA
BH171	Henry	13	yes	9-13	694898.1	437972.5	6.8	500
BH172	Ballard South	10	yes	6-10	677781.1	419486.7	6.87	449

ft bgs feet below ground surface
µS/cm microSiemens per centimeter
NA no sample or parameter collected, location dry
Northings and Eastings are in State Plane Coordinate System, Idaho East, NAD27, US Feet.
* Field parameter data appeared suspect, YSI meter was recalibrated again in the field after this data was taken.

TABLE A-2
ENOCH VALLEY 2010 NEW MONITORING WELL
DRILLING AND CONSTRUCTION DETAILS

P4 MONSANTO, IDAHO
(Page 1 of 1)

Mine	Well ID	Well Location	Date Installed	Boring TD (ft bgs)	Depth Water Encountered when Drilling (ft bgs)	Depth to Formation Contacts (ft bgs)[1]	Well Completion TD (ft bgs)	Screened Interval [Length] (ft bgs)	Screen Slot Size (in)	Sand Size at Screen	Primary Filter Interval (ft bgs)	Bentonite Seal (Chips) Interval (ft bgs)	Permanent Steel Casing (ft bgs)
Enoch Valley Mine	MMW037	Paired with MMW036 and downgradient of MMW027 and MMW035	9/20/2010	302.5	114.3	0-Alluvium 80-Basalt **263-Dinwoody**	302	302-292 [10]	0.01	20X40	302-286	286-surface	15.5

Notes:
(1) - Bold indicates formation at screened interval
in inches
ft bgs feet below ground surface

BORING LOG NUMBER: BH159

SHEET 1 OF 1

LOC ID: BH159 ELEVATION: DATUM:

PROJECT NAME: monsanto DRILL DATE: 8/19/10

INCLINATION: AZIMUTH: HAMMER WEIGHT: DATE FINISHED: 8/19/10

LOCATION SKETCH

@BH125

↑n @BH159

DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	SAMPLES USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
Sample #									
0		silty clay, soft, 7.5yr 1/1, moist. apx 1.0' transition to silty clay with gravels bgs							
001		10yr 4/2, soft, mid plasticity, gravels fine range		CL					only 2.5' of recovery
5		silty gravel, 10yr 4/4, gravels fine range, wet transition 6.0' bgs to							
002		~~sig~~ silt, 10yr 5/6, moist		GM					only 2.5' of recovery
10				ML					
		TD 10.0							
		DTW ~6.0'							
15									
20									
25									
30									
35									
40									
45									

DEPTH UNITS: 1unit = 1foot

DRILLING CONTRACTOR: earth probe

DRILLER: pat casey

LOGGED BY: E. Jackson

CHECKED BY:

REV No.	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE

SCALE: FIGURE No:

SOIL BORING LOG FORM

BORING LOG NUMBER: BH160

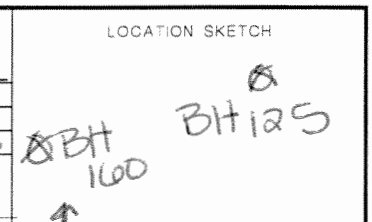
SHEET 1 OF 1

LOC. ID: BH160 ELEVATION: DATUM:

PROJECT NAME: monsanto DRILL DATE: 8/19/10

INCLINATION: AZIMUTH: HAMMER WEIGHT: DATE FINISHED 8/19/10

LOCATION SKETCH



DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	SAMPLES: USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
0		silty clay, soft, moist, 10yr 5/1, mdplasticity		CL					only 1.5' of recovery
5		silty gravels, gravels fine range, wet, 10yr 4/1		GM					only 1.5' of recovery
10		TD 10.0 DTW ~5.0'							
15									
20									
25									
30									
35									
40									
45									

Sample #
001
002

DEPTH UNITS: 1unit = 1 foot

DRILLING CONTRACTOR: earthprobe

DRILLER: pat casey

LOGGED BY: E. Jackson

CHECKED BY:

REV No.	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.:

AutoCAD FILE:

SCALE

FIGURE No

SOIL BORING LOG FORM

BORING LOG NUMBER: BH161

SHEET 1 OF 1

LOC. ID: BH161 ELEVATION: DATUM:

PROJECT NAME: monsanto DRILL DATE: 8/19/10

INCLINATION: AZIMUTH: HAMMER WEIGHT: DATE FINISHED: 8/19/10

LOCATION SKETCH

BH118

BH161

N

Sample #	DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
001	0		clay, soft, md plasticity, 10yr 2/1, dry. Transition at 4.5' to gravelly silts, moist, fine gravels, 10yr 4/2		CL					
	5		gravelly silts, wet, ~~off~~ fine gravels, 10yr 4/2, Transition at 8.0' to clay, moist, soft, 10yr 4/2, md. plasticity		ML					
002					ML					only 2.5' of recovery
	10				CL					
			TD 10.0							
			DTW ~ 5.0'							
	15									
	20									
	25									
	30									
	35									
	40									
	45									

DEPTH UNITS: 1 unit = 1 foot

DRILLING CONTRACTOR: earth probe

DRILLER: Pat Cosby

LOGGED BY: E. Jackson

CHECKED BY:

REV No.	REVISIONS	REV. DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE

SCALE: FIGURE No.

SOIL BORING LOG FORM

BORING LOG NUMBER: BH1L02

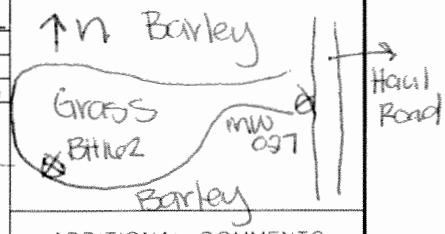
SHEET 1 OF 1

LOC. ID: BH1L02 ELEVATION: DATUM:

PROJECT NAME: monsanto DRILL DATE: 8/18/10

INCLINATION: AZIMUTH: HAMMER WEIGHT: DATE FINISHED: 8/18/10

LOCATION SKETCH



Sample #	DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
001	0		clayey silt, 10YR 5/4, dry, stiff, low plasticity		ML					
002	5		interbedded clayey silt / silt wet in silt zones, iron oxide staining, 10YR 5/4, soft, md plasticity		ML					
	10		TD 10.0							
	15									
	20									
	25									
	30									
	35									
	40									
	45									

DEPTH UNITS: 1 unit = 1 foot

DRILLING CONTRACTOR: earth probe

DRILLER: pat casey

LOGGED BY: E. Jackson

CHECKED BY:

REV No.	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE:

SCALE

FIGURE No.

SOIL BORING LOG FORM

BORING LOG NUMBER BH1163

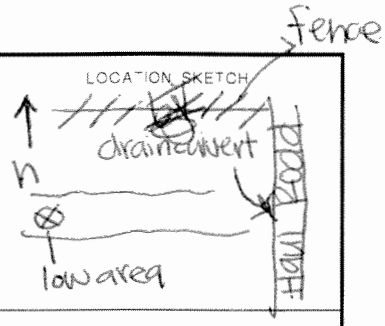
SHEET 1 OF ___

LOC. ID: BH1163 ELEVATION: DATUM:

PROJECT NAME: Monsanto DRILL DATE 8/18/10

INCLINATION: AZIMUTH: HAMMER WEIGHT DATE FINISHED 8/18/10

LOCATION SKETCH



Sample #	DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
	0		no recovery							
001	5		silty clay/clayey silt with medium and fine range gravels, dry, soft, md plasticity, 10 yr 4/3		ML CL					
002	10		silty clay, 10 yr 4/3, soft, md. plasticity, dry. 1.0" gravel layer at 12.0' bgs, angular, medium to fine range		CL GP					
003	15		interbedded silt and silty clay, iron oxide staining bounding beds, 10 yr 5/4. moist 1.0" thick zone at approx 16.0' bgs		ML CL					
004	20		silty clay, dry, 10 yr 5/6, stiff, low to non plasticity.		CL					
005	25		silty clay/clay, dry, stiff, non plastic, 2.5 yr 4/1.		CL					
	30		TD 30.0							
	35									
	40									
	45									

DEPTH UNITS: 1 unit = 1 foot

DRILLING CONTRACTOR: Earthprobe

DRILLER: Pat Casey

LOGGED BY: E. Jackson

CHECKED BY:

REV No.	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE.

SCALE: FIGURE No

SOIL BORING LOG FORM

BORING LOG NUMBER: BH164

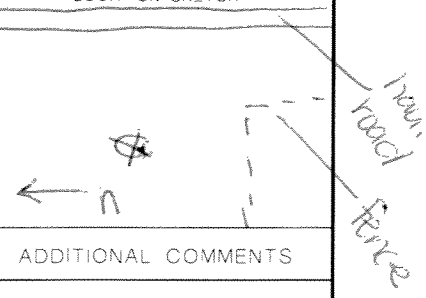
SHEET 1 OF ___

LOC. ID: BH164 ELEVATION: DATUM:

PROJECT NAME: monsanto DRILL DATE: 08/18/10

INCLINATION AZIMUTH: HAMMER WEIGHT DATE FINISHED 08/18/10

LOCATION SKETCH



DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	SAMPLES: USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
0		Gravely silts, dry, 10yR 3/2, fine gravel range		ML					
5		as above transition at 7.5' bgs to silty clay, wet, soft, md. plasticity, 10yR 5/8		ML / CL					
10		silty clay with some fine gravels → clayey silt, dry, 10yR 5/8, stiff, low plasticity		ML / CL					
15		as above, transition at 16.5' bgs to clayey silt, wet, 10yR 5/8, soft, fine grained		ML					
20		TD 20.0							
25									
30									
35									
40									
45									

sample # 001 002 003 004

DEPTH UNITS: 1unit = 1 foot

DRILLING CONTRACTOR earthprobe

DRILLER: Pat Casey

LOGGED BY: E. Jackson

CHECKED BY:

REV No.	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE

SCALE FIGURE No.

SOIL BORING LOG FORM

BORING LOG NUMBER: BH165

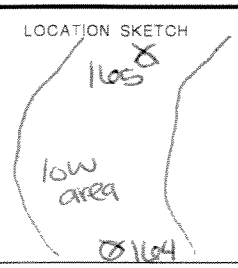
SHEET 1 OF ___

LOC. ID: BH165 ELEVATION: DATUM:

PROJECT NAME.: Monsanto DRILL DATE 08/18/10

INCLINATION: AZIMUTH: HAMMER WEIGHT: DATE FINISHED: 08/18/10

LOCATION SKETCH



Sample #	DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
001	0		Gravely silt, dry, gravels fine range, 10yR 4/2. Transition at 4.0' to		ML					
			silty clay, dry, 10 yR 5/6, stiff, low plasticity		CL					
	5		silty clay / clayey silt, dry, with some fine gravels throughout,		CL					
002			10yR 5/6, stiff, low plasticity		ML					
	10		silty clay / clay, soft, mod plasticity dry 10 yR 5/6, some fine gravels		CL					
003			present in silty clays.							
	15		silty clay with some fine gravels		CL					
004			through out, dry, 10yR 5/6, stiff,							
	20		mod plasticity		CL					
			as above, transition at 23.0' bgs		ML					
005			gravely silt, wet, gravels fine range 10yR 6/6. 24.5' clay, 10yR 4/6, soft, mod plastic.		CL					
	25		silty clay with fine gravels		CL					
006			throughout, 7.5 yR 4/6, moist today, soft, mod plasticity.							
	30		TD 30.0							
	35									
	40									
	45									

DEPTH UNITS: 1 unit = 1 foot

DRILLING CONTRACTOR: earthprobe

DRILLER: Pat Casey

LOGGED BY: E. Jackson

CHECKED BY:

REV. No.	REVISIONS	REV. DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.:

AutoCAD FILE:

SCALE: FIGURE No:

SOIL BORING LOG FORM

BORING LOG NUMBER: BH1606

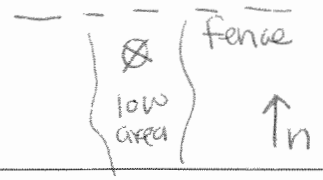
SHEET 1 OF 1

LOC. ID: BH1606 | ELEVATION: | DATUM:

PROJECT NAME: Monsanto | DRILL DATE: 8/18/10

INCLINATION: | AZIMUTH: | HAMMER WEIGHT | DATE FINISHED 8/18/10

LOCATION SKETCH



Sample #	DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
001	0		silty clay, dry, soft, 10yr 4/3, md plasticity		CL					recovered only 1 foot of sample
002	5		silty clay, stiff, dry, md plasticity, 10yr 4/4. some iron oxide staining in siltier regions		CL					
003	10		silty clay / clayey silt, dry to moist, → at 12.0' iron oxide staining through out, 10yr 4/4, soft, md plasticity		ML / CL					
004	15		as above, wet. Transition at 18.0' to 2.5 y 6/3 clay, stiff, md plasticity, dry		CL					
	20		TD 20.0							
	25									
	30									
	35									
	40									
	45									

DEPTH UNITS 1unit = 1 foot

DRILLING CONTRACTOR: earthprobe

DRILLER: pat casey

LOGGED BY E. Jackson

CHECKED BY:

REV No	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE.

SCALE: FIGURE No.

SOIL BORING LOG FORM

BORING LOG NUMBER: BH167

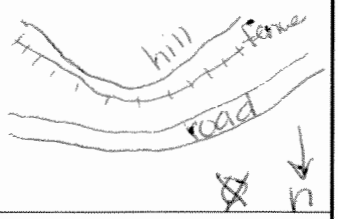
SHEET 1 OF 1

LOC ID: BH167 | ELEVATION: | DATUM:

PROJECT NAME: monsanto | DRILL DATE: 08/17/10

INCLINATION: | AZIMUTH: | HAMMER WEIGHT | DATE FINISHED: 08/17/10

LOCATION SKETCH



DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	SAMPLES: USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
0		silty dry, 10yR 3/4, fine grained. Gravels at approx 2.0' bgs angular range 0.10"-2.0" across, transition to silty clay 10yR 3/4, mod plasticity mod stiff.		ML					
				GW					
5		silty clay / clayey silt with gravels and some sand, dry up to 7.0' bgs then wet. mod plasticity, mod stiff, 10yR 3/4		ML					
				CL					
10		as above, transition at 12.0' bgs to silty clay, mod stiff, dry. Some iron oxide staining, 10yR 4/6		ML					
				CL					
15		TD 15.0'							
20									
25									
30									
35									
40									
45									

sample #
001
002
003

DEPTH UNITS: 1 unit = 1 foot

DRILLING CONTRACTOR: Pat Casey

DRILLER: earthprobe

LOGGED BY: E. Jackson

CHECKED BY:

REV No.	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.:

AutoCAD FILE:

SCALE | FIGURE No.

SOIL BORING LOG FORM

BORING LOG NUMBER: BH168

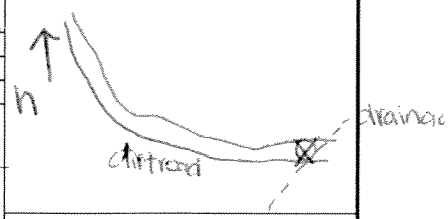
SHEET 1 OF 1

LOC. ID: BH168 ELEVATION: DATUM:

PROJECT NAME: monsanto DRILL DATE 8/17/10

INCLINATION: AZIMUTH: HAMMER WEIGHT: DATE FINISHED 8/17/10

LOCATION SKETCH



DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	SAMPLES: USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
0		silty clay with gravel, gravel range 0.05"-1.0" across, dry, 10YR4/6		CL					
5		as above, transition at 7.5' bgs to interbedded silt and silty clay, dry, very stiff, iron oxide staining at beds 10yr 2/6	ML / CL						
10		as above but 10yr 5/6, dry		ML					
15		as above with some fine gravels, dry, iron oxide staining bounding clay and silts, 10 yr 5/4, stiff, md plasticity		CL / ML					
20		clay, 10yr 3/1, dry, md plasticity, medium stiff		CL					
25		clay, 10yr 3/1, dry, stiff, low plasticity		CL					
30		TD. 30.0 no water sample, dry							
35									
40									
45									

sample 001 002 003 004 005 006

DEPTH UNITS: 1unit = 1 foot

DRILLING CONTRACTOR: Earth Probe

DRILLER: Pat Casey

LOGGED BY: E. Jackson

CHECKED BY:

REV No.	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.:

AutoCAD FILE

SCALE: FIGURE No.

SOIL BORING LOG FORM

BORING LOG NUMBER: BH169

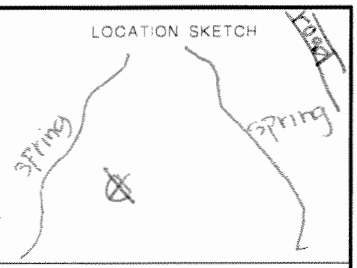
SHEET 1 OF 1

LOC. ID: BH169 | ELEVATION | DATUM:

PROJECT NAME: BH169 MONSANTO | DRILL DATE:

INCLINATION: | AZIMUTH: | HAMMER WEIGHT: | DATE FINISHED

LOCATION SKETCH



Sample #	DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
	0		clay, very soft, md plasticity, 10yR 2/2. transition at 2.0' bgs to clay, stiff with gravels and some sand, subangular to subrounded 0.10" across, dry, 10yR 4/6		CL	✓				
001	5		clay, md stiff, md plasticity 2.5yR 4/2		CL					
002			Transition at 7.0' bgs to silty clay/clayey silt, wet, 2.5yR 4/1 md stiff. Transition at 9.0' to gravely sand, wet, 2.5yR 5/4		CL					
003	10		as above. Transition at 11.5' bgs to clay, soft, md plasticity; 2.5yR 3/2, moist.		ML					
	15		TD 13.0'							
	20									
	25									
	30									
	35									
	40									
	45									

DEPTH UNITS: 1unit = 1 foot

DRILLING CONTRACTOR: Earth Probe

DRILLER: Pat Casey

LOGGED BY: E. Jackson

CHECKED BY:

REV No	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE:

SCALE: | FIGURE No

SOIL BORING LOG FORM

BORING LOG NUMBER: BH172

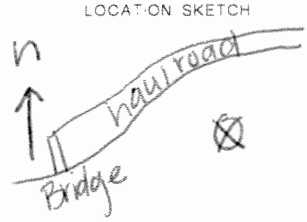
SHEET 1 OF 1

LOC. ID: BH172 | ELEVATION: | DATUM:

PROJECT NAME: monsanto | DRILL DATE: 8/19/10

INCLINATION | AZIMUTH: | HAMMER WEIGHT: | DATE FINISHED 8/19/10

LOCATION SKETCH



Sample #	DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
001	0		silty clay, rootlets present, soft, md plasticity, 10yR 4/4.		CL					only apx. 1' of recovery
002	5		silty clay/silt, wet, 10yR 5/4. some fine gravels present. at 9.5' silty gravels, wet, fine, 10yR 3/1		CL ML GM					
	10		TD 10.0 DTW ~ 5.5' bgs							
	15									
	20									
	25									
	30									
	35									
	40									
	45									

DEPTH UNITS: 1unit = 1 foot

DRILLING CONTRACTOR: earthprobe

DRILLER: pat casey

LOGGED BY: E. Jackson

CHECKED BY:

REV No.	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE

SCALE: | FIGURE No.

SOIL BORING LOG FORM

1008924 ~~1007903~~ E. Jackson

08/17/10 Monsanto

0645 arrive at Monsanto Office

0715 Earth probe arrive, safety briefing

0900 mob to Henry mine site

1020 begin BH~~169~~ 167, 0-15' soil samples taken wet at apx 8.0'-12.' let water charge into hole. Calibrate YSI 169

1117 Set up on BH-~~169~~ 169, Barry K. on site

1230 sample BH~~169~~ 169 9-13', DTW 5.5' bgs pH 7.07 ORP 102.2 DO% 64.3 TDS 0.406 21.22°C 0.625 ms/cm³ 40.4 pHmV. Barry leave

1255 set up on BH~~169~~ 171 drive rods to apx 13.0' bgs no soil taken

1310 sample BH~~169~~ 171 9-13', DTW 4.4' bgs 15.60°C, 0.500 ms/cm³ 0.325 TDS ~~pH~~ 6.80 pH, 47.0 pHmV, 154.4 ORP 77.0 DO%

N 437972.5 E 694898.1

1338 set up BH~~169~~ 171 drive rods to apx. 30.0 no soil sample taken. 0-5' dry 5-10' dry 10-15' dry 15'-20' dry 20-25' moist to dry 25'-30' dry no sample taken

~~1007903~~ 1008924

08/17/10 Monsanto E. Jackson

1430 BH~~169~~ 168 Henry, begin pulling rods. N = 438369.2
E = 694239.7

1500 BH169 N = 437458.2
E = 684480.7

1511 BH~~169~~ 167 DTW 8.0' bgs take water sample

15.2°C 1.32 ms/cm³ 0.858 TDS 78.5% DO 6.52 pH 56.2 pHmV 157.8 ORP

N = 437462.8 E = 693285.2

1545 set up on BH~~169~~ 168 moved to drainage and road cross

1624 reach TD ~~30~~ 30.0' bgs BH~~169~~ 168 dry, no sample

1628 take EQ400 Henry
N = 437462.1
E = 693285.2

1648 leave Henry mine site

1705 begin marking west Ballard sites

1752 done for day

ej 08/17/10

08/18/10 monsanto E. Jackson
0645 arrive at Enoch office, calibrate YSI meter
0750 meet Earthprobe and Barry Koch at Ballard west site, DEQ will visit today.
0838 setup on BH164
collect soil samples upto 20.0' bgs
0932 collect water sample BH164, water coming in slowly. Going to let hole sit and move to next location.
n= ~~427660~~ 427659.4
E= 679282.9
0955 setup on BH165
1015 Idaho DEQ on site
1038 reach TD 30.0' bgs BH165 allow hole to stay open in hopes water will come in
n=427980.2
E=679309.7
1110 setup BH166
1140 reach TD 20.0' bgs, take water sample
1150 take Ballard-GW400
1153 WL BH166 15.25' bgs
17.25°C, 0.351 ms/cm³, 0.228 TDS

08/18/10 ② monsanto EJ
87.6% DO, pH 5.56, 41.2 pH mV
183.1 ORP
n= 428476.6
E= 679446.3
1215 recalibrated YSI for pH in the field due to BH166 reading.
1230 check WL on BH165, dry
1240 back at BH164, dtw 16.0' bgs TD now 18.0' caved in 2.0'
1253 BH164 continued to cave where water is, going to drive the rods back down to 20.0' to keep hole open and try for watersample again. Sample taken.
25.25°C, 0.567 ms/cm³, 0.368 TDS
57.1 DO%, 6.81 pH, 18.2 pH mV, 255.0 ORP
1447 set up on BH163
1514 reach TD 30.0', dry
n= 428475.5
E= 679963.3
1609 setup on BH162, unwound barbed wire fence to enter field, did not drive on any barley. Hit Basalt at 5.0' bgs, moving to edge of barley and weeds.

1008924 ~~1007903~~

08/18/10 (3) monsanto EJ
1647 refusal and 2nd location, Basalt at 5.0' bgs, moving east
1700 water at 5'-10'.0 bgs at 3rd location, leaving rods in ground overnight to allow recharge of screen interval
1748 back in town

ej 08/18/10

~~1007903~~ 1008924

08/19/10 monsanto E. Jackson
0700 meet crew at BH162
0715 sample BH162, also took ms/msD here
~~13.98°C~~, 8.20 pH, 0.002 ms/cm, 11.9% DO, 185 ORP, 17.38°C
n = 425437.3 } recal. YSI again in
E = ~~679884.7~~ 674805 } field above reading?
0919 set up on BH172
n = 419486.7
E = 677781.1
0934 took GW sample BH172
13.82°C, 0.449 ms/cm, 115.1 DO%
6.87 pH, 39.3 pHmV, 195.4 ORP
0949 setup on BH161
n = 419029.9
E = 678157.9
1000 took GW sample BH161
13.42°C, 0.564 ms/cm, 0.366 TDS,
85.6 DO%, 6.69 pH, 45.1 pHmV, 162.2 ORP
1010 took Ballard EQ400
1025 set up BH160
n = ~~418956.2~~ 418856.1
E = 678729.3
1040 took sample GW BH160
12.46°C, 0.764 ms/cm, 0.496 TDS

1008924 ~~1009903~~

08/19/10 (2) monsanto EJ

88.2 % DO, 6.65 pH, 46.3 pHmV,
121.2 ORP

1054 set up BH159
N = 418287.5
E = 679154.3

1106 took GW sample BH159
13.83°C, 0.784 mS/cm, 0.510 TDS
120.5 DO%, 6.86 pH, 39.5 pHmV
188.1 ORP

1200 Done at Site, decon of equipment complete.

1212 Enoch office to drop off soil samples and equipment.

1228 done at Enoch office, begin drive to SLC.

1510 ship samples at Riverdale Utah fex ex

1600 Back in SLC

08/19/10

BORING LOG NUMBER: MMW037

SHEET 1 OF 6

LOC. ID: MMW037 ELEVATION: DATUM:

PROJECT NAME: Monsanto P4 DRILL DATE: 09/15/10

INCLINATION: AZIMUTH: HAMMER WEIGHT: DATE FINISHED: 09/19/10

LOCATION SKETCH

DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
0	Time								
5	NA driller's beacon early	silt, dry, 7.5YR 2.5/2, fine grained		ML	1				sample # 1 0-7'
10		sandy clay with gravels, dry, gravel range fine, subangular, 7.5YR 4/2, some basaltic gravel		CL	2				# 2 7-14
15		clay, wet, 10YR 5/3, very soft, medium plasticity		CL	3				#3 14-21'
20	0845	Gravel, sand, silt mixture, wet, 10YR 4/4, gravel range fine, subangular, some basaltic gravel.		GM	4				# 4 21-30'
25	0850	clayey gravels, wet, 10YR 4/4, gravel range fine, subangular, basaltic gravels present		GC	5				outer 12.0" casing (surface) present to 28.0' bgs #5 30-40'
30	1033	as above, some volcanics (cinder) present along with basaltic gravel		GC	6				#6 40'-50'
35									
40									
45									

DEPTH UNITS: 1unit = 1 foot

DRILLING CONTRACTOR: AK Drilling

DRILLER: Mike Wilson

LOGGED BY: E. Jackson

CHECKED BY:

Boring method: Dual Rotary

REV No	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE.

SCALE FIGURE No

SOIL BORING LOG FORM

BORING LOG NUMBER: MMW037

SHEET 2 OF 6

LOC ID: MMW037 ELEVATION: DATUM:

PROJECT NAME: Monsanto P4 DRILL DATE 09/15/10

INCLINATION: AZIMUTH: HAMMER WEIGHT DATE FINISHED 9/16/10

LOCATION SKETCH

↑n

⊗ MW032 ⊗ MW037

DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	USCS	SAMPLES NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
50	Time								
55	1036	as above but gravels now range from medium to fine, more volcanics present.		GC	7				#7 50-60'
60–65	1058	clayey gravels as above, 10yr 4/4, wet, gravels are fine range, poorly graded, basaltics and volcanics present		GC	8				#8 60-70'
70–75	1105	Basalt at 80.0' bgs, Grayish black N2, hard, ~~vesicular~~. From 70'-80' bgs, clayey gravels, basalt gravels only, subrounded, vesicular.	Basalt		9				#9 70-80'
80–85	1208	Basalt, N3 Dark gray, hard	Basalt		10				# 10 80-90'
90–95	1253	Basalt as above	Basalt		11				#11 90-100'
100									

DEPTH UNITS: 1unit = 1foot

DRILLING CONTRACTOR: AK Drilling

DRILLER: Mike Wilson

LOGGED BY: E. Jackson

CHECKED BY:

REV No.	REVISIONS	REV. DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE

SCALE

FIGURE No.

SOIL BORING LOG FORM

BORING LOG NUMBER: MMW037

SHEET 3 OF 6

LOC. ID: MMW037 | ELEVATION | DATUM:

PROJECT NAME: monsanto PA | DRILL DATE: 09/15/10

INCLINATION | AZIMUTH | HAMMER WEIGHT | DATE FINISHED 9/19/10

LOCATION SKETCH

↑n

⊗ MW036 ⊗ MW037

DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	SAMPLES: USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
100	Time								
105	1321	Basalt as above	Basalt		12				#12 100-116'
110	1333	as above	Basalt		13				#13 110-120'
115									
120	1354	as above	Basalt		14				#14 120'-130'
125									
130	1412	as above	Basalt		15				#15 130-140'
135									
140	1431	as above some iron staining on flat surfaces	Basalt		16				#16 140-150'
145									
150									

DEPTH UNITS: 1unit = 1 foot

DRILLING CONTRACTOR: AK Drilling

DRILLER: Mike Wilson

LOGGED BY: E. Jackson

CHECKED BY:

REV No	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE

SCALE | FIGURE No

SOIL BORING LOG FORM

BORING LOG NUMBER: MMW037

SHEET 4 OF 12

LOC. ID: MMW037 | ELEVATION: | DATUM:

PROJECT NAME: Monsanto P4 | DRILL DATE: 09/15/10

INCLINATION | AZIMUTH: | HAMMER WEIGHT | DATE FINISHED 9/19/10

LOCATION SKETCH

↑n

MW036 ⊗ ⊗ MW037

DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	USCS	SAMPLES: NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
150	Time								
150–155	1445	Basalt as above, iron staining and some cementation present on flat surfaces. Fractured zone 158'	Basalt		17				#17 150-160' 20-25gpm coming out of cyclone at appx 158' bgs.
160–165	1517	as above	Basalt		18				#18 160-170' back into solid rock zone at 162.0'
170–175	1615	no recovery	Ø						wash out at 175.0' from fractured zone at 158.0', hole will not stay open. Pulling rods, 8" casing, drive 8.0' and use under reamer bit to depth.
180–185	1820	Basalt, vesicular, 5yr 2/1 brownish black to n3 dark gray, with red cinders 5R 2/2 blackish red	Basalt w/cinders		19				#19 180-190'
190–195	1900	same as above, some iron staining and cementation present on cinders	Basalt w/cinders		20				#20 190-200'
200									

09/15/10 09/16/10 redrill

09/18/10

DEPTH UNITS: 1unit = 1foot

DRILLING CONTRACTOR: AK Drilling

DRILLER: Mike Wilson

LOGGED BY: E. Jackson

CHECKED BY:

REV No	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE:

SCALE: | FIGURE No.

SOIL BORING LOG FORM

BORING LOG NUMBER: m MW037

SHEET 5 OF 6

LOC. ID: mMW037 ELEVATION: DATUM:

PROJECT NAME: monsanto P4 DRILL DATE: 09/18/10

INCLINATION: AZIMUTH: HAMMER WEIGHT DATE FINISHED 9/19/10

LOCATION SKETCH

↑n

⊗ mW036 ⊗ mW037

DEPTH (UNITS)	~~BORING METHOD~~	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	USCS	SAMPLES NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
200	T1112								
205	1107	as above, some cementation still present	Basalt w/cinders		21				#21 200-210'
210	1253	Basalt, vesicular, 10R 2/2 Very dusky red, some clay nodules present.	Basalt		22				#22 210-220' apx. 218' 20gpm coming out of cyclone
220	1405	Basalt, n2 grayish black, slightly vesicular, with Blackish red 5R 2/2 cinders	Basalt w/cinders		23				#23 220-230'
230	1445	Basalt, n2 grayish black, vesicular, no cinders present. Clay nodules, stiff, medium plasticity, 7.5YR 4/6	Basalt/CL		24				#24 230'-240' apx. 236' drilling easier, possible clay seams
240	8322	clay seam at 248.0', clay nodules with few volcanics, md plasticity, stiff, 7.5YR 4/6. 25-30 gpm coming out of cyclone at 248.0'. at 250.0' Basalt, n2 grayish black, 10R 2/2 very dusky red cinders present.	Basalt/cl w/cinders		25				clays are binding up under reamer bit, loss of rotation, flushing out hole. 248.0' clay seam with few volcanics.
250	0840								

09/18/10

09/19/10

DEPTH UNITS: 1unit = 1 foot

DRILLING CONTRACTOR: AK Drilling

DRILLER: Mike Wilson

LOGGED BY: E. Jackson

CHECKED BY:

REV No.	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.:

AutoCAD FILE:

SCALE: FIGURE No.

SOIL BORING LOG FORM

BORING LOG NUMBER: MMW037

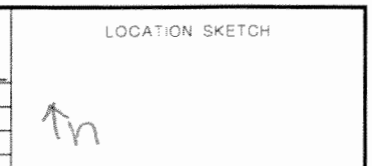
SHEET 6 OF 6

LOC. ID: MMW037 ELEVATION: DATUM:

PROJECT NAME: Monsanto P4 DRILL DATE: 9/19/10

INCLINATION: AZIMUTH: HAMMER WEIGHT DATE FINISHED 9/19/10

LOCATION SKETCH



DEPTH (UNITS)	BORING METHOD	SOIL PROFILE / SOIL DESCRIPTION	GRAPHIC LOG	SAMPLES: USCS	NUMBER	TYPE	BLOW COUNT/6"	RECOVERY	ADDITIONAL COMMENTS
250	Time								#26 250-260'
255	0854	Hit another clay seam at 254.0', continued to 260.0'. stiff, low plasticity, 10yR5/4, 25-30 gpm coming out of cyclone		CL	26				
260	0955	Hit limestone at gpx 263.0', calcareous, olive gray 5y 4/1 to Brownish gray 5yR 4/1, some finely laminated	limestone		27				#27 260'-270' sample collected in ziploc bag as per workplan.
270	1010	silt stone. 5y 5/2 light olive gray, finely laminated. sandstone 5yR 2/2 grayish brown (minor). Limestone, calcareous, olive gray 5y 4/1	siltstone, sandstone, limestone	limestone	28	Dinwoody			#28 sample collected in ziploc bag.
280	1124	as above: siltstone, sandstone, limestone. More sandstone and siltstone than above sample.	siltstone, sandstone, limestone		29				#29 sample collected in ziploc bag. gpx 40-50 gpm coming out of cyclone
290	1206	as above: siltstone, sandstone, limestone. more limestone present than above sample. TD 300.0'	siltstone, sandstone, limestone		30				#30 sample collected in ziploc bag. measured water discharge ~ 2000gpm
300									

DEPTH UNITS: 1 unit = 1 foot

DRILLING CONTRACTOR: AK Drilling

DRILLER: Mike Wilson

LOGGED BY: E. Jackson

CHECKED BY:

REV No.	REVISIONS	REV DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

MWH

PROJECT No.

AutoCAD FILE.

SCALE. FIGURE No.

SOIL BORING LOG FORM

LOG OF BORING BY CUTTINGS

BORING NO: MW037 | PAGE 1 OF 1

SITE NAME: Enoch Valley

PROJECT NO.: Monsanto P4

BORING LOCATION:

DRILLING TIME RECORD DEPTH FROM	DEPTH TO	TIME FROM	TIME TO	MIN.	DEPTH FROM	DEPTH TO	HYDRAULIC PRESSURE	DRILLING ACTION	CALC. CONTENT	DESCRIPTION AND DRILLERS NOTES: (material, color, texture, hardness, and other notes)
0	21			NA				E		
21	30	0839	0845	12				E		
30	40	0845	0850	5				E		additional time due to the
40	50	0850	1033	103				E		Placing 12.0" surface casing to 38.0' bgs
50	60	1033	1036	3				E		
60	70	1036	1058	22				E		
70	80	1058	1105	7				E		
80	90	1105	1202	57				r		delay due to more casing being
90	100	1202	1253	51				r		delivered to site, had to unload
100	110	1253	1321	28				r		basalt at 80' drilling slightly rough
110	120	1321	1332	11				r		open hole start at 100
120	130	1332	1354	22				r		
130	140	1354	1412	18				r		
140	150	1412	1431	19				r		
150	160	1431	1445	14				r		
160	170	1445	1517	32				R		wash out from 158-175', fractured
170	180	na								zone at 158 washing out hole.
180	190	0900	0920	20				C		
190	200	0920	1000	40				C		
200	210	1000	1107	67				I		
210	220	1107	1253	106				C		1 hour used to get water in truck
220	230	1253	1405	72				I		
230	240	1405	1445	40				I		
240	250	0822	0840	18				C		
250	260	0840	0856	16				E		
260	270	0856	0950	54				C		
270	280	950	1010	20				C		
280	290	1010	1127	77				C		
290	300	1127	1206	39				C		TD 300.00, measured water
										discharge at cyclone ~200gpm

ABBREVIATIONS:

DRILLING ACTION		CALC. CONTENT	HYD. PRESS.
E: Even, smooth	r: Slightly rough	N: Non-calc.	N: None
C: Crunchy	R: Moderately rough	S: Slightly	L: Low
I: Intermittently rough	R: Very rough	M: Moderately	M: Medium
		V: Very	F: Full

Bore by Cut, Page 2, MAC/CAD, Rev: 9-8-95

MWH

Project Name: Monsanto [illegible]	Date Drilled: From 09/19/[illegible] to 09/19/10	Well ID
Project Number: 170 [illegible]	Date Installed: From 09/19 to 09/19/10	MW[illegible]
Longitude: 111 26 51.3	Latitude: 42 [illegible]	Elevation: Datum:

Protective Casing: 4' 2" BGS (AGS)

Well Casing Top: 3' 0" BGS (AGS)

Well Casing Schedule: 40/80 Other:

Well Casing Diameter: 4.0" in

Screen Joint: 300.00 (BGS)

Screen Material: PVC Manufacturer: Johnson Screens

Screen Type: Slotted 10.0' Slot Size: 0.010

End Cap Bottom: 300.5' 300.5' (BGS)

Borehole Bottom: 300.5' (BGS)

Borehole Diameter: 9.25" (BGS)

Surface Seal (BGS): Top: Bottom:

Surface Seal Material:

Annular Seal (BGS): Top: 0 Bottom: 278.0

Annular Space Seal Material: Cetco Pureguard medium chips

Primary Filter Pack (BGS) Top: 278.0' Bottom: 300.00'

Sand Size: 20/40 50 lb bag Volume Added: 50-500 bags Ft³

Manufacturer: Pennsuco Cap and Lock:

Protective Casing:

Inside diameter: 8" Steel to 15.0' bgs

Drainage ports:

Backfilled with: From: to (BGS)

Drilling Method: Dual Rotary

Drilling Fluids: none

Drilling Additives (Describe): Waxes Foam Plus Cetco

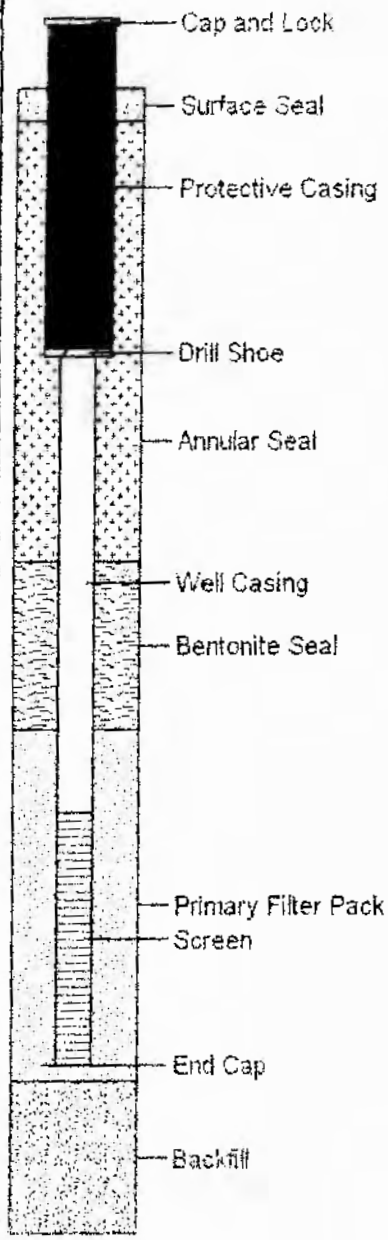
Water level after completion: 114.3' BGS (TOC)

USCS Soil Classification @ Screen:

GP GM GC GW SW SP (Bed Rock)
SM SC ML MH CL CH

Bedrock Classification: limestone, siltstone, sandstone

Formation/Unit @ Screen: Dinwoody



Well Drilled By	Well Installed By
Firm: AK Drilling	Firm: AK Drilling
Operator: Mike Wilson	Installer: Mike Wilson, Lyle Smith

Notes: helper Lyle Smith

Centralizers placed at bottom of screen (300.0') and 282.0'

2" steel conduit for measuring tape at 282.0 bgs

All angles and depths are recorded in feet unless otherwise noted.

* 192 50 lb bags of hydrated bentonite chips used

amec

WELL SAMPLING AND/OR DEVELOPMENT RECORD

Well ID: MMW037 (CERCLA)
Sample ID: MMW037 Duplicate ID: NA
Sample Depth: NA
Project Name: Monsanto
Date: Sept 23 2010
Sampled By: M. STORB
Method of Purging: air lift (tremmie pipe)
Method of Sampling: grab

Initial Depth to Water: 110.3 bgs
Depth to Water after Sampling: 144.6
Total Depth to Well: 306
Well Diameter: 4" PVC
1 Casing/Borehole Volume: (Circle one)
3 Casing/Borehole Volumes: (Circle one)
Total Casing/Borehole Volumes Removed:

Time	Intake Depth	Rate (gpm)	Cum. Vol. (gal.)	Temp. (°C)	pH (units)	Specific Electrical Conductance (µS/cm)	Dissolved Oxygen (mg/l)	Redox Potential (mV; SSCE)	Remarks (color, turbidity, and sediment)
iron 9:05	295						*	*	T
9:14				7.98	8.00	440	~~8.88~~ 16.8 mg	123.9	Turb: 630.8 Very Brown
9:30				7.84	7.89	403	8.70	116.7	Turb: 916.88 milky color
9:45				7.82	7.93	403	8.80	121.3	Turb: 33.77
9:55				7.65	7.95	404	8.80	131.7	Turb: 16.91
10:05				7.66	7.91	404	9.16	131.5	Turb: 14.42
10:15				7.66	7.91	404	9.07	138.1	Turb: 10.63
10:28				7.67	7.92	405	9.01	140.0	Turb: 6.79
11:15	✓			7.69	7.93	405	9.12	129.8	Turb: 4.57
11:20	Sample Time.								
11:34	air off		DTW @ after air off = 144.6 (11:41)						
			→ measured recovery rate @ 1" every 20 sec						

pH CALIBRATION (choose two)

Buffer Solution	pH 4.0	pH 7.0	pH 10.0
Field Temperature °C	10.52		10.65
Instrument Reading	3.99		10.00

Model or Unit No.: YSI 550 MPS

SPECIFIC ELECTRICAL CONDUCTANCE – CALIBRATION

KCL Solution (µS/cm=µmhos/cm)	1413 at 25°C	12880 at 25°C
Field Temperature °C	11.02	
Instrument Reading	1413	

Model or Unit No.:

REDOX CALIBRATION		DISSOLVED OXYGEN CALIBRATION	
Standard Solution	468 mV	Salinity %	
Field Temperature °C	10.40	Pressure (mm Hg)	589.3
Instrument Reading	250.0	Instrument Reading	78.9
Model or Unit No.:		Model or Unit No.:	

Notes:
Bottom of tremmie 295'
→ No way to measure flow rate
Down hole pressure 50 psi, the lowest the compressor will go.
Driller estimates at least 50 gpm

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* Do not still stabilizing

RECORD OF BOREHOLE: MMW037

MONSANTO
P4 PRODUCTION
SITE INVESTIGATION

Project No. 1008924.160102

IDWR Tag No	: None	Drilling Method / Rig	: Dual Rotary
Drilling Date(s)	: 9/15/2010-9/19/2010	Drilled By	: AK Drilling
Latitude	: N 42 53' 26.1"	Logged By	: Emily Yeager (MWH)
Longitude	: W 111 26' 07.3"	Installed By	: Mike Wilson, Lyle Smith
Elevation (ft) AMSL	: 6,419 Measuring point	Surveyed By	: Monsanto

Water Levels
▼ Water Level Before Sampling
▽ N/A

Depth in Feet	Sample	Time	DESCRIPTION	Formation
0–5	1	NA	Silt, dry, bown (7.5YR 5/2), fine-grained.	ML
5–10	2	NA	Sandy clay with gravel, dry, gravel range from fine to subangular, brown (7.5YR 4/2), some basaltic gravel.	CL
10–15	3	NA	Clay, wet, (10YR 5/3), very soft, medium plasticity.	CL
15–20	4	0845	Gravel, sand, silt mixture, wet, (10YR 4/4), gravel range fine to subangular, some basaltic gravel.	GM
20–25	5	0850	Clayey gravel, wet, dark yellowidh brown (10YR 4/4) gravel range fine to subangular, some basaltic gravels present.	GC
25–30	6	1033	As above, some cinder volcanics present, along with basaltic gravel.	GC
30–35	7	1036	As above, but gravels range from medium to fine, more volcanics present.	GC
35–40	8	1058	Clayey gravels as above, dark yellowish brown (10YR 4/4), wet, gravels are fine range, poorly graded, basaltic volcanics present.	GC
40–45	9	1105	Basalt at 80 feet bgs, grayish black (N2), hard. From 70 to 80 feet bgs, clayey gravels, basalt gravels only, subrounded, vesicular.	GC
45–50	10	1202	Basalt, dark gray (N3), hard.	Basalt
50–55	11	1253	Basalt as above.	Basalt

Well Details

CONSTRUCTION DETAILS

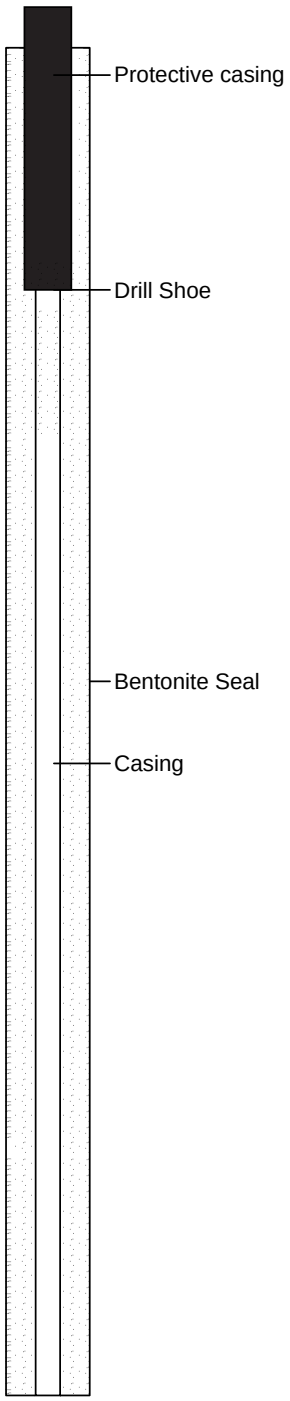
Installation Date	: 9/19/2010 to 9/22/2010
Boring Total Depth (ft bgs)	: 302.5
Well Total Depth (ft bgs)	: 302.5
Casing Type	: Schedule 40 PVC
Screen Slot Size	: 0.010
Screen Length (ft)	: 10 feet
Screened Interval (ft bgs)	: 292 to 302 feet
Sand Size at Screen	: 20X40
Filter Interval (ft bgs)	: 286 to 302
Secondary Filter Interval (ft bgs)	: N/A
Bentonite Seal (Chips)	: Cetco pure gold med. chips
Interval (ft bgs)	: 0 to 286
Bentonite Seal (slurry)	: NA
Interval (ft bgs)	: NA
Formation at Screen	: Dinwoody
Depth Water Encountered when Drilling (ft bgs)	: 114.3
Sump (ft bgs)	: NA
Drill Shoe Burial (ft bgs)	: NA
Backfill (ft bgs)	: NA
Steel Casing Depth (ft bgs)	: _____
Pump Depth (ft bgs)	: _____
Pump Intake Depth (ft bgs)	: _____
Height of MP (ft ags)	: _____

SAMPLE DETAILS

Fall 2010 Static Water Level (ft bmp) : 110.3
Fall 2010 Total Se (mg/L) : 0.0088

NOTES:
- Centralizers placed at bottom of screen (302 feet) and at (289 feet).
- 12 inch long piece of steel rod broke off measuring tape at 286 feet bgs.
- Protective casing: 8 inch from 1 foot to 18 feet bgs.
- Drilling activities: Versa Foam Plus Cetco.

Well: MMW037
Elev.: 6,419 AMSL



RECORD OF BOREHOLE: MMW037

MONSANTO
P4 PRODUCTION
SITE INVESTIGATION

Project No. 1008924.160102

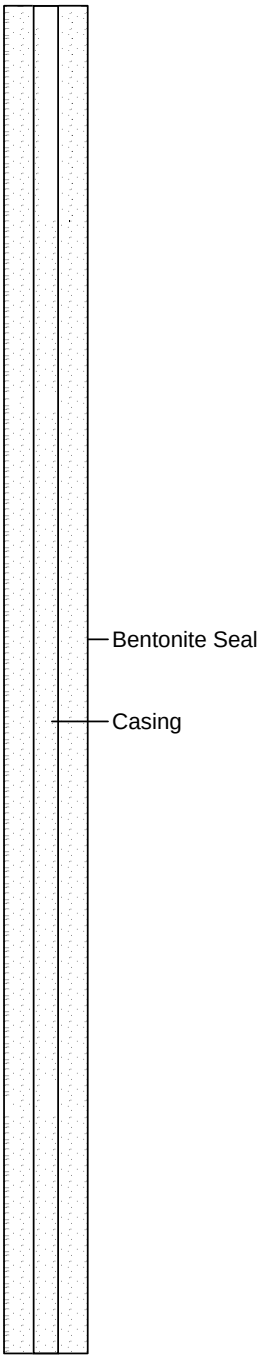
IDWR Tag No	: None	Drilling Method / Rig	: Dual Rotary
Drilling Date(s)	: 9/15/2010-9/19/2010	Drilled By	: AK Drilling
Latitude	: N 42 53' 26.1"	Logged By	: Emily Yeager (MWH)
Longitude	: W 111 26' 07.3"	Installed By	: Mike Wilson, Lyle Smith
Elevation (ft) AMSL	: 6,419 Measuring point	Surveyed By	: Monsanto

Water Levels
▼ Water Level Before Sampling
▽ N/A

Well: MMW037
Elev.: 6,419 AMSL

Depth in Feet	Sample	Time	DESCRIPTION	Formation
100–105	12	1321	Basalt as above.	Basalt
105–110	13	1332	As above.	Basalt
110–115	14	1354	As above.	Basalt
115–120	15	1412	As above.	Basalt
120–125	16	1431	As above, some iron staining on flat surfaces.	Basalt
125–130	17	1445	Basalt as above, iron staining and some cementation present on flat surfaces. Fractured zone at 158 feet. 20 to 25 gpm coming out of cyclone at approximately 158 feet bgs.	Basalt
130–135	18	1517	As above. Back into solid rock at 162 feet bgs.	Basalt
135–140	9/16/2012	0900	No recovery. Wash out at 175 feet bgs from fractured zone at 158 feet bgs. Hole will not stay open. Pulling rods, 8 inch casing, drive 8 foot and use under reamer bit to depth.	NR
140–145	19	0920	Basalt, vesicular, (5YR 2/1) brownish black to (N3) dark gray, with red cinders (5R 2/2) blackish red.	Basalt with cinders
145–150	20	1000	Same as above, some iron staining and cementation present on ciders.	Basalt with cinders

Well Details



RECORD OF BOREHOLE: MMW037

MONSANTO
P4 PRODUCTION
SITE INVESTIGATION

Project No. 1008924.160102

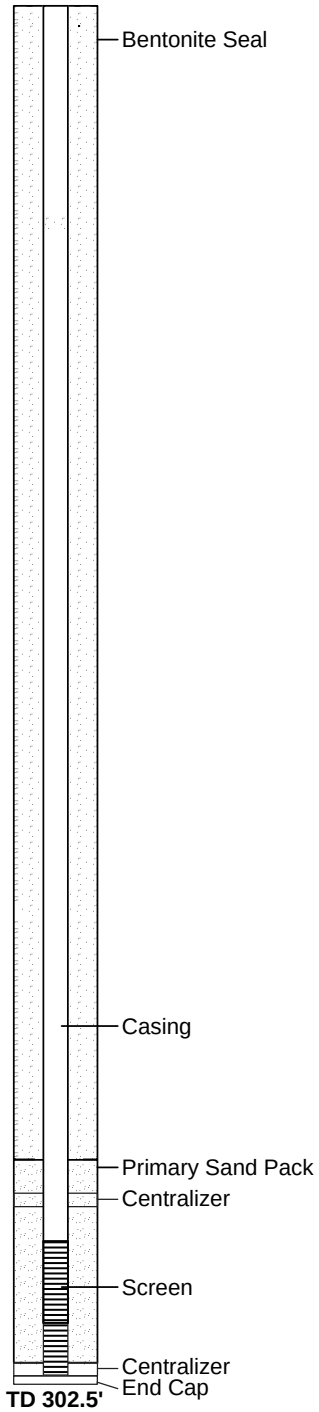
IDWR Tag No	: None	Drilling Method / Rig	: Dual Rotary
Drilling Date(s)	: 9/15/2010-9/19/2010	Drilled By	: AK Drilling
Latitude	: N 42 53' 26.1"	Logged By	: Emily Yeager (MWH)
Longitude	: W 111 26' 07.3"	Installed By	: Mike Wilson, Lyle Smith
Elevation (ft) AMSL	: 6,419 Measuring point	Surveyed By	: Monsanto

Water Levels
▼ Water Level Before Sampling
▽ N/A

Depth in Feet	Sample	Time	DESCRIPTION	Formation
200–205	21	1107	Basalt as above, some cementation still present.	Basalt with cinders
205–215	22	1253	Basalt, vesicular, (10R 2/2) very dusky red, some clay nodules present. At approximately 218 feet bgs 20 gpm coming out of cyclone.	Basalt
215–225	23	1405	Basalt, (N2) grayish black, slightly vesicular, with blackish red (5R 2/2) cinders.	Basalt with cinders
225–235	24	1145	Basalt, (N2) grayish black, vesicular, no cinders present, clay nodules, stiff, medium plasticity, (7.5YR 4/6). Drilling easier at approximately 236 feet bgs, possible clay seams.	Basalt/CL
235–250	25	0822 9/17/2012 0840	Clay seam at 248 feet bgs, clay nodules with few volcanics, medium plasticity, stiff, (7.5YR 4/6). 25 to 30 gpm coming out of cyclone at 248 feet bgs. Basalt (N2) grayish black, (10R 2/2 very dusky red cinders present.	Basalt/CL
250–255	26	0856	Another clay seam at 254 to 260 feet bgs, stiff, low plasticity, (10YR 5/4), 25 to 30 gpm coming out of cyclone.	CL
255–265	27	0955	Limestone at approximately 263 feet bgs, calcareous, (5Y 4/1) olive gray to (5YR 4/1) brownish gray, some finely laminated. Sample collected in Ziploc bag as per work plan.	Limestone
265–275	28	1010	Siltstone, (5Y 5/2) light olive gray, finely laminated sandstone, (5YR 2/2) grayish brown (minor). Limestone, calcareous, (5Y 4/1) olive gray. Sample collected in Ziploc bag.	Siltstone, sandstone, limestone
275–285	29	1124	As above; siltstone, sandstone, limestone. More sandstone and siltstone than above. Sample collected in Ziploc bag. Approximately 40 to 50 gpm coming out of cyclone.	Siltstone, sandstone, limestone
285–300	30	1206	As above; siltstone, sandstone, limestone. More limestone present than above sample. Sample collected in Ziploc bag. Measured water discharge at 200 gpm.	Siltstone, sandstone, limestone

Well Details

Well: MMW037
Elev.: 6,419 AMSL



Location MW037 (Enoch) Date 09/15/10

Project / Client Well Installation / P4

0730 arrive at Monsanto Enoch office, meet with Barry Koch. He will show me drilling location

0750 arrive at MW037, drillers have already begun, they are at 21.0' bgs

0839 begin driving next 20.0' of casing

0850 reach 40.0' bgs

~~0924~~ 1030 begin driving next 20.0' of casing, 40.0' of 12.0" surface casing in place, will now drive 8.0" to depth. Reach 60.0' bgs

1053 begin next 20.0' drive casing

1105 reach 80.0' bgs

1120 additional AK Drilling crew on site to drop off more casing

1135 done unloading casing

1140 begin next 20.0' drive casing, drilling is rough and slow-in basalts

1154 other AK crew depart

1253 reach 100.0' bgs, going to try to drill open hole from here

1311 begin next 20.0' drive casing, open hole

1335 reach 120.0', begin next 20.0' drive

Location MW037 (Enoch) Date 9/15/10

Project / Client Well Installation / P4

Scale

1412 reach 140.0', begin next 20.0' drive

1449 reach 160.0', begin next 20.0' drive

1502 appx. 20-25 gpm of water coming out of cyclone at ~~140.0'~~ appx 158.0', fractured zone

1507 past fractured zone at 162.0', hammer bit is driving hard again.

~~1526 pulling 8.0" rods, open hole may have washed out at 170.0' bgs~~

1526 open hole keeps washing out and filling with fractured material from 158.0' zone. Got to appx. 175.0' before total wash out. Going to pull rods, ~~pull~~ and 8.0", push 12.0" to 158.0' zone and use under-reamer bit.

Location MW037 (Enoch) Date 09/15/10

Project / Client Well Installation / P4

1543 begin pulling rods

1557 all rod pulled, begin pulling 8.0" casing

1605 driller informed me the shoe bit may have dropped off because it was inbedded in the basalt. Will pull all 100' of 8.0" casing and see, if so we will have to move hole and start over.

1645 done pulling 8.0". Shoe is gone. We will move rig forward and restart hole

1652 Begin pulling 12.0" casing

1730 Done pulling 12.0" casing

1737 pull rig forward apx 10.0', set up on new location

1807 done for day

Location MW037 (Enoch) Date 09/17/10

Project / Client Well Installation / P4

Scale

0700 arrive at Enoch mine office meet AK Drilling Crew

0745 arrive on site MW037, crew drilled to 100' bgs yesterday.

0804 begin drilling, add next 20.0' of rod

0825 begin drive to 120.0' bgs, driving 8.0" outercasing, using underreamer bit.

0850 losing some circulation (apx. 110') using foam to bring up cuttings

~~0910 reach 120.0'~~

0922 crew leave site to get water

1015 back from getting water

1040 reach 120.0' bgs

1105 begin driving next 20.0' to 140.0'

1248 reach 140.0' bgs

1314 begin driving next 20.0' to 160.0'

1505 reach 160.0' bgs

1530 begin next 20.0', depart site

Location MW037 (Enoch) Date 09/18/10

Project / Client ~~leg~~ Well installation / P4

0700 arrive on site, crew got to 180.0' bgs yesterday.

0810 begin drive next 20.0' to 200'

0846 driller having a hard time with rod rotation, still at 180.0'

0900 regained rotation, begin drive to 200.0' bgs

1000 reach 200.0' bgs

1034 begin drive next 20.0' to 220'

1123 drill rods / bit jumping around alot at appx 215', rotation is not smooth, catching as rotating. Cuttings coming out of cyclone changed color (lighter) around ~ 215'

1151 crew leave to get water in truck

1242 crew back on site

1253 reach ~~2200~~ 220.0' bgs

1322 begin next 20.0' drive to 240.0'

1445 reach 240.0' bgs

1513 begin drive next 20.0' to 260.0' lost rod rotation, clays are binding up under reamer bit.

Location MW037 (Enoch) Date 9/18/10

Project / Client Well Installation / P4

Scale

flushing out hole to try and regain rotation.

1718 Still no rotation, talked with crew about possibly tripping out and using hammer or cleaning under reamer bit. Also could let hole sit for night and see if clays de-swell and bit can break free.

1750 tried raising under reamer bit up into 8.0" outer casing and flushing bit, did not work. Going to start pulling rods.

1821 done pulling rod

1837 done cleaning bit, plugged with clay. Leave site

09/18/10

Location MW037 (Enoch) Date 09/19/10

Project / Client Well Installation / P4

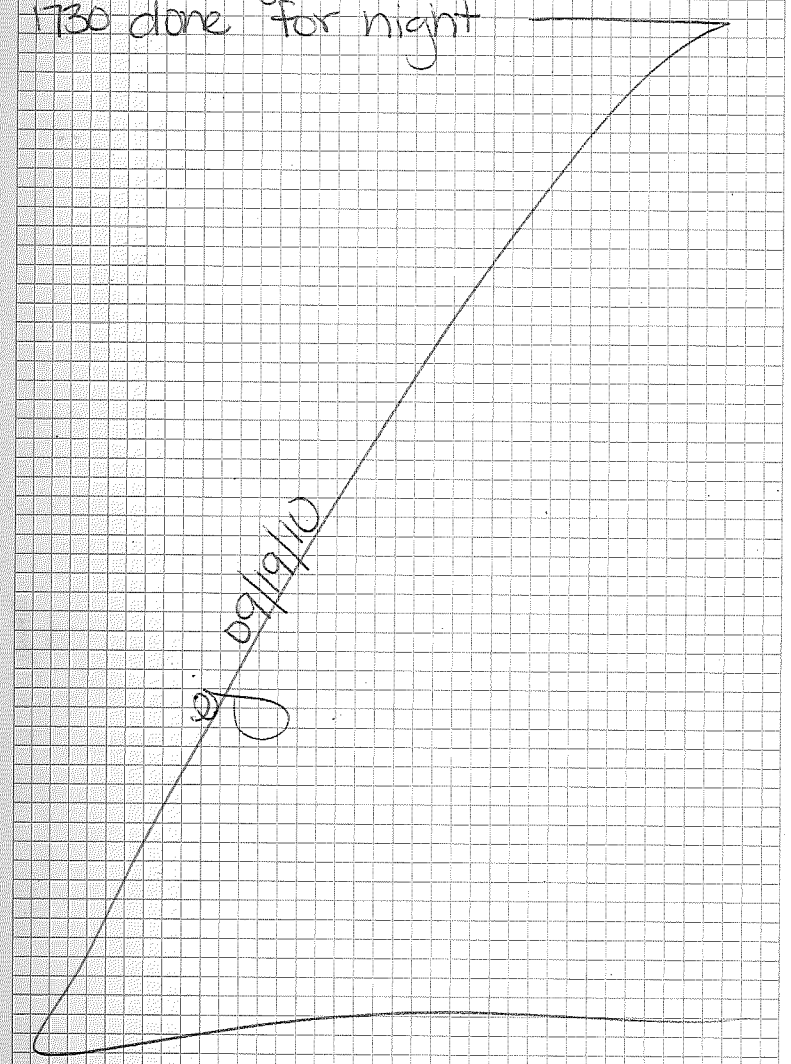
0700 arrive on site
0739 begin putting rods back in ground.
0822 begin next 20.0' drive to 260.0'
0856 reach 260.0' bgs
0933 begin next 20.0' drive to 280.0'
0955 reach 270.0', Dinwoody at 263.0'
1010 reach 280.0' bgs
1039 begin next 20.0' drive to 300.0'
1124 reach 290.0' bgs
1206 reach 300.0' bgs TD, ~~well~~ measured water discharge at cyclone ~200gpm.
1231 begin to trip out rods, there was no shoe used on the 8.0" casing due to under reamer bit use.
1254 done pulling rods
1340 leave site to pick up well building materials at Plant
1543 back on site
1610 begin well building
1722 done lowering well into casing.
1725 take WL inside of well casing, ~~113.61 bgs~~

Location MW037 (Enoch) Date 09/19/10

Project / Client Well Installation / P4

Scale

111.00' bgs static ▽.
1730 done for night



Location MMW037 (Enoch) Date 09/20/10

Project / Client Well Installation / P4

0700 arrive at machine shop to pack coolers and water samples.

0740 arrive at Monsanto Plant to ship samples, relinquish to MAC from Monsanto

0900 arrive on site, begin well building

1330 Jeff Godfrey (from field to the west of site) stopped by, asked questions about drilling, offered to let us use his road to drive rig out.

1400 done with sandpack (302-286) used 30-50 lb bags 20/40 sand

1621 steel rod apx. 12" long broke off of measuring tape at 286.0' bgs

1640 bentonite bridged at static WL apx 111.0' bgs, going to use tremie pipe to blow out.

1800 done for day

ej 09/20/10

Location Date

Project / Client

Scale

A-2 2010 Riparian Soil, Sediment, and Surface Water Sampling

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 9 / 28 / 10 **Arrival Time** 1230

Field Personnel

Emily Jackson **Signatures**

Rob Young

SITE DESCRIPTION

Station Name MSP023 (Enoch Valley Mine (0.64 acres)) **Station Number** MSP023

Latitude N 42 ° 52 ' 42.12 " **Longitude** W 111 ° 25 ' 20.00 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-0002

Stream & Riparian Area Description Dry Mine Pond NW of mine office, no vegetation within pond, desert vegetation surrounding, two dry ~1ft inlet channels

Surface Water Characteristics (color, odor, appearance): * DRY

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-MSP023-SD-001, 1010-MSP023-SD-002, 1010-MSP023-SD-003, 1010-MSP023-SD-004 **Sample Time:** 1230

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)			DRY				
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 09 / 28 / 10 **Time** 1230 **Station Number** MSP023

Completed by: Rob Young **Checked by:** Emily Jackson

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	DRY	

Flow by Meter

R.E.W._____ft **L.E.W.**_____ft **Total Width**_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

DRY

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 9 / 28 / 10 **Arrival Time** ~~1410~~ 1430

Field Personnel

Rob Young
Emily Jackson

Signatures

SITE DESCRIPTION

Station Name MSP031 Enoch Valley Mine Shop Pond (~~1.2~~ 0.3 acres) **Station Number** MSP031

Latitude N 42 ° 52 ' ~~39.69~~ 34.40 **Longitude** W 111 ° ~~24.25~~ ~~19.65~~ 11.40

Elevation _____ ft **Datum** NAD 27 **Photo Number** 100-0003

Stream & Riparian Area Description Pond dry south / southeast of mine office, cattails and field grass

Surface Water Characteristics (color, odor, appearance): Dry

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Core, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-MSP031-SD-001-1, 1010-MSP031-SD-001-2, 1010-MSP031-SD-002, 1010-MSP031-SD-003 **Sample Time:** 1440

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

DRY

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 9 / 28 / 10 **Time** 1440 **Station Number** MSP031

Completed by: Emily Jackson **Checked by:** Rob Young

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

DRY

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

DRY

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 09 / 29 / 10 **Arrival Time** 0910

Field Personnel

Emily Jackson **Signatures** E Jackson

Rob Young (<0.10)

SITE DESCRIPTION

Station Name Enoch Valley Mine Keyhole Pond **Station Number** MSP018

Latitude N 42 ° 52 ' 08.96" **Longitude** W 111 ° 23 ' 51.57 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-0004

Stream & Riparian Area Description Pond, surrounded by reeds ~~in~~ 2-4 at the top of a narrow valley, old mine pond, no apparent inlet

Surface Water Characteristics (color, odor, appearance): Bright green surface water, strong non-organic odor.

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010SWMSP018-F&U, 1010-MSP018-SD-001, 002, 003

Sample Time: 0930

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0920				0930		
Water Temperature (°C)	–				11.41		
Specific Conductivity (µS/cm) @ 25° C	1435				2316		
Conductivity (µS/cm)	–				1714 ~~1614~~		
TDS (g/L)	–				1.506		
Dissolved Oxygen (% sat.)	20.4				67.6		
Dissolved Oxygen (mg/L)	–				7.15		
pH	6.98 4.04				7.19		
ORP (mV)	219.1				117.0 ~~9.2~~		
Turbidity (FTU)	1001, 10.55, 0.02				~~417.0~~	← 7.98	
Air Temperature (°C)	44°F				44°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 09/ 29 / 10 **Time** 0930 **Station Number** SWMSP018

Completed by: E. Jackson **Checked by:** R. Young

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	no flow	

Flow by Meter

R.E.W._____ft **L.E.W.**_____ft **Total Width**_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

no flow

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 9 / 29 / 10 **Arrival Time** 1110

Field Personnel

Rob Young **Signatures**

Emily Jackson

SITE DESCRIPTION

Station Name Enoch Valley South Pond (2.69 acres) **Station Number** MSP017

Latitude N 42 ° 52 ' 01.17 " **Longitude** W 111 ° 23 ' 30.78 "

Elevation ft **Datum** NAD 27 **Photo Number** 100 - 0005

Stream & Riparian Area Description Large (2.69 acre) pond, ~~no obvious inlet~~, RY adjacent to inactive haul road, culvert inlet present

Surface Water Characteristics (color, odor, appearance): surface vegetative debris and algae, dk blue to dk green, thick vegetation surrounding pond, pungent smell like MSP018.

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-MSP017-SD-(001,002,003,004), 1010-SWMSP017-(F,U)

Sample Time: 1130

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0920				1130		
Water Temperature (°C)	–				10.94		
Specific Conductivity (µS/cm) @ 25° C	1435				1426		
Conductivity (µS/cm)	–				1042		
TDS (g/L)	–				0.927		
Dissolved Oxygen (% sat.)	20.4				326.5		
Dissolved Oxygen (mg/L)	–				36.25		
pH	6.98 4.04				8.68		
ORP (mV)	219.1				52.6		
Turbidity (FTU)					4.12		
Air Temperature (°C) °F	44°F				66°		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 9 / 29 / 10 **Time** 1110 **Station Number** MSP017

Completed by: Rob Young **Checked by:** Emily Jackson

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	NO FLOW	

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7		NO				
	8		FLOW				
	9		(POND)				
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 9 / 29 / 10 **Arrival Time** 1350

Field Personnel

Rob Young **Signatures** RHY

SITE DESCRIPTION

Station Name Henry Mine Henry Pond (5.8 acres) **Station Number** MSP014

Latitude N 42 ° 52 ' 17.85 " **Longitude** W 111 ° 27 ' 39.15 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 100-0006

Stream & Riparian Area Description Large manmade pond in broad valley, sage and field grass, adjacent to active haul roads

Surface Water Characteristics (color, odor, appearance): Dark greenish-blue, slight pungent non-organic odor, steep banks, plentiful pond-bottom aqueous vegetation and surface veg along shoreline

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-SWMSP014-(U,F), 1010-MSP014-SD-(001-1, 001-2, 002, 003, 004, 005) **Sample Time:** 1420

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0920				1420		
Water Temperature (°C)	–				15.28		
Specific Conductivity (µS/cm) @ 25° C	1435				883		
Conductivity (µS/cm)	–				719		
TDS (g/L)	–				0.574		
Dissolved Oxygen (% sat.)	20.4				310		
Dissolved Oxygen (mg/L)	–				31.89		
pH	6.98 4.04				9.65		
ORP (mV)	219.1				-44		
Turbidity (FTU)					2.41		
Air Temperature ~~(°C)~~ °F RY	44°F						

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 9 / 29 / 10 **Time** 1420 **Station Number** MSP014

Completed by: Rob Young **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	POND (NO FLOW	

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						Ry
	4						
	5						
	6		NO	FLOW			
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 9 / 30 / 10 **Arrival Time** 1000

Field Personnel

Rob Young **Signatures**

SITE DESCRIPTION

Station Name Henry Mine Henry Pond (1.28 acres) **Station Number** MSP015

Latitude N 42 ° 53 ' 09.79 " **Longitude** W 111 ° 28 ' 39.81 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-0007

Stream & Riparian Area Description Cattle ditch/pond fed by runoff and spring, now mostly marsh w/ a couple standing cattle ponds

Surface Water Characteristics (color, odor, appearance): Surface covered in algae, light green, cattle odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-SWMSP015-(U,F), 1010-MSP015-SD-(001,002,003,004)

Sample Time: 1030

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0900				1020		
Water Temperature (°C)	–				7.05		
Specific Conductivity (µS/cm) @ 25° C	1440				1038		
Conductivity (µS/cm)	–				680		
TDS (g/L)	–				0.672		
Dissolved Oxygen (% sat.)	86.4				233.4		
Dissolved Oxygen (mg/L)	–				28.6		
pH	3.99 10.00				7.82		
ORP (mV)	220.0				164.9		
Turbidity (FTU)					41.97		
Air Temperature (~~°C~~) F	47° F				55° F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date ____/____/____ **Time** _____ **Station Number**_____

Completed by: _____ **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft **L.E.W.**_____ft **Total Width**_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 9 / 30 / 10 **Arrival Time** 1600

Field Personnel

Robert Young **Signatures**

SITE DESCRIPTION

Station Name Henry Mine Center Henry Pond (.71 acres) **Station Number** MSP0116

Latitude N 42 ° 53 · 23.25" **Longitude** W 111 ° 28 · 53.93"

Elevation ft **Datum** NAD 27 **Photo Number** 100-0008

Stream & Riparian Area Description Large pond utilized by cattle surrounded by field grass (and cows) and small aspen grove, ditch all road is inlet

Surface Water Characteristics (color, odor, appearance): Dark green to brown, slight organic odor (cows), some algae and pond vegetation

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-SW MSP0116-(U,F), 1010-MSP0116-SD(001, 002, 003, 003-MS, 003-MSD, 004, 004-1) * 2 water * 7 sed **Sample Time:** 1640

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0920				1640		
Water Temperature (°C)	–				16.03		
Specific Conductivity (µS/cm) @ 25° C	1440				689		
Conductivity (µS/cm)	–				571		
TDS (g/L)	–				.448		
Dissolved Oxygen (% sat.)	86.5				361.3		
Dissolved Oxygen (mg/L)	–				40.22		
pH	3.99 / 10.0				9.34		
ORP (mV)	220.0				-72.4		
Turbidity (FTU)	975 9.86 0.02				17.58		
Air Temperature (°C)	47°F				80°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date ____/____/____ **Time** _____ **Station Number**_____

Completed by: _____ **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft **L.E.W.**_____ft **Total Width**_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 1 / 10 **Arrival Time** 0850

Field Personnel

Rob Young **Signatures**

SITE DESCRIPTION

Station Name ~~Tributary to Lone Pine Creek~~ Northeast and Above East Fork Lone Pine Creek RY **Station Number** MST275

Latitude N 42 ° 51 ' 56.33 " **Longitude** W 111 ° 25 ' 04.24 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-0009

Stream & Riparian Area Description Small ponded area in middle of sage filled valley, dried ring of sed around standing water, no apparent stream channel in or out, used by livestock

Surface Water Characteristics (color, odor, appearance): Brown, standing water, no vegetation in the water nor on soil ring surrounding small area of ponded water, livestock odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: RY ~~1010-SWMST275-(U,F)~~, 1010-SWMST275A-(U,F), 1010-SWMST275B-(U, 1010-MST275A-SD-001, 1010-MST275B-SD-001, 1010-MST275A-RS-(001,002) 1010-MST275B-RS-(001,002)

Sample Time: 0925

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0900				0925		
Water Temperature (°C)	-				9.18°C		
Specific Conductivity (µS/cm) @ 25° C	1420				849		
Conductivity (µS/cm)	-				543		
TDS (g/L)	-				0.552		
Dissolved Oxygen (% sat.)	78.4				48.1		
Dissolved Oxygen (mg/L)	-				5.35		
pH	4.03→4.00 10.02→10				8.36		
ORP (mV)	216.2				RY ~~79.2~~	101.9	
Turbidity (FTU)	1011→1000 9.92→10.0 .05→0.02				478.2		
Air Temperature (°C) °F	44°F				74°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10/1/10 **Time** 0925 **Station Number** MST275

Completed by: Rob Young **Checked by:** Rob Young

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	NO FLOW	

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5			STANDING POOL - NO FLOW			
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10/1/10 (SW) 10/2/10 (RS,Sed) **Arrival Time** 1545 (SW) 0720 (RS,Sed) (RS,Sed)

Field Personnel

Rob Young **Signatures**

SITE DESCRIPTION

Station Name Above Rasmussen Creek **Station Number** MST274

Latitude N 42 ° 51 ' 31.00 " **Longitude** W 111 ° 23 ' 34.00 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-0010

Stream & Riparian Area Description Small creek just north of Ras Valley Rd, grass wetland trees present, meandering nature through marsh grasses

Surface Water Characteristics (color, odor, appearance): Clear, no odor, dark organic sediment in creek bottom

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-SWMST274A-(U,F), 1010-SWMST274B-(U,F) 1010-MST274 (A,B)-SD-001, 1010-MST274(A,B)-RS-(001,002) **Sample Time:** 1600 (SW) 0720 (Sed/Soil)

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0900				1600		
Water Temperature (°C)					12.24		
Specific Conductivity (µS/cm) @ 25° C	1420				420		
Conductivity (µS/cm)	–				317		
TDS (g/L)	–				0.273		
Dissolved Oxygen (% sat.)	78.9				65.0		
Dissolved Oxygen (mg/L)	–				6.94		
pH	4.03 10.02				7.68		
ORP (mV)	216.2				139.6		
Turbidity (FTU)	1011 9.92 .05				7.24		
Air Temperature (°C)	44°F				76°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 1 / 10 **Time** 1600 **Station Number** MST274

Completed by: Rob Young **Checked by:** _____

Flow by Capture Method ✓

L/S

Measurement Number	Time (sec)	Volume (L)	
1	5.05	1 Liter	0.20 L/s
2	4.73	1 Liter	0.21
3	4.52	1 Liter	0.22

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 2 / 10 **Arrival Time** 0910

Field Personnel

Rob Young **Signatures**

Darrin Weaver

SITE DESCRIPTION

Station Name Enoch Valley Mine Stock Pond (1.62 acres) **Station Number** MSP021

Latitude N 42 ° 52 ' 31.69 " **Longitude** W 111 ° 24 ' 19.85 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-0011

Stream & Riparian Area Description Large mine pond surrounded by reeds and field grass banks, adjacent to dirt access road w/ med. traffic, natural inlet and culvert inlet

Surface Water Characteristics (color, odor, appearance): dark greenish-brown, pungent odor, surface algae/vegetation along shoreline of pond

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-SWMSP021-(U,F)-(1,2), 1010-SWMSP021-(U,F)-1 (MS, MSD)

1010-MSP021-SD-(001, 002-1, 002-2, 003, 004) **Sample Time:** 0930

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0900				0930		
Water Temperature (°C)	–				13.98		
Specific Conductivity (µS/cm) @ 25° C	1429				~~11.76~~ 1476 RY		
Conductivity (µS/cm)	–				~~11.65~~ 1165 RY		
TDS (g/L)	–				.960		
Dissolved Oxygen (% sat.)	71.2				68.5		
Dissolved Oxygen (mg/L)	–				7.02		
pH	4.00 / 10.01				8.84		
ORP (mV)	233.0				90.4		
Turbidity (FTU)	99.5 / 9.72 and 0.01				1.98		
Air Temperature (°C) °F	53°F				53°F		

* 1010-MSP021-SD-002 is the Inlet sample

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 2 / 10 **Time** 0900 **Station Number** MSPC21

Completed by: Robert Young **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	NO FLOW (POND)	

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6	NO					
	7	FLOW					
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 2 / 10 **Arrival Time** 1200

Field Personnel

Rob Young **Signatures**

Damin Weaver

SITE DESCRIPTION

Station Name Enoch Valley Mine (3.99 acres) **Station Number** MSP020

Latitude N 42 ° 52 ' 23.25" **Longitude** W 111 ° 24 ' 26.81 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-0012

Stream & Riparian Area Description large watering hole / mine pond w/ mod livestock usage, large bare mud ring around standing water, no vegetation in/around pond

Surface Water Characteristics (color, odor, appearance): Brown, dark green, deep mud w/ some surface algae, organic / livestock odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-SWMSP020-(U,F), 1010-MSP020-SD-(001,002,003, 004, 005, 005-MS, 005-MSD) **Sample Time:** 1220

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0700				1220		
Water Temperature (°C)	–				14.52		
Specific Conductivity (µS/cm) @ 25° C	1429				319		
Conductivity (µS/cm)	–				244		
TDS (g/L)	–				.027		
Dissolved Oxygen (% sat.)	79.2				83.1		
Dissolved Oxygen (mg/L)	–				~~83.1~~ 8.21		
pH	4.0/10.01				9.1		
ORP (mV)	233				60.2		
Turbidity (FTU)	999.9,972 0.01				16.68		
Air Temperature (°C)	53°F				60°F		

* 1010-MSP020-SD-003 is the inlet sample

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date ____/____/____ **Time** _____ **Station Number**_____

Completed by: _____ **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft **L.E.W.**_____ft **Total Width**_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 2 / 10 **Arrival Time** 1400

Field Personnel

Robby Young **Signatures**

Darrin Weaver

SITE DESCRIPTION

Station Name Rasmussen Creek / Above Angus Creek **Station Number** MST131

Latitude N 42 ° 51 ' 08.00" **Longitude** W 111 ° 22 ' 31.00 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-0013 & 100-0014

Stream & Riparian Area Description Narrow steep banked small creek, short but rough steep banks, willows sporatic w/ green grass and small shrubs, rocky creek bottom

Surface Water Characteristics (color, odor, appearance): Clear, no odor, quick healthy looking stream w/ rocky stream bottom, light livestock use

SAMPLE COLLECTION

Collection Method: ~~1L~~ 2L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-SW-MST131-(a,F), 1010-MST131-SD-(001,002), 1010-MST131-RS-(001,002)

Sample Time: 14:20

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0900				1420		
Water Temperature (°C)	–				13.83		
Specific Conductivity (µS/cm) @ 25° C	1429				430		
Conductivity (µS/cm)	–				338		
TDS (g/L)	–				.280		
Dissolved Oxygen (% sat.)	79.2				74.2		
Dissolved Oxygen (mg/L)	–				7.74		
pH	4.0/10.01				~~7.80~~ 8.39		
ORP (mV)	233				~~427.6~~ 39.4		
Turbidity (FTU)	9958/7.72 0.01				7.63		
Air Temperature (°C)	53°F				76°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 2 / 10 **Time** 1400 **Station Number** MSJ131

Completed by: Bob Young (MWH) **Checked by:** Darril Weaver (Deq.)

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 2.4 **ft** **L.E.W.** 5.8 **ft** **Total Width** 3.4 **ft**

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
.15	1	.4	.37				
.45	2	.45	.04				
.75	3	.4	.06				
1.05	4	.4	.51				
1.35	5	.4	1.00				
1.65	6	.4	.36				
1.95	7	.4	.85				
2.25	8	.4	.23				
2.55	9	.35	.13				
2.85	10	.3	.67				
3.15	11	.25	.03				
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 3 / 10 **Arrival Time** 1150

Field Personnel

Rob Young **Signatures**

Darrin Weaver

SITE DESCRIPTION

Station Name Northwest of Henry Mine above Long Valley Creek **Station Number** MST277

Latitude N 42 ° 51 ' 52.20 " **Longitude** W 111 ° 29 ' 04.20 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 100-00

Stream & Riparian Area Description Dry. Large dried marsh area in middle of ag. field. No apparent channel, tall field grass. Took sed sample from lowest part of marsh near GPS spot.

Surface Water Characteristics (color, odor, appearance): DRY.

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: ~~1010-SW MST277 (A,B)-(U,F)~~ RY - DRY, 1010-MST277(A,B)-SD-001, 1010-MST277(A,B)-RS-(001,002) *6 samples **Sample Time:** 1210

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0900				1210		
Water Temperature (°C)	–						
Specific Conductivity (µS/cm) @ 25° C	1400						
Conductivity (µS/cm)	–						
TDS (g/L)	–					DRY	
Dissolved Oxygen (% sat.)	20.1						
Dissolved Oxygen (mg/L)	–						
pH	4.04 / 9.98						
ORP (mV)	215.2						
Turbidity (FTU)	979.5, 9.98 0.0,						
Air Temperature (°C)	70°F				68°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 3 / 10 **Time** 1240 **Station Number** MST277

Completed by: Rob Young **Checked by:** Darrin Weaver

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	DRY	

Flow by Meter

R.E.W. — ft **L.E.W.** — ft **Total Width** — ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7			DRY			
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 3 / 10 **Arrival Time** 0830

Field Personnel

Bob Young
Darrin Weaver

Signatures

SITE DESCRIPTION

Station Name Lone Pine Creek / Above Blackfoot River **Station Number** MST053

Latitude N 42 ° 54 ' 26.02 " **Longitude** W 111 ° 28 ' 32.61 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 100-0015

Stream & Riparian Area Description 6.4 foot wide stream in middle of ag fields, short but steep banks (~3 feet tall), green field grass covers banks

Surface Water Characteristics (color, odor, appearance): Clear to light brown, slow flow, mud has slight organic odor,

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-SWMST053-(U,F), 1010-MST053-SD-(001,002)
1010-MST053-RS-(001,002) **Sample Time:** 0945

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0900				9:45		
Water Temperature (°C)	–	~~[illegible]~~ TW			6.3		
Specific Conductivity (µS/cm) @ 25° C	1400				394		
Conductivity (µS/cm)	–				253		
TDS (g/L)	–				.255		
Dissolved Oxygen (% sat.)	20.1				38.1		
Dissolved Oxygen (mg/L)	–				4.65		
pH	4.04 / 9.98				7.69		
ORP (mV)	215.2				48.2		
Turbidity (FTU)	979.5	and 9.98 0.01			14.84		
Air Temperature (°C)	70°F				78°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 3 / 10 **Time** 9:45 **Station Number** MST053

Completed by: Rob Young **Checked by:** Darrin Weaver

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 4.5 ft **L.E.W.** 10.9 ft **Total Width** 6.4 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
.5	1	.3	0				
1.0	2	.4	0				
1.5	3	.4	.02				
2.0	4	.7	.02				
2.5	5	.7	.03				
3.0	6	.7	.03				
3.5	7	.8	.04				
4.0	8	.8	.06				
4.5	9	1.0	.04				
5.0	10	.75	.04				
5.5	11	.6	.05				
6.0	12	.4	.03				
6.4	13	0	0				
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10/3/10 **Arrival Time** 1500

Field Personnel

Rob Young **Signatures**

Darrin Weaver

SITE DESCRIPTION

Station Name Ephem Trib to B-foot Riv | Above Blackfoot River **Station Number** MST0066

Latitude N 42 ° 48 ' 56.30 " **Longitude** W 111 ° 30 ' 07.32 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-001

Stream & Riparian Area Description Meandering Creek in middle of field, green field grass along banks | rip area, small shrubs nearby, heavily used by livestock altering channel characteristi

Surface Water Characteristics (color, odor, appearance): Brown, heavily filled w/ sediment, pungent livestock odor, currently only standing water in the drainage (sporatic ponding).

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-SW MST0066-(U,F)-(1,2), 1010-MST0066-SD-001-(1,2), 1010-MST066-RS-001-(1,2), 1010-MST0066-RS-002 **Sample Time:** 1515

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0900				1515		
Water Temperature (°C)	–				22.56		
Specific Conductivity (µS/cm) @ 25° C	1400				686		
Conductivity (µS/cm)	–				845		
TDS (g/L)	–				0.576		
Dissolved Oxygen (% sat.)	20.1				3.4		
Dissolved Oxygen (mg/L)	–				0.29		
pH	4.04 / 9.98				7.05		
ORP (mV)	215.2				143.5		
Turbidity (FTU)	979.5, 9.98 0.01				185.9		
Air Temperature ~~(°C)~~ °F	70°F				82°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 3 / 10 **Time** 1515 **Station Number** MST066

Completed by: Rob Young (MWH) **Checked by:** Darrin Weaver (Dag)

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	* NO FLOW IN	DRAINAGE

Flow by Meter

R.E.W. — ft **L.E.W.** — ft **Total Width** — ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5	STANDING		WATER			
	6			ONLY			
	7	IN		MST066			
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 3 / 10 **Arrival Time** 1400

Field Personnel

Robert Young
Darrin Weaver

Signatures

SITE DESCRIPTION

Station Name Ephemeral Trib to 3-foot Riv / Below Ballard Mine **Station Number** MST067

Latitude N 42 ° 49 ' 26.29 " **Longitude** W 111 ° 29 ' 30.30 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 100-0017

Stream & Riparian Area Description Small creek/ditch/drainage S of Ballard mine shop, tall field grass, distinct drainage channel ~ 2 feet wide, soft seds in channel

Surface Water Characteristics (color, odor, appearance): DRY, mud in channel had mod. organic odor, possibility result of light livestock usage

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-MST067-SD-001, 1010-MST067-RS-(001, 002)

Sample Time: 1415

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

DRY

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 3 / 10 **Time** 1400 **Station Number** MSJ067

Completed by: Rob Young **Checked by:** Darrin Weaver

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	DRY	

Flow by Meter

R.E.W. — ft **L.E.W.** — ft **Total Width** — ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

DRY

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 4 / 10 **Arrival Time** 1200

Field Personnel

Rob Young **Signatures**

Travis Ostler

SITE DESCRIPTION

Station Name Below Ballard Mine **Station Number** MST095

Latitude N 42 ° 49 ' 38.89 " **Longitude** W 111 ° 29 ' 05.02 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-0019

Stream & Riparian Area Description Dry drainage ditch just south of dirt road, no sign of recent water w/in channel, high field grass and sage brush

Surface Water Characteristics (color, odor, appearance): -DRY-, no odors in seds/soils, healthy brown soil, no gravel

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-MST095-SD-001, 1010-MST095-RS-(001,002)

Sample Time: 1210

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							Dry
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)				DRY			
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 4 / 10 **Time** 1210 **Station Number** MST095

Completed by: Rob Young **Checked by:** Travis Ostler

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	DRY	

Flow by Meter

R.E.W. — **ft** **L.E.W.** — **ft** **Total Width** — **ft**

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6		DRY!				
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 4 / 10 **Arrival Time** 1340

Field Personnel

Rob Young **Signatures**

Travis Ostler

SITE DESCRIPTION

Station Name Headwater Wooley Valley Above Ballard Mine **Station Number** MST093

Latitude N 42 ° 50 ' 25.34 " **Longitude** W 111 ° 28 ' 32.89 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-0020

Stream & Riparian Area Description Drainage / creek (dry) w/ no sign of recent water, field grass in channel, field grass and sage surrounding.

Surface Water Characteristics (color, odor, appearance): Dry, no odor in seds, station used heavily by livestock, livestock pond nearby

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: RY ~~1010-MST093(A,B)~~, 1010-MST093B-(SD)-001, 1010-MST093B-RS-(001,00

1010-MST093A-SD-001-(1,2), 1010-MST093A-RS-(001,002)-(1,2) **Sample Time:** 1355

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1355		
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 4 / 10 **Time** 1340 **Station Number** MST093

Completed by: Rob Young **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	DRY	

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6		DRY				
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 4 / 10 **Arrival Time** 1530

Field Personnel

Rob Young **Signatures**

Travis Ostler

SITE DESCRIPTION

Station Name Wooley Valley, Above North Fork Wooley Valley Creek **Station Number** MST092

Latitude N 42 ° 49 ' 40.00 " **Longitude** W 111 ° 27 ' 04.00 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-0021

Stream & Riparian Area Description Dry, no odors from sediments in channel, light livestock usage, moist seds in stream channel (recent rain).

Surface Water Characteristics (color, odor, appearance): Dry, creek bed in middle of flat valley bottom, sage and abundant field grass, green field grass in channel, muddy/moist seds in channel, no obvious riparian bench

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-MST092-SD-001, 1010-MST092-RS-001-(MS,MSD), 1010-MST092-RS-002 **Sample Time:** 1540

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)			DRY				
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 4 / 10 **Time** 1530 **Station Number** MST092

Completed by: Rob Young **Checked by:** Travis Ostler

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	DRY	

Flow by Meter

R.E.W. — ft **L.E.W.** — ft **Total Width** — ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7		* DRY				
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 5 / 10 **Arrival Time** 0840

Field Personnel

Rob Young **Signatures**

Travis Ostler

SITE DESCRIPTION

Station Name Wooley Valley Creek; ~~Wooley Valley Creek~~ Below North Fork **Station Number** MST089

Latitude N 42 ° 49 ' 29.00 " **Longitude** W 111 ° 26 ' 20.00 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 100-0022

Stream & Riparian Area Description Creek channel (dry) ~ 3.5 feet wide, short (grazed) field grass veg, meandering in open field, muddy/moist channel bottom

Surface Water Characteristics (color, odor, appearance): Dry, no odor in soil, light-mod livestock usage, healthy dark brown, moist, soil

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-MST089-SD-001, 1010-MST089-RS-(001,002)

Sample Time: 0910

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)			DRY				
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 5 / 10 **Time** 0900 **Station Number** MST089

Completed by: Rob Young **Checked by:** Travis Ostler

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	DRY	

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6		DRY				
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 5 / 10 **Arrival Time** 1140

Field Personnel

Rob Young **Signatures**
Travis Ostler

SITE DESCRIPTION

Station Name Wooley Valley Creek; Above Loadout Creek at Road **Station Number** ~~MST0 ay~~ MST272

Latitude N 42° 48' 03.97" **Longitude** W 111° 24' 40.99"

Elevation _____ ft **Datum** NAD 27 **Photo Number** 100-0024

Stream & Riparian Area Description Narrow creek bed (dry) w/ field grass in middle of hilly pasture, heavy livestock use, short steep banks, along fenceline

Surface Water Characteristics (color, odor, appearance): Dry, no odor from seds, heavy livestock usage, adjacent to road / fenceline

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, Trowel, Other( ). Up-stream / Across-stream

Sample IDs: 1010-MST272-SD-001-(MS,MSD), 1010-MST272-RS-(001, 002) **Sample Time:** 1150

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)				DRY			
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10/ 5 / 10 **Time** 1140 **Station Number** MST272

Completed by: Rob Young **Checked by:** Travis Ostler

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	DRY	

Flow by Meter

R.E.W. — ft L.E.W. — ft Total Width — ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7		DRY				
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10/ 5 / 10 **Arrival Time** 0945

Field Personnel

Rob Young **Signatures**

Travis Ostler

SITE DESCRIPTION

Station Name Wooley Valley Crk; Above ponding and below MST-089 **Station Number** ~~MST0~~ MST273 Ry

Latitude N 42 ° 49 ' 08.02" **Longitude** W 111 ° 25 ' 41.02 "

Elevation ft **Datum** NAD 27 **Photo Number** 100-0022

Stream & Riparian Area Description Dry, meandering creek bed in flat valley, dry field grass, one steep bank/cut, stream bed used as cattle trail

Surface Water Characteristics (color, odor, appearance): Dry, no odor in sediment, very hard surface seds in channel probably due to mod. livestock useage

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Corer, [Trowel], Other( ). Up-stream / Across-stream

Sample IDs: 1010-MST273-SD-001, 1010-MST273-RS-(001,002)

Sample Time: 1000

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)				DRY			
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2010 Sediment-Riparian Soil-SW Sampling

Date 10 / 5 / 10 **Time** 1000 **Station Number** MST273

Completed by: Rob Young **Checked by:** Travis Osher

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	DRY	

Flow by Meter

R.E.W. — ft **L.E.W.** — ft **Total Width** — ft

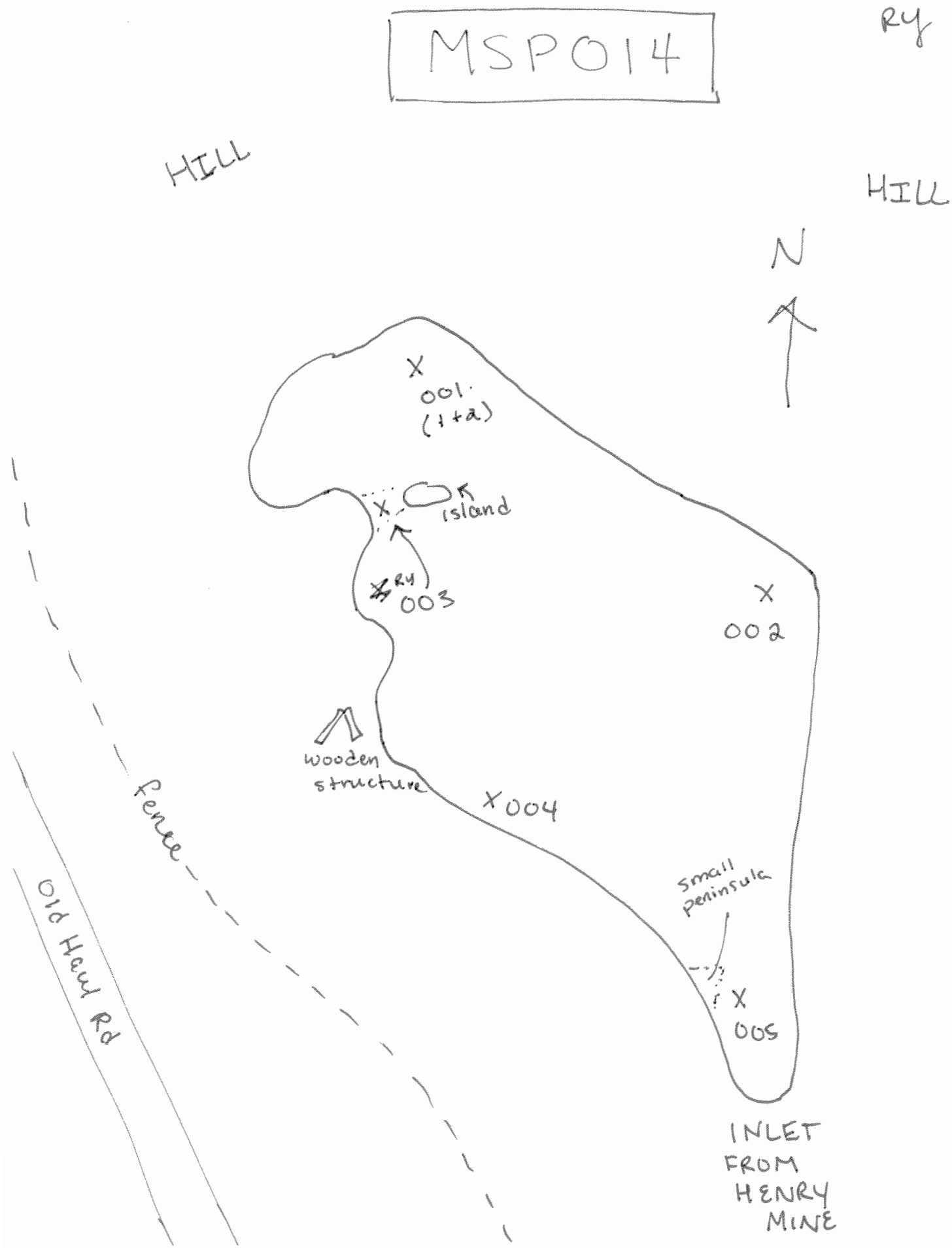
Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

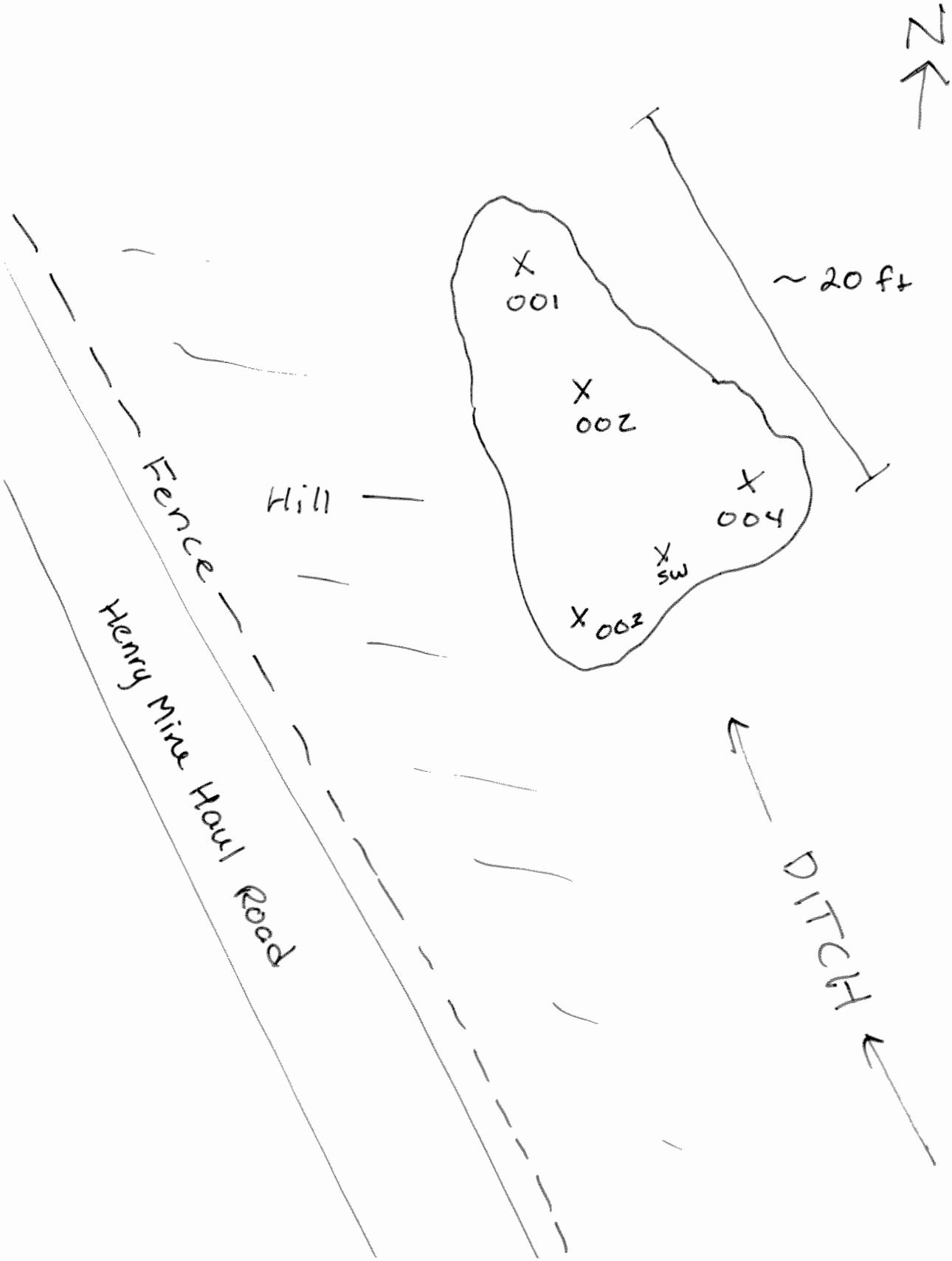
Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

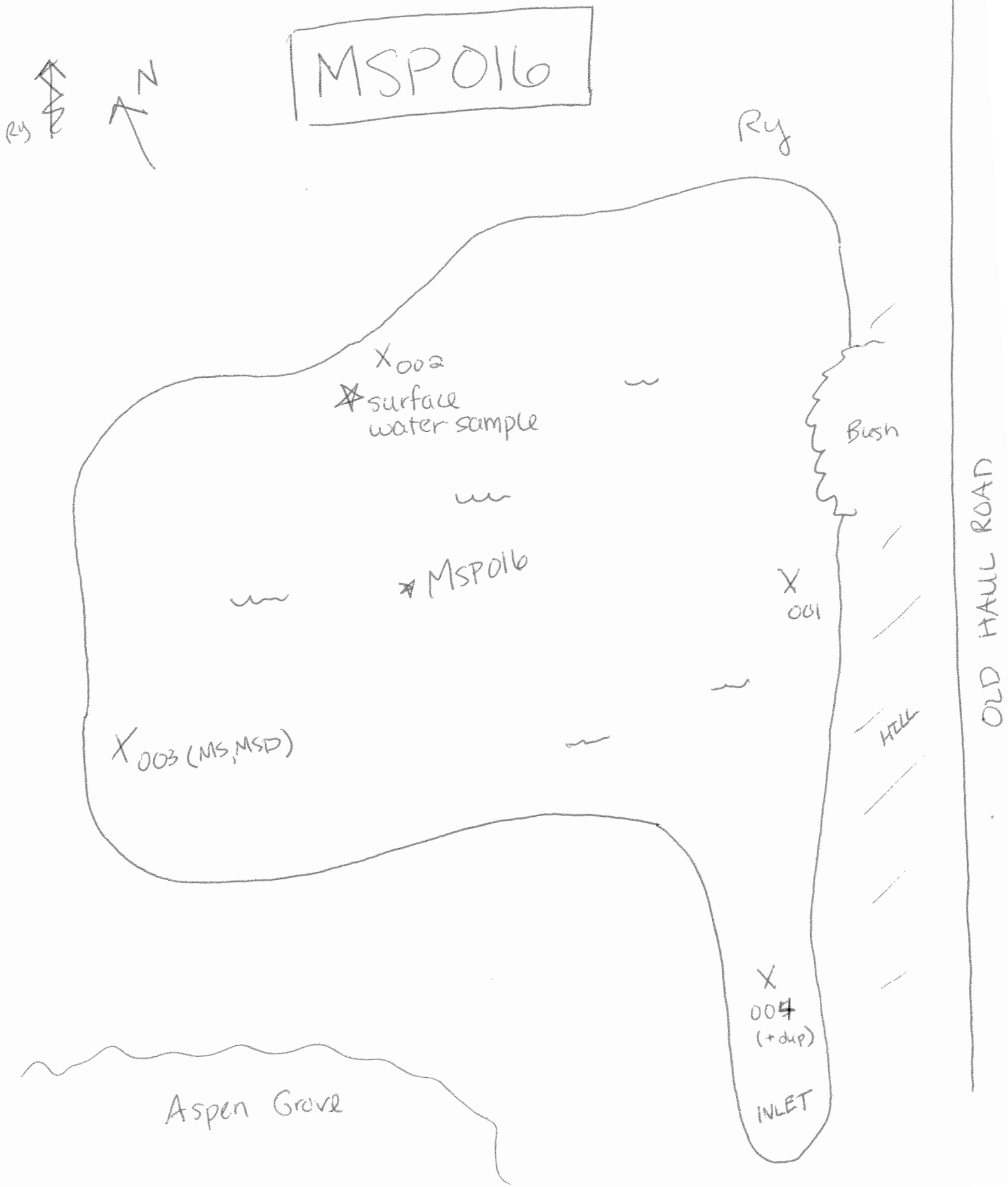
Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7			DRY			
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

MSP014


RY
HILL
HILL
N
X
001
(1+2)
X
island
RY
003
X
002
wooden
structure
X004
small
peninsula
X
005
fence
Old Haul Rd
INLET
FROM
HENRY
MINE

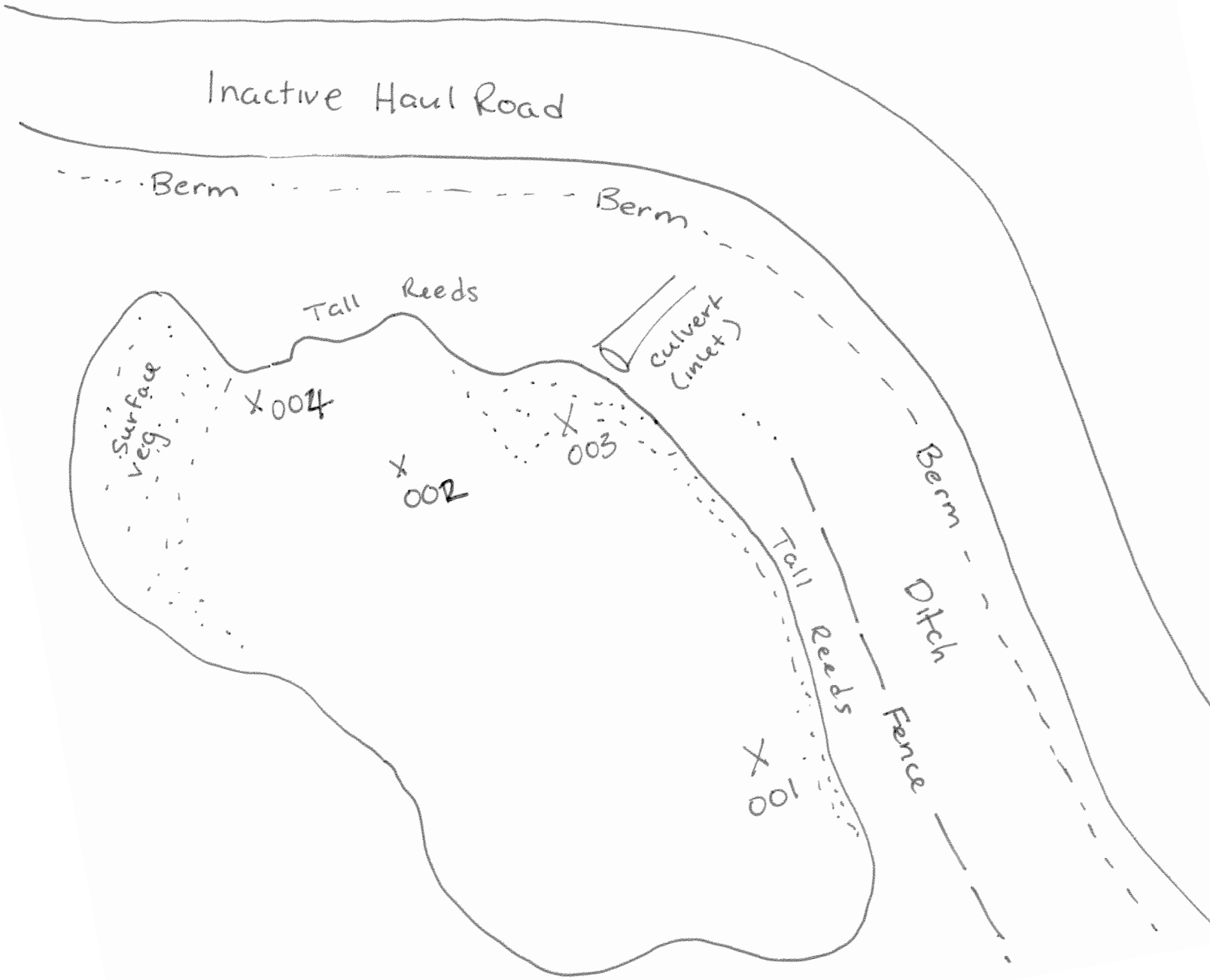
MSP015


N
~20 ft
X 001
X 002
X 004
X SW
X 003
Hill
Fence
Henry Mine Haul Road
DITCH

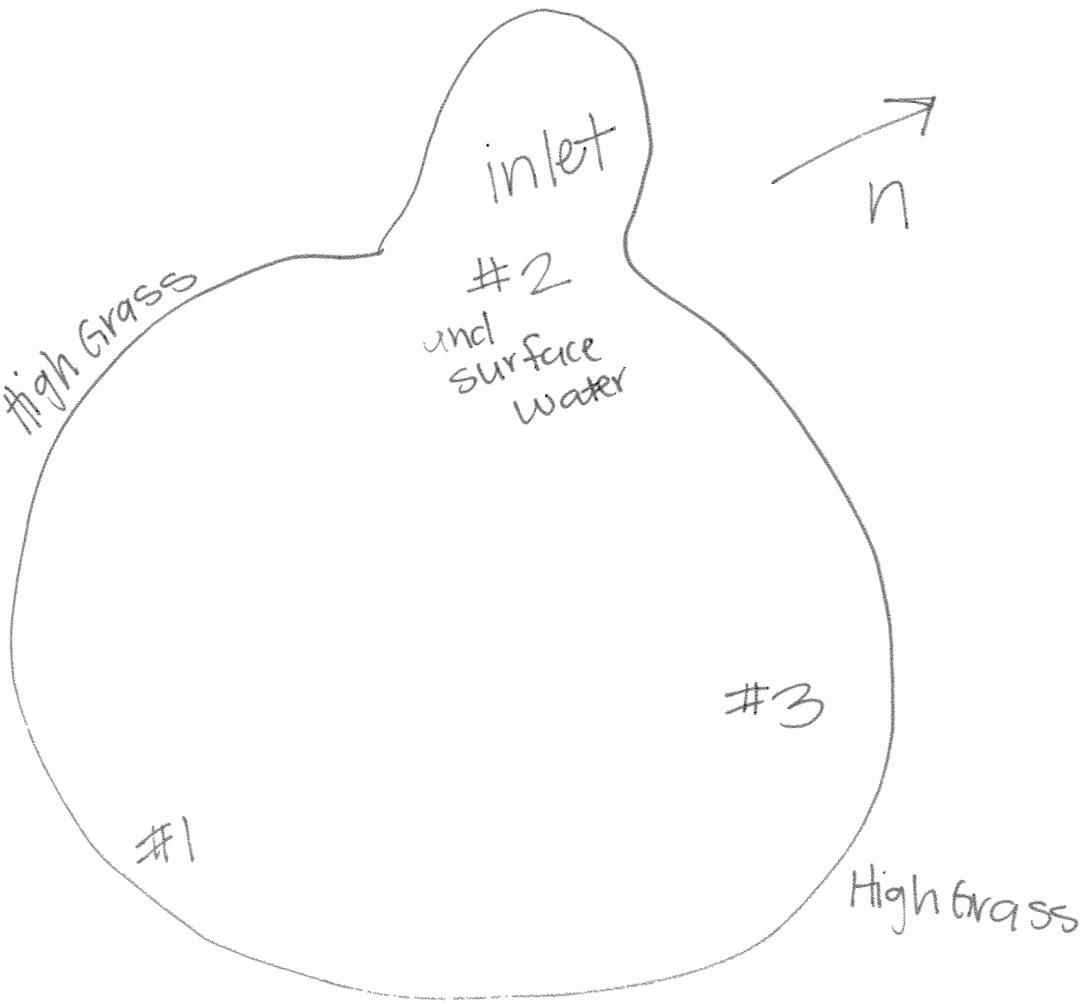

MSP016
N
Ry
Ry
X 002
surface water sample
Bush
MSP016
X 001
X 003 (MS, MSD)
HILL
OLD HAUL ROAD
X 004 (+dup)
INLET
Aspen Grove

RY

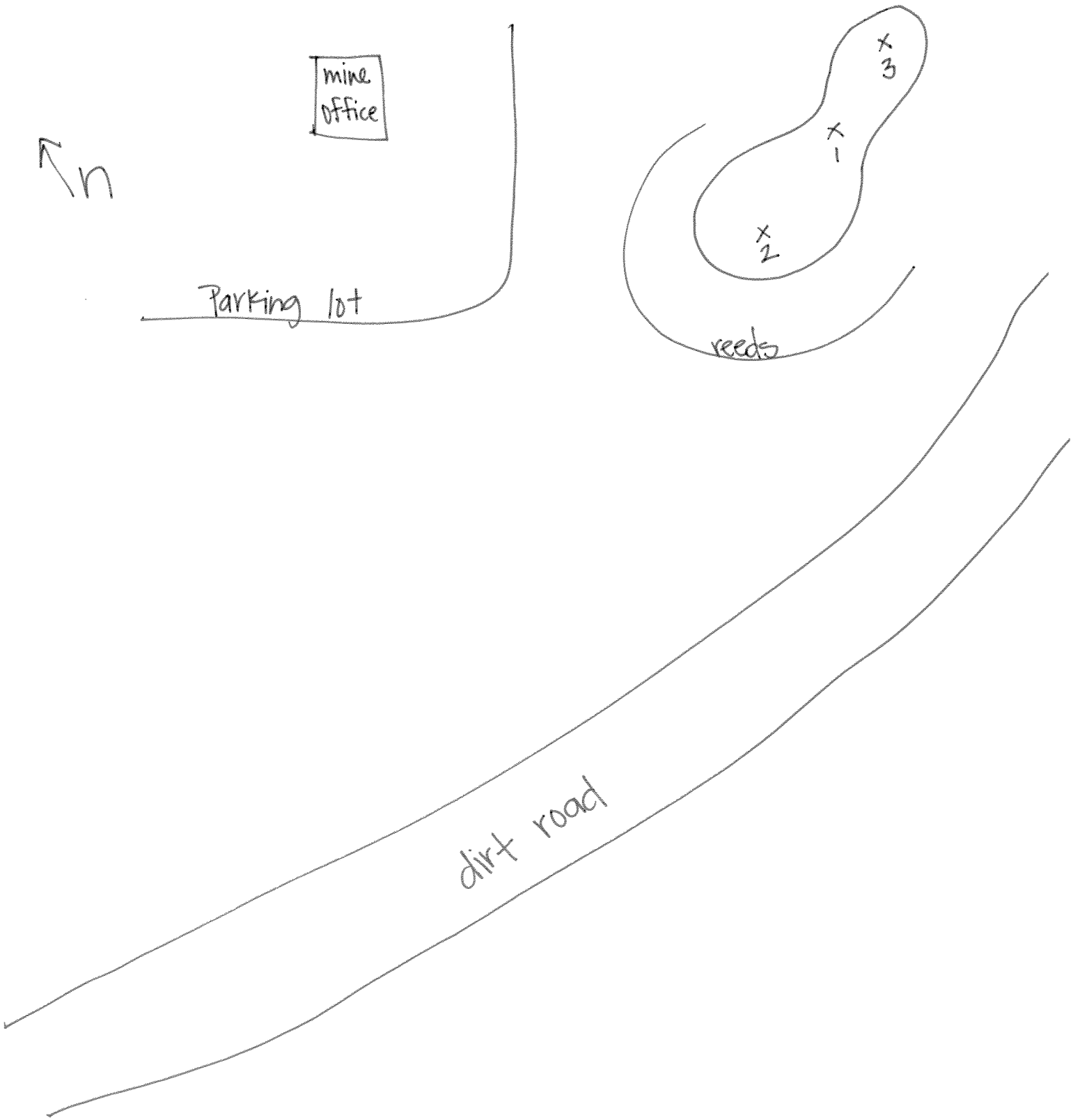
MSP017


Inactive Haul Road
Berm
Berm
Tall Reeds
culvert (inlet)
Surface veg.
X 004
X 003
X 002
Berm
Ditch
Tall Reeds
Fence
X 001

MSP 018

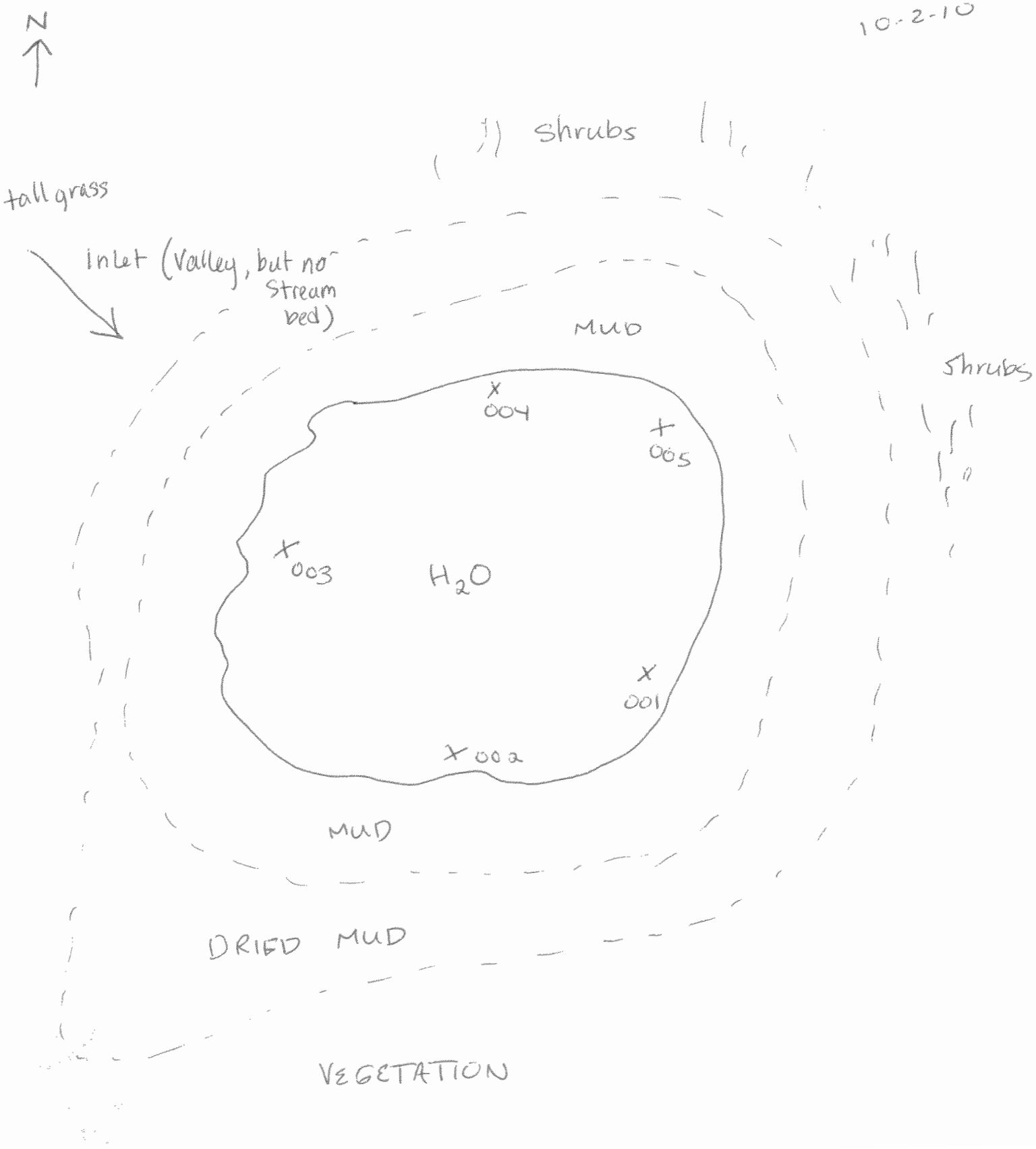


MSP031



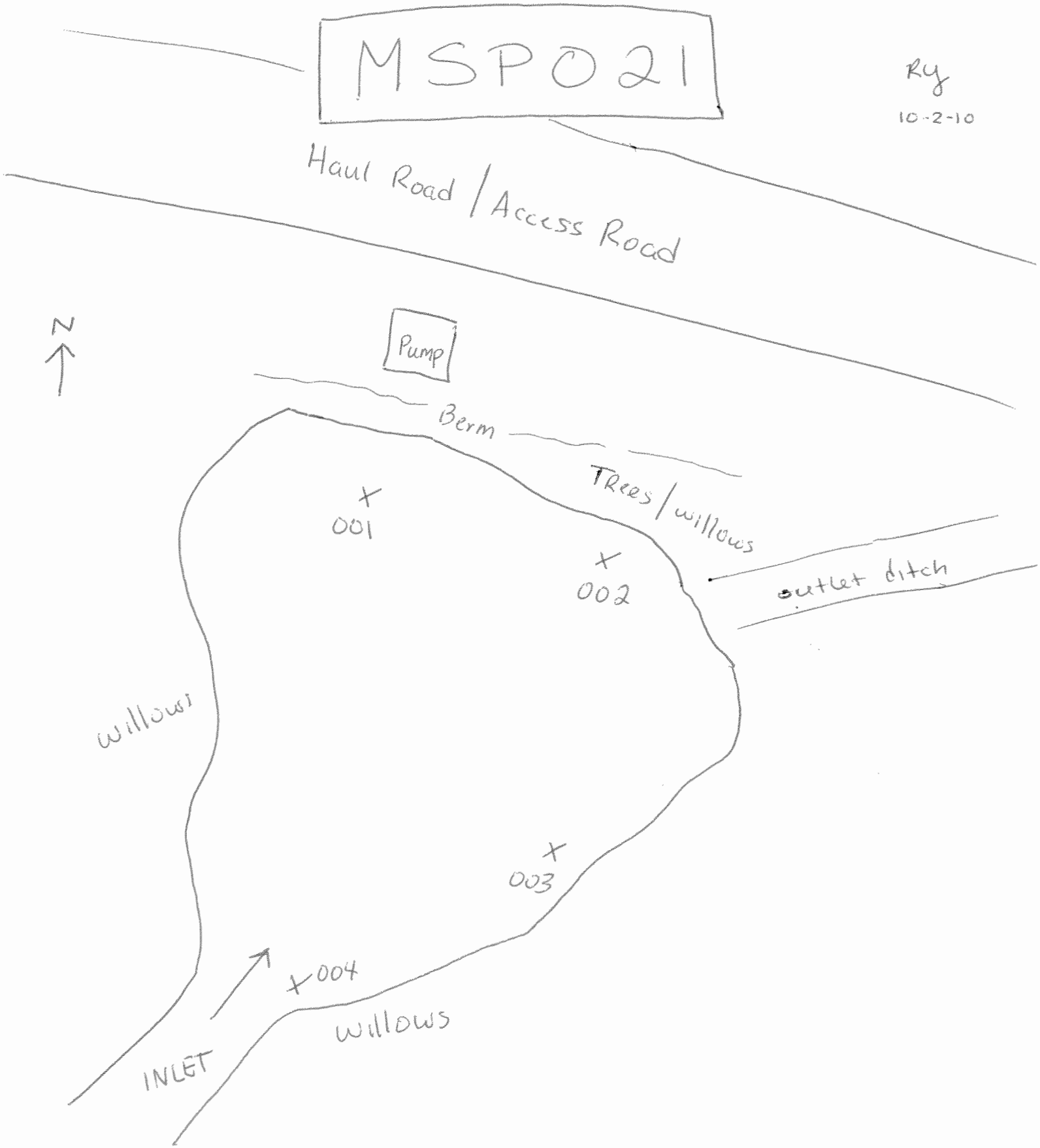
MSP020

RY
10-2-10



MSP021

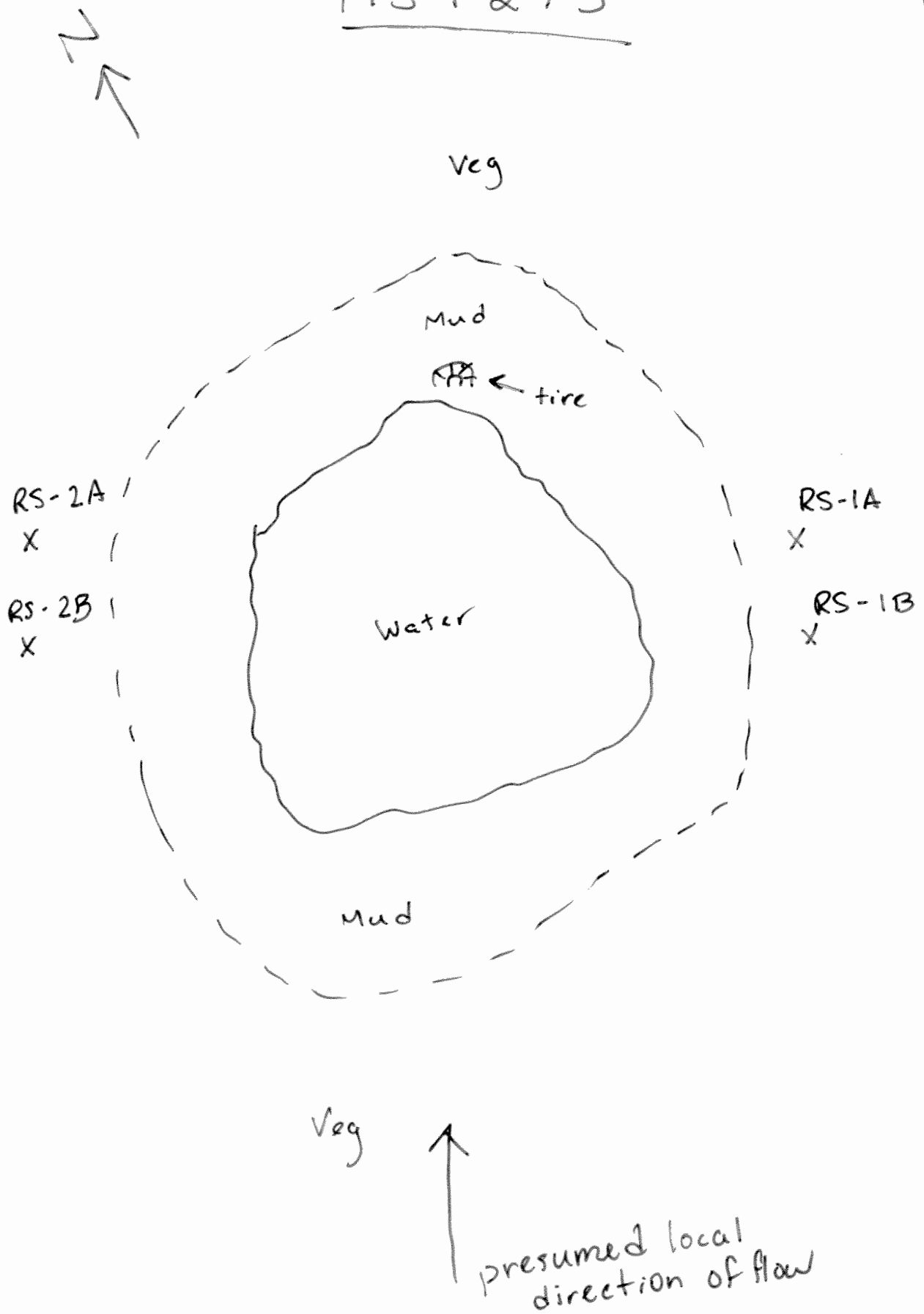
RY
10-2-10



MSP023

MST275

RY


N
Veg
Mud
tire
RS-2A
RS-1A
RS-2B
RS-1B
Water
Mud
Veg
presumed local direction of flow

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT:** Rob Siegmund (925) 627-4766

FED EX #: 6620 4139 9151 COOLER #: 006 Page 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Rob Young

LAB: CAS-Rose

PROJECT NAME: PG Productions LLC RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Mercury (EPA 245.1)	Dissolved As, Ca, Cr, Cu, Fe, Mg, Mn, Ni, Pb, Se, Tl, V (EPA 6020)	Dissolved As, B, Cd, Hg, Sb, Mo, Se, Tl (EPA 6020)	Dissolved Hardness (SM2340B)	Dissolved Sulfate (EPA 300.0)	Total As, Ca, Cd, Cr, Cu, Fe, Hg, Mg, Mn, Mo, Ni, Pb, Sb, Se, Tl, V (EPA 6020)	Total Sb, B, Mo, Mn, Ni (EPA 6020)	Total Mercury (EPA 245.1)	AVS-SEM	TOC (Walkley-Black)	Comments
	1010-SWMBP01S-R	9/20/10	1040	Water		X	X	X	X						
	1010-SWMBP01S-U			Water											
	1010-MSP016-SD-001			Sediment						X	X	X	X	X	
	1010-MSP016-SD-002			Sediment						X	X	X	X	X	
	1010-MSP016-SD-003			Sediment						X	X	X	X	X	
	1010-MSP016-SD-003-MS			Sediment						X	X	X	X	X	
	1010-MSP016-SD-003-MSD			Sediment						X	X	X	X	X	
	1010-MSP016-SD-004			Sediment						X	X	X	X	X	
	1010-MSP016-SD-004-2			Sediment						X	X	X	X	X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		Robert P. Young	MWH	9/24/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Temp Cons.

ORIGINAL: Send with sample (sign only in blue or black ink) COPIES: Retained by Sampler, Sent to Office

MWH USE ONLY:

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8620 4139 9151 COOLER #: 004 Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Rob Young

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	1010-SWMST053-F	10/3/10	0945	Water		X	X	X	X						
	1010-SWMST053-U			Water	X										
	1010-MST053-SD-001			Sediment						X	X	X	X	X	
	1010-MST053-SD-002			Sediment						X	X	X	X	X	
	1010-MST053-RS-001			Soil						X	X	X		X	
	1010-MST053-RS-002			Soil						X	X	X		X	

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	Robert H Young	MWH	10/4/10
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Cond

ORIGINAL: Send with sample (sign only in blue or black ink) COPIES: Retained by Sampler, Sent to Office

MWH USE ONLY:

MWH CHAIN OF CUSTODY RECORD

MWH CONTACT: Ruth Siegmund (925) 627-4769

FED EX #: 9620 4139 9161 COOLER #: 004 Pg 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Robert Young

LAB: CAS-Reno

PROJECT NAME: P4 Production LLC - NS Sac-SV Field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Cu, Ni, Pb, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (1631E)	Dissolved Hexavalent Chromium (SW846 7196A-Ion Chrom)	Total As, Cd, Cr, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Total Mercury (EPA 7471A)	AVS-SEM	Total Metals: Black	Comments
	1010-SWMST275A-[illegible]	10/1/10	0925	Water		X	X	X	X						
	1010-SWMST275A-U	↓	↓	Water	X										
	1010-MST275A-SD-001	↓	↓	Sediment						X	X	X	X	X	
	1010-MST275A-RS-001	↓	↓	Soil						X	X	X		X	
	1010-MST275A-RS-002	↓	↓	Soil						X	X	X		X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	Robert Young	Robert Young	MWH	10/4/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab use only: Sample Cond.

ORIGINAL: Send with sample (sign only in blue or black ink)

COPIES: Retained by Sampler. Sent to Office

MWH USE ONLY:

MWH **CHAIN OF CUSTODY RECORD** MWH CONTACT: Keith Segerstrand (925) 627-4796

FED EX #: 8420 4149 9151 COOLER #: 004 Pg 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Robert Young RY

LAB: CAL-Xelba

PROJECT NAME: P4 Production LLC - RS-002 SW fold program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Chromium (EPA 6020A)	Dissolved As, Sb, Cr, Cu, Ni, Pb, Tl, U, V (EPA 6020A)	Dissolved Sb, Ba, Cu, Mg, Mn, Ni, Zn (EPA 6010B)	Dissolved Aluminum (EPA 6010B)	Dissolved Phosphorus (SM4500-P-E)	Total As, Cd, Cr, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, Ba, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	Total Oil and Grease	Comments
	1010-SWMST275B-F	10/1/10	0925	Water		X	X	X	X						
	1010-SWMST275B-U			Water	X										
	1010-MST275B-SD-001			Sediment						X	X	X	X	X	
	1010-MST275B-RS-001			Soil						X	X	X		X	
	1010-MST275B-RS-002			Soil						X	X	X		X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title	Date
RELINQUISHED BY:	Robert Young	Robert Young	MWH	10/4/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

Pg. Lab Use Only. Sample Cond.

ORIGINAL: Send with sample (sign only in blue or black ink)
(MWH USE ONLY)

COPIES: Retained by Sampler, Supply Office

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8620 4139 9129 COOLER #: 003 Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Rob Young RY

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	~~1010-SWMST277B-F~~	10/3/10	12:10	Water		X	X	X	X						DRY - NO SAMPLE
DRY	~~1010-SWMST277B-U~~			Water	X										
	1010-MST277B-SD-001			Sediment						X	X	X	X	X	
	1010-MST277B-RS-001			Soil						X	X	X		X	
	1010-MST277B-RS-002			Soil						X	X	X		X	

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	Robert Young	MWH	10/4/10
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Cond

ORIGINAL: Send with sample (sign only in blue or black ink) COPIES: Retained by Sampler, Sent to Office

MWH USE ONLY:

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 862041399129 **COOLER #:** 003 Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE

Robert Young RY

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
DRY	~~1010-SWMST277A-F~~	10/3/10	1210	Water		X	X	X	X						DRY - NO SAMPLE
	~~1010-SWMST277A-U~~			Water	X										"
	1010-MST277A-SD-001			Sediment						X	X	X	X	X	
	1010-MST277A-RS-001			Soil						X	X	X		X	
	1010-MST277A-RS-002			Soil						X	X	X		X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		Robert Young	MWH	
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Cond

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES: Retained by Sampler, Sent to Office**

MWH USE ONLY:

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8620 4139 9129 **COOLER #:** _____ Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Rob Young

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	1010-SWMST066-F-1	10/3/10	1515	Water		X	X	X	X						
	1010-SWMST066-U-1			Water	X										
	1010-SWMST066-F-2			Water		X	X	X	X						
	1010-SWMST066-U-2			Water	X										
	1010-MST066-SD-001-1			Sediment						X	X	X	X	X	
	1010-MST066-SD-001-2			Sediment						X	X	X	X	X	
	1010-MST066-RS-001-1			Soil						X	X	X		X	
	1010-MST066-RS-001-2			Soil						X	X	X		X	
	1010-MST066-RS-002			Soil						X	X	X		X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert Young	MWH	10/4/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Cond

ORIGINAL: Send with sample (sign only in blue or black ink)
MWH USE ONLY

COPIES: Retained by Sampler, Sent to Office

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8620 4139 9130 COOLER #: 002 Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Robyoung Ry

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Co, Cr, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (74/70A)	Dissolved Hardness (SM2340B Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (74/71A)	AVS/SEM	TOC (Walkley-Black)	Comments
	1010-SWMSP021-F-1	10/2/10	0930	Water		X	X	X	X						
	1010-SWMSP021-U-1			Water	X										
	1010-MSP021-SD-001			Sediment						X	X	X	X	X	
	1010-MSP021-SD-002-1			Sediment						X	X	X	X	X	
	1010-MSP021-SD-002-2			Sediment						X	X	X	X	X	
	1010-MSP021-SD-003			Sediment						X	X	X	X	X	
	1010-MSP021-SD-004			Sediment						X	X	X	X	X	
	1010-SWMSP021-F-2			Water		X	X	X	X						
	1010-SWMSP021-U-2			Water	X										
	1010-SWMSP021-F-1-MS			Water		X	X	X	X						
	1010-SWMSP021-U-1-MS			Water	X										
	1010-SWMSP021-F-1-MSD			Water		X	X	X	X						
	1010-SWMSP021-U-1-MSD	10/2/10	0930	Water	X										X

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert Young	MWH	10/4/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Cond:

ORIGINAL: Send with sample (sign only in blue or black ink) COPIES: Retained by Sampler, Sent to Office

MWH USE ONLY:

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 2620 4139 9130 COOLER #: 002 Pg 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Robert Young

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	1010-SWMSP020-F	10/2/10	1220	Water		X	X	X	X						
	1010-SWMSP020-U			Water	X										
	1010-MSP020-SD-001			Sediment						X	X	X	X	X	
	1010-MSP020-SD-002			Sediment						X	X	X	X	X	
	1010-MSP020-SD-003			Sediment						X	X	X	X	X	
	1010-MSP020-SD-004			Sediment						X	X	X	X	X	
	1010-MSP020-SD-005			Sediment						X	X	X	X	X	
	1010-MSP020-SD-005-MS			Sediment						X	X	X	X	X	
	1010-MSP020-SD-005-MSD			Sediment						X	X	X	X	X	

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	Robert Young	MWH	10/4/10
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Samples Cont.

ORIGINAL: Send with sample (sign only in blue or black ink) COPIES: Retained by Sampler, Sent to Office

MWH USE ONLY:

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8620 4139 9140 COOLER #: 001 Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Robert Young RY

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	~~1010-SWMST067-F-1~~			~~Water~~		X	X	X	X						DRY
	~~1010-SWMST067-U-1~~			~~Water~~	X										DRY
	1010-MST067-SD-001-1	10/3/10	1415	Sediment						X	X	X	X	X	
	1010-MST067-RS-001-1	↓	↓	Soil						X	X	X		X	
	1010-MST067-RS-002	↓	↓	Soil						X	X	X		X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		Robert H Young	MWH	10/4/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Cond

ORIGINAL: Send with sample (sign only in blue or black ink) COPIES: Retained by Sampler, Sent to Office

MWH USE ONLY:

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: _____ **COOLER #:** _____ **Pa** 1 **of** 1

SAMPLER(S) PRINTED NAME AND SIGNATURE

Rob Young RY

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	1010-SWMST131-F	10/2/10	1420	Water		X	X	X	X						
	1010-SWMST131-U	↓	↓	Water	X										
	1010-MST131-SD-001	↓	↓	Sediment						X	X	X	X	X	
	1010-MST131-SD-002	↓	↓	Sediment						X	X	X	X	X	
	1010-MST131-RS-001	↓	↓	Soil						X	X	X		X	
	1010-MST131-RS-002	↓	↓	Soil						X	X	X		X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert Young	MWH	10/4/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Cond

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES:** Retained by Sampler, Sent to Office

MWH USE ONLY:

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8620 4139 9140 COOLER #: 001 Pg 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Robert Young RY

LAB: CAS-Kelso

PROJECT NAME: PA Production LLC - RS-Sed-SW new program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020B)	Dissolved As, Ba, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se, Tl, U, V (EPA 6020A)	Dissolved Fe, Al, Ca, Mg, Mn, Mo, Zn (EPA 200.7B)	Dissolved Manganese (EPA 200.7B)	Dissolved Molybdenum (EPA 6020)	Total As, Cd, Cr, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Be, Mo, Zn (EPA 6010B)	Total Mercury (EPA 7471A)	Total Sulfide (EPA 9030B)	TOC (Walkley-Black)	Comments
	1010-SWMST274A-7	10/1/10	1600	Water		X	X	X	X						
	1010-SWMST274A-1	10/1/10	1600	Water	X										
	1010-MST274A-SD-001	10/2/10	0720	Sediment						X	X	X	X	X	
	1010-MST274A-RS-001	↓	↓	Soil						X	X	X		X	
	1010-MST274A-RS-002	↓	↓	Soil						X	X	X		X	

Comments/Instructions:

	Signature	Print Name:	Company Name/Title	Date
RELINQUISHED BY:	[signature]	Robert Young	MWH	10/4/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Custody Seal

ORIGINAL: Sent with sample (sign only in blue or black ink)
MWH USE ONLY:

COPIES: Retained by Sampler. Sent to Office

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8620 4139 9140 **COOLER #:** 001 Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE

Robert Young RY

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	1010-SWMST274B-F	10/1/10	1600	Water		X	X	X	X						
	1010-SWMST274B-U	10/1/10	1600	Water	X										
	1010-MST274B-SD-001	10/2/10	0720	Sediment						X	X	X	X	X	
	1010-MST274B-RS-001	↓	↓	Soil						X	X	X		X	
	1010-MST274B-RS-002	↓	↓	Soil						X	X	X		X	
	1010-ER-SD-02-U	9/30/10	1830	water						X	X	X			
	1010-ER-RS-01-U	10/1/10	1730	water						X	X	X			
	1010-ER-RS-02-U	10/2/10	1740	water						X	X	X			
	1010-ER-SD-03-U	10/3/10	1730	water						X	X	X			

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert Young	MWH	10/4/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Cond.

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES:** Retained by Sampler, Sent to Office

MWH USE ONLY:

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8620 4139 9107 **COOLER #:** _____ Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE

E. Jackson ej
R. Young Ry

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - ~~RS-Sed-SW~~ field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	1010-SWMSP018-F	9/29/10	0930	Water		X	X	X	X						
	1010-SWMSP018-U			Water	X										
	1010-MSP018-SD-001			Sediment						X	X	X	X	X	
	1010-MSP018-SD-002			Sediment						X	X	X	X	X	
	1010-MSP018-SD-003			Sediment						X	X	X	X	X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert Young	MWH	9/30/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Cond

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES:** Retained by Sampler, Sent to Office

MWH USE ONLY:

* shipped 9/30/10

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8620 4139 9107 COOLER #: _____ Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Rob Young, Emily Jackson

LAB: CAS-Kelso

PROJECT NAME: P9 Production LLC - RS-Bed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Cu, Ni, Pb, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Sb, Cd, Cr, Cu, Fe, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	SVOC/EDM	TOC (Walkley-Black)	Comments
	~~1010-SWMSP031-F-1~~			~~Water~~		X	X	X	X						
	~~1010-SWMSP001-U-1~~			~~Water~~	X										
	1010-SWMSP031-F-2			~~Water~~		X	X	X	X						
	~~1010-SWMSP001-U-2~~			~~Water~~	X										
	~~1010-SWMSP031-F-1-MS~~			~~Water~~		X	X	X	X						
	1010-SWMSP031-U-1-MS			Water	X										
	1010-SWMSP031-F-1-MSD			Water		X	X	X	X						
	~~1010-SWMSP031-U-1-MSD~~			~~Water~~	X										
	1010-MSP031-SD-001-1	9/28/10	1440	Sediment						X	X	X	X	X	
	1010-MSP031-SD-001-2			Sediment						X	X	X	X	X	
	1010-MSP031-SD-002			Sediment						X	X	X	X	X	
	1010-MSP031-SD-003			Sediment						X	X	X	X	X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert Young	MWH	9/30/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Seals Intact

ORIGINAL: Send with sample (sign only in blue or black ink) COPIES: Retained by Sampler, Sent to Office

MWH USE ONLY:

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MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8420 4139 9107 COOLER #: Pg 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Rob Young, Emily Jackson

LAB: CAS-Kelso

PROJECT NAME: PI Production LLC - RS-Sediment field program

PROJECT NUMBER: Direct Bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cu, Cr, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Ba, Cd, Cr, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	% Moisture	TOC (Walkley-Black)	Comments
	1010-SW-MSP017-F	9/28/10	1180	Water		X	X	X	X						
	1010-SW-MSP017-U			Water	X										
	1010-MSP017-SD-001			Sediment						X	X	X	X	X	
	1010-MSP017-SD-002			Sediment						X	X	X	X	X	
	1010-MSP017-SD-003			Sediment						X	X	X	X	X	
	1010-MSP017-SD-004			Sediment						X	X	X	X	X	

Comments/Instructions:

	Signature	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		Robert Young	MWH	9/30/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Cond.

ORIGINAL: Send with sample (sign only in blue or black ink)
MWH USE ONLY:

COPIES: Retained by Sampler, Sent to Office

* shipped 9/30/10

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8620 4139 9092 **COOLER #:** _____ Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE

Rob Young [signature]

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	1010-SWMSP015-F	9/30/10	1020	Water		X	X	X	X						
	1010-SWMSP015-U	↓	↓	Water	X										
	1010-MSP015-SD-001	↓	↓	Sediment						X	X	X	X	X	
	1010-MSP015-SD-002	↓	↓	Sediment						X	X	X	X	X	
	1010-MSP015-SD-003	↓	↓	Sediment						X	X	X	X	X	
	1010-MSP015-SD-004	↓	↓	Sediment						X	X	X	X	X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert Young	MWH	9/30/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Cond

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES:** Retained by Sampler, Sent to Office

MWH USE ONLY:

* shipped 9/30/10 RY

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8620 4139 9092 COOLER #: _____ Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Rob Young RY

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	1010-SWMSP014-F	9/29/10	1420	Water		X	X	X	X						
	1010-SWMSP014-U			Water	X										
	1010-MSP014-SD-001-1			Sediment						X	X	X	X	X	
	1010-MSP014-SD-001-2			Sediment						X	X	X	X	X	
	1010-MSP014-SD-002			Sediment						X	X	X	X	X	
	1010-MSP014-SD-003			Sediment						X	X	X	X	X	
	1010-MSP014-SD-004			Sediment						X	X	X	X	X	
	1010-MSP014-SD-005			Sediment						X	X	X	X	X	
	1010-ER-SW-01-U	9/29/10	1730	Water						X	X	X			

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert Young	MWH	9/30/10
RECEIVED BY:	[signature]			
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Cond.

ORIGINAL: Send with sample (sign only in blue or black ink) COPIES: Retained by Sampler, Sent to Office

MWH USE ONLY:

* Shipped 9/30/10 RY

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: 8620 4139 9092 COOLER #: _____ Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Rob Young, Emily Jackson

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	~~1010-SWMSP023-F~~			~~Water~~		~~X~~	~~X~~	~~X~~	~~X~~						
	~~1010-SWMSP023-U~~			~~Water~~	~~X~~										
	1010-MSP023-SD-001	09/28/10	1230	Sediment						X	X	X	X	X	
	1010-MSP023-SD-002			Sediment						X	X	X	X	X	
	1010-MSP023-SD-003			Sediment						X	X	X	X	X	
	1010-MSP023-SD-004			Sediment						X	X	X	X	X	
	1010-ER-SD-01-4	9/28/10	1730	water						X	X	X			

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		Robert Young	MWH	9/30/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Condi

ORIGINAL: Send with sample (sign only in blue or black ink) COPIES: Retained by Sampler, Sent to Office

MWH USE ONLY:

* shipped 9/30/10 RY

MWH CHAIN OF CUSTODY RECORD

MWH CONTACT: Ruth Siegmund (925) 627-4756

FED EX #: 8620 4139 9173 COOLER #: 006

Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Rob Young RY

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	~~1010-SW-MST273-F~~	~~10/5/10~~	~~1000~~	~~Water~~		X	X	X	X						DRY
	~~1010-SW-MST273-U~~			~~Water~~	X										DRY
	1010-MST273-SD-001	10/5/10	1000	Sediment						X	X	X	X	X	
	1010-MST273-RS-001	↓	↓	Soil						X	X	X		X	
	1010-MST273-RS-002	↓	↓	Soil						X	X	X		X	
	1010-ER-RS-03-U	10/4/10	1800	water						X	X	X			
	1010-ER-RS 04-U	10/5/10	1430	water						X	X	X			
	1010-B-SW-01	10/5/10	1430	water						X	X	X			

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert Young	MWH	10/6/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Cond:

ORIGINAL: Send with sample (sign only in blue or black ink)

COPIES: Retained by Sampler, Sent to Office

MWH USE ONLY:

MWH CHAIN OF CUSTODY RECORD

MWH CONTACT: Ruth Siegmund (925) 627-4756

FED EX #: 8620 4139 9173 COOLER #: 006

Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Rob Young RY

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	~~1010-SWMST272-F~~	10		Water		X	X	X	X						DRY
	~~1010-SWMST272-U~~			Water	X										DRY
	1010-MST272-SD-001	10/5/10	1150	Sediment						X	X	X	X	X	
	1010-MST272-SD-001-MS			Sediment						X	X	X	X	X	
	1010-MST272-SD-001-MSD			Sediment						X	X	X	X	X	
	1010-MST272-RS-001			Soil						X	X	X		X	
	1010-MST272-RS-002			Soil						X	X	X		X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert Young	MWH	10/6/10
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For Lab Use Only: Sample Cond:

ORIGINAL: Send with sample (sign only in blue or black ink)

COPIES: Retained by Sampler, Sent to Office

MWH USE ONLY:

MWH CHAIN OF CUSTODY **RECORD**

MWH CONTACT: Rush Stagmund (925) 627-4755

FED EX #: 8620 4139 9662 COOLER #: 005

Pg 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Rob Young

TAT: 5-25-Prio

PROJECT NAME: [illegible] Production LLC - [illegible]

PROJECT NUMBER: Diesel Oil to Monitoring

ANALYSIS REQUEST

Laboratory #	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Petroleum Hydrocarbons (EPA 8015M)	Dissolved Cd, Cr, Cu, Ni, Pb, Zn (EPA 6020A)	Dissolved Cd, Cr, Cu, Ni, Pb, Zn (EPA 6020A)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total Cd, Cr, Cu, Ni, Pb, Zn (EPA 6020A)	Total Sb, As, Mo, Se, Tl (EPA 6020A)	Total Mercury (7471A)	Anions	Cl, F, NO3, SO4	Comments
	[illegible]			Water	X	X	X	X							DRY
	[illegible]			Water	X										DRY
	[illegible]			Water	X	X	X	X							DRY
	[illegible]			Water	X										DRY
	[illegible]			Water	X	X	X	X							DRY
	[illegible]			Water	X										DRY
	[illegible]			Water					X	X	X	X	X		
	1010-MS-TBS-SS-SW-001	10/6/10	0910	Sediment					X	X	X	X	X		Calipso analysis additional - Silver
	1010-MS-TBS-SS-001			Soil					X	X	X		X		
	1010-MS-TBS-SS-002			Soil					X	X	X		X		

Comments/Special Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	Robert Young	MWH	10/6/10
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For Use On Site Sample Bank

ORIGINAL: Send with sample (sign only in blue or black ink)

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MWH USE ONLY:

MWH CHAIN OF CUSTODY RECORD

MWH CONTACT: Ruth Siegmund (925) 627-4756

FED EX #: 8620 4139 9162 COOLER #: 005

Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Rob Young

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	~~1010-SWMST095-F~~		1210	~~Water~~		X	X	X	X						DRY
	~~1010-SWMST095-U~~			~~Water~~	X										DRY
	1010-MST095-SD-001	10/4/10	1210	Sediment						X	X	X	X	X	
	1010-MST095-RS-001			Soil						X	X	X		X	
	1010-MST095-RS-002			Soil						X	X	X		X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert H Young	MWH	10/6/10
RECEIVED BY:				
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For Lab Use Only: Sample Cond:

ORIGINAL: Send with sample (sign only in blue or black ink) COPIES: Retained by Sampler, Sent to Office

MWH USE ONLY:

MWH CHAIN OF CUSTODY RECORD

MWH CONTACT: Ruth Siegmund (925) 627-4755

FED EX #: 8620 4399 9173 COOLER #: 002

Pg. 1 of 1

SAMPLERS: PRINTED NAME AND SIGNATURE: Rob Young

LAB: CAS (Lab)

PROJECT NAME: PG Production LLC - RG Sec 36 (MW prepmm)

PROJECT NUMBER: Client bill to Minnesota

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Suspended Solids (EPA 160.2)	Chloride (Cl, Br, Cl, Br, No, Ag, TO, U, V (EPA 300.0))	Dissolved Oil & Grease (EPA 1664B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B Calc)	Chloride (Cl, Br, Cl, Br, Mg, Sn, Na, K, U, V (EPA 300.0))	Sulfate (Cl, Br, S, Mn, Mo, Zn (EPA 300.0))	Total Alkalinity (SM2320B)	pH	DTW (Walkerg Water)	Comments
	MW-[illegible]			Water	X	X	X	X	X						
	MW-[illegible]			Water	X										
	1010-MSTUBZ-RD-001	10/4/10	1240	Sediment						X	X	X	X	X	
	1010-MSTUBZ-RD-001			Soil						X	X	X		X	
	1010-MSTUBZ-RD-001-MS			Soil						X	X	X		X	
	1010-MSTUBZ-RD-001-MSD			Soil						X	X	X		X	
	1010-MSTUBZ-RD-002			Soil						X	X	X		X	

Comments/Instructions:

	Signature	Print Name	Company Name/Title	Date
RELINQUISHED BY:	[signature]	Robert Young	MWH	10/6/10
RECEIVED BY:				
RELINQUISHED BY:				
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For Lab Use Only: Sample Cond.

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MWH USE ONLY #:

MWH CHAIN OF CUSTODY RECORD

MWH CONTACT: Ruth Siegmund (925) 627-4756

FED EX #: 862041399162 COOLER #: 005 Pa 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Robert H Young RHY

LAB: CAS-Kelso

PROJECT NAME: P4 Production LLC - RS-Sed-SW field program

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Selenium (EPA 6020A)	Dissolved As, Cd, Cr, Co, Cu, Ni, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, Zn (EPA 6010B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, Zn (EPA 6010B)	Total Mercury (7471A)	AVS/SEM	TOC (Walkley-Black)	Comments
	~~1010-SWMST093A-F-1~~			Water		X	X	X	X						DRY
	~~1010-SWMST093A-U-1~~			Water	X										DRY
	~~1010-SWMST093A-F-2~~			Water		X	X	X	X						DRY
	~~1010-SWMST093A-U-2~~			Water	X										DRY
	1010-MST093A-SD-001-1	10/4/10	1355	Sediment						X	X	X	X	X	
	1010-MST093A-SD-001-2			Sediment						X	X	X	X	X	
	1010-MST093A-RS-001-1			Soil						X	X	X		X	
	1010-MST093A-RS-001-2			Soil						X	X	X		X	
	1010-MST093A-RS-002-1			Soil						X	X	X		X	
	1010-MST093A-RS-002-2			Soil						X	X	X		X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert H Young	MWH	10/6/10
RECEIVED BY:				
RELINQUISHED BY:				
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For Lab Use Only: Sample Cond:

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MWH USE ONLY:

MWH

CHAIN OF CUSTODY RECORD

MWH CONTACT: Ruth Segmund (925) 527-4755

FED EX #: 8620 4299 1162 COOLER #: 005

Pg 1 of 1

SAMPLER(S) PRINTED NAME AND SIGNATURE: Robert Young

LAB: CAS-KPO

PROJECT NAME: PG Production LLC - RS Site (SR 124 project)

PROJECT NUMBER: Direct bill to Shell

ANALYSIS REQUEST

Laboratory ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Semivol. (EPA 8260B)	Dissolved As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Dissolved Sb, B, Ca, Mg, Mn, Mo, K, Na, Sr, Zn (EPA 6020B)	Dissolved Mercury (7470A)	Dissolved Hardness (SM2340B-Calc)	Total As, Cd, Cr, Co, Cu, Ni, Se, Ag, Tl, U, V (EPA 6020A)	Total Sb, B, Mn, Mo, K, Na, Sr, Zn (EPA 6020B)	Total Mercury (7470A)	AVS/SEM	TOC (Walkley-Black)	Comments
	~~4010-SWMST093B-E~~		~~1355~~	~~Water~~		~~X~~	~~X~~	~~X~~	~~X~~						
	~~1010-SWMST093B-U~~			~~Water~~	~~X~~										
	1010-MST093B-SD-001	10/4/10	1355	Sediment						X	X	X	X	X	
	1010-MST093B-RS-001	↓	↓	Soil						X	X	X		X	
	1010-MST093B-RS-002	↓	↓	Soil						X	X	X		X	

Comments/Instructions:

	Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:	[signature]	Robert Young	MWH	10/6/10
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

For Lab Use Only: Sample Condition

ORIGINAL: Send with samples (Ink only in blue or black ink) MWH USE ONLY.

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CONTENTS

PAGE	REFERENCE	DATE

Location Mine Office Date 9/28/10

Project / Client Monsanto

0900 - Emily & Rob met in Soda Springs to collect/purchase supplies for sampling

1000 - Met Barry at mine office to discuss sampling, check inventory of supplies at the core shed.

1020 - Rob undergoes safety orientation

* Amec using turbidity meter so Barry suggested beginning w/ dry ponds in the Enoch Valley mine area. Amec should be finished using the turbidity meter after Wed. Sept. 29.

Location Enoch Valley Date 9/28/10

Project / Client Monsanto

MSP023 - Arrived @ 1230,
sampled 1010-MSP023-SD-(001-004).
- Pond was dry → no SW samples
- 001 & 002 were speculated inlet samples
- Photo # 100-0002
- left site @ 1330.

MSP031 - Arrived @ 1430
1440 sampled 1010-MSP031-SD (001-003) plus FD.
- pond was dry → no SW samples
- photo # 100-0003
1520 leave site

- MST275 - located site w/ GPS and aerial photograph but no sign of water or any sign of channel/drainage at all (empty sage field) → will follow up w/ Leland / Vance / Leah on how to proceed
- located GPS point @ approx. 1530

Location Enoch Valley Date 9/28/10

Project / Client Monsanto

1600 - Located MSP017, MSP018, MST274, and MST131 but all contained H_2O. May sample sediments @ these stations tomorrow if AMEC isn't finished w/ turbidity meter for sake of progress.
1700 - Took equipment blank (1010-ER-SD-01-U) at machine shop.

1755 - Left machine shop, done for day.

Location Enoch Valley | Date 9/29/10

Project / Client Monsanto

0715 - Met @ Machine shop for prep, YSI calibration

0800 - Signed in at mine office and picked up turbidity meter from Barry

* calibration numbers
  - pH → 6.98 & 4.04
  - Spec. Cond → 1435
  - ORP → 219.1
  - Turb → 1001, 10.55, 0.02
  - Air Temp → 44°F
  - DO → 20.4

0920 arrive at MSP018

0930 sample time sediment & surface water 11.41°C, 2316 µS/cm³, ~~1714~~ 1714 µS/cm, 1.506 TDS, DO 67.6%, DO 7.15 mg/L, pH 7.19, ORP ~~92~~ 112 mV, Turb = 17.98 FTU

- 1010SWMSP018 - (F, U), and 1010 - MSP018 - SD - 001, 002, 003 samples taken (Using 5L bucket + corer)
- Photo # 100-0004

Location Enoch | Date 9/29/10

Project / Client Monsanto

MSP017 - Arrive @ 1110 and prep
- Collect samples 1010 - MSP017 - SD (001 - 004) (4 samples) and ~~1010 - MSP017 - RY~~ 1010 - SW MSP017 - (F, U) (2 samples)
- SW parameters: (1130)
  - Turb. = 4.12 FTU
  - Water Temp = 10.94°C
  - Spec. Cond. = 1426 µS/cm
  - Cond. = 1042 µS/cm
  - TDS = 0.927 g/L
  - DO = 326.5 % sat.
  - DO = 36.25 mg/L
  - pH = 8.68
  - ORP = 52.6 mV
  - Air Temp = 66°F
- 1200 - Return to truck to decon
- Emily home sick, Rob will continue sampling ponds this afternoon
- 1220 - Leave MSP017

* 003 sample taken at a culvert inlet area, otherwise there was no obvious stream/creek inlet

Location Henry Mine Date 9/29/10
Project / Client Monsanto

MSP014 - Arrive @ 1350 and prep
1420 - Collect SW + sed samples
1010 - SW MSP014 - (U,F) and
~~1010 - SD - MSP014 - (001,~~ RJ
1010 - MSP014 - SD - (001-1, 001-2, 002, 003, 004, and 005) @ Henry Pond (5.6 acres)
RJ ~~1450~~ SW Parameters (1420)
H_2O Temp → 15.28°C
Spec. Cond → 883 µS/cm @ 25.0°C
Cond. → 719 µS/cm
TDS → 0.574 g/L
DO (%) → 310%
DO (mg/L) → 31.89 mg/L
pH → 9.65
ORP → -44 mV
Turbidity → 2.41 FTU
Air Temp → 80°F
- Photo # 100-0006
* abundant sub-aqueous vegetation, sediment samples have abundant organics
1630 - Leave site MSP014
1710 - Recon neighboring MSP015 + MSP016

Location Date 9/29/10 - 9/30/10
Project / Client Monsanto

1725 - Return to Machine Shop
1750 - Leave machine shop after storing samples in fridge and prepping for tomorrow
1820 - Spoke w/ Leland re: MST275, D.O. calibration, and DFRs
1825 - Touched base w/ Emily and setup meeting time for tomorrow
1830 - End of day

Location Henry Mine Area Date 9/30/10
Project / Client Monsanto

0645 - leave Sids, Emily out sick, pick up supplies in town
0800 - Meet w/ Barry, sign in and pick up supplies at mine office (pH solution). Discuss MST275 w/ Barry, decide to sample small pond near MST275 GPS point
0900 - Machine shop to prep
YSI Calibration
pH → 3.99, 10.00
Spec. Cond → 1440 µS/cm
DO (%) → 86.5
ORP → 220.0 mV
Turb. → 975 FTU, 9.86, and 0.02
Air Temp → 47°F

MSP015 Arrive @ 1000, only small cattle pond remains in this long ditch, verify location w/ GPS
1020 - sampled 1010-SWMSP015-(U,F) using 1L bottle
SW Parameters (1020)
Turb = 41.97
Air Temp = 55°F

Location Henry Mine Area Date 9/30/10
Project / Client Monsanto

ORP = 164.9
pH = 7.82
DO (%) = 233.4 %
DO (mg/L) = 28.6 mg/L
TDS = 0.672 g/L
Cond. = 680 µS/cm
Spec. Cond = 1058 µS/cm
Water Temp = 7.05°C
1145 - Left MSP015, went to cell service area to call Leland per message through Barry re: sample shipment
*Photo number → 100-0007
1220 - Back to machine shop to prep ship samples before 330 pickup
1426 - Drop two coolers off at Monsanto plant for shipping
1500 - Prep for afternoon sample
1600 - Arrive @ MSP016
SW Parameters
Turb = 17.58 Air Temp = 80°F ORP = -724 mV
pH = 9.34 DO = 40.22 mg/L and 361.3 %
TDS = 0.448 g/L Cond = 571 µS/cm
Spec. Cond = 689 µS/cm H_2O temp = 16.03°C

Location Henry Mine Date 9/30/10

Project / Client Monsanto Sed/Rip 2010

- Samples 001 and 004 (+dup) heavily influenced by cow "activity"
- took samples 1010-SWMSP016-(U,F) and 1010-MSP016-SD-(001, 002, 005, 003-MS, 003-MSD, 004-1, and 004-2) → 2 sw and 7 sed total
  * 004 (+dup) are next to ditch inlet

1800 - Leave MSP016

1830 - Equipment Rinse 1010-SR-M performed

1840 - Leave machine shop, END OF day

Location Enoch Valley Date 10/1/10

Project / Client Monsanto Sed Rip 2010

0700 - Leave Sid's and head to town for DI water, garbage bags, and ziplocs.

0800 - Arrive @ machine shop for prep
* Emily out sick, will head back to SLC and try to track down a replacement during day today

0900 - Arrive @ MST275 and calibrate YSI and Hub

Calibration

- Spec. Cond → 1420 ORP → 16.2
- DO → 78.9
- pH → 4.07 and 10.02
- Turbidity → 1011, 9.92, and 0.05
- Air Temp → 44°F

0925 - Sampled SW samples
↳ 1010-SWMST275-(U,F)
* Was NOT able to take parameters in-situ due to shallowness of pooled H_2O
↳ took in 5L bucket

H_2O Temp → 9.18°C DO = 48.1% / 5.35 mg/L
Spec. Cond → 849 µS/cm ORP = -79.2 mV
Cond → 593 µS/cm Turb = 478.2
TDS → 0.553 g/L Air Temp → 74°F

Location Enoch Valley Date 10/1/10
Project / Client Monsanto Sed/Rip 2010

1150 - Leave MST275 after collecting 2 sets of samples (A and B), 1010-MST275(A,B)-RS-(001, 002), 1010-MST275 (A,B)-SD(001), 1010-SW MST 275 (A,B)-001
1200 - Going to get cell service to call Emily re: replacement and give Leah an update
1200-1500 - Swapping vehicles, planning for Emily's replacement, phone calls, supplies
1545 - Arrive @ MST274
1600 - SW samples taken (1010-SW MST274A-(U,F), 1010-SW MST274B-(U,F) w/ 1L bottle

SW Paramuters

H_2O Temp → 17.24 °C
Spec. Cond. → 420 µS/cm
Cond. → 317 µS/cm
TDS → 0.273 g/L
DO → 65.0 % / 6.94 mg/L
pH → 7.68
ORP → 139.6 mV
Turb → 7.24 FTU

1630 - Capture method for flow measurement used

Location Enoch Valley Date 10/1/10
Project / Client Monsanto Sed/Rip 2010

* No sed/RS samples taken due to timing. will finish MST274 in morning
~~1720~~ RY - Capture Flow Method

			L/s
1	5.05 sec	1L	0.20
2	4.75 sec	1L	0.21
3	4.52 sec	1L	0.22

1720 - Returned to machine shop
↳ took equipment rinsate on Rip soil bowl → ~~1010-MST279~~ RY 1010-ER-RS-01-U
1800 - End of day

Location Enoch Valley Date 10/2/10

Project / Client Monsanto Sed/Rip 2010

0640-Machine shop for prep and supplies
0700-Met Darren (Monsanto laborer) ☺ move office
0710-Arrive @ MST274 to finish sed/RS sampling
0720-Sampled 1010-MST274A-SD-001, 1010-MST274B-SD-001, 1010-MST274 (A,B)-RS-(001,002)
0820-Left MST274
0900-Arrive @ MSP021
0905-Calibrate YSI → Prep for MS/MSD SW sample that wasn't able to be taken at MSP031 due to being dry
~~0930-Sampled SW samples~~ RY

Calibration (900)

Spec. Cond. → 1429 µS/cm
DO → %sat, 79.2
pH → 4.00 / 10.01
ORP → 233.0 mV
Turb → 995.9 / 9.72 / 0.01

0930-Sampled 1010-SWMSP021-(U,F)-(1,2), 1010-SWMSP021-(U,F)-1-(MS,MSD), 1010-MSP021-SD-(001,002-1,002-2, 003,004) * 004 is inlet sed sample

Location Enoch Valley Date 10/2/10

Project / Client Monsanto Sed/Rip 2010

SW Parameters

H_2O Temp → 13.98°C
Spec. Cond. → 1429 µS/cm
Cond. → 1165
TDS → 0.960 g/L
D.O. → 68.5 % / 7.02 mg/L
pH → 8.24
Turb. → 1.98 FTU
Air Temp → 53°F

1150-Leave MSP021 after sample packaging, decon, cleanup
1200-Arrive @ MSP020
1210-SW Parameters ~~(1220)~~ RY

H_2O Temp → 14.52°C
Spec. Cond → 319 µS/cm
Cond. → 244 µS/cm
TDS → 0.027 g/L
D.O. → 83.1 %, 8.21 mg/L
pH → 9.10
ORP → 60.2
Turb → 16.68 FTU
Air Temp → 60°F

Location Enoch Valley Date 10/2/10

Project / Client Monsanto Sed/Rip 2010

1220 - Sampled SW 1010-SWMSP020-(U,F)
- Sampled sed 1010-MSP020-SD-(001, 002, 003, 003-MS, 003-MSD, 004, 005) * 003 is the inlet sample
1325 - Left MSP020 after sample prep and decon and cleanup
1400 - Arrive @ MST131, prep bottles and review flow measurement procedures
1420 - Sample SW and take flow measur.
↳ 1010-SWMST131-(U,F)

Flow Measurements

Distance	Subsec. Depth	Velocity
.15	.4	.37
.45	.45	.04
.75	.4	.06
1.05	.4	.51
1.35	.4	1.00
1.65	.4	.36
1.95	.4	.85
2.25	.4	.23
2.55	.35	.13
2.85	.30	.67
3.15	.25	.03

Location Enoch Valley Date 10/2/10

Project / Client Monsanto Sed/Rip 2010

SW Parameters

H_2O Temp → 15.83°C
Spec. Cond → 430 µS/cm
Cond. → 338 µS/cm
TDS → .280 g/L
D.O. → 74.2% / 7.74 mg/L
pH → 8.39
ORP → 80.4 mV
Turb → 7.63 FTU
Air Temp → 76°F

Photo → 100-0014

- Soil Samples (RS) → 1010-MST131-RS-(001,002) taken
- Sed samples → 1010-MST131-SD-(001,002) taken

1620 - Leave MST131 after decon/cleanup
1705 - Arrive @ Machine shop to pack samples, cleanup, etc...
1740 - Take equip blank sample (1010-ER-RS-02-U)
1800 - End of day

Location Henry Mine Date 10/3/10
Project / Client Monsanto Sed/RS 2010

0700-Arrive @ machine shop for prep
0745-Mine office for more filters
0830-Arrive @ Ellis Ranch, talk to owner and get access to MST053
0900-Calibrate YSI meter
Spec. Cond → 1400 µS/cm
D.O. (%) → 20.1
pH → 4.04/9.98
ORP → 215.2
Turb. → 979.5/9.98/0.01
Air Temp → 70°F
0945-Took samples 1010-SWMST053-(U,F)
1010-MST053-SD-(001,002), 1010-MST053-RS-(001,002)

SW Parameters

H_2O temp → 6.3°C
Spec. Cond → 394 µS/cm
Cond. → 253 µS/cm
TDS → .255 g/L
D.O. → 38.1% / 4.68 mg/L
pH → 7.69
ORP → 48.2 mV
Turb → 14.84 FTU
Air Temp → 78°F

Location Henry Mine Date 10/3/10
Project / Client Monsanto Sed/RS 2010

1115-Leave site MST053 after cleanup/decon *Photo → 100-0015
1150-Arrive @ MST277 and prep
-Station is DRY
1210-Samples 1010-MST277A-SD-001
1010-MST277B-SD-001
1010-MST277A-RS-(001,002)
1010-MST277B-RS-(001,002)
-Took sed samples at lowest point near GPS spot because no stream channel present. Simply low point in ag field w/ dried up marsh area.
-Picture # 100-0016 showing sample loc.
1332-Leave MST277 @ 1332
1400-Arrive @ MST067 → DRY
1415-Collect sed/RS samples
1010-MST067-SD-001
1010-MST067-RS-(001,002)
1455-Left MST067 after photo (100-0017)
1500-Arrived @ MST066
-No flow in drainage, just sporadic ponding in channel, SW sample collected from 3 different pools of standing water w/in the channel → same as sed sample

Location Ballard Mine Area Date 10/3/10
Project / Client Monsanto Sed/RS sampling

* heavily used by livestock currently,
-SW parameters collected w/in the 5L bucket due to current conditions (depth) of ponded water in channel

SW Parameters

H_2O Temp → 22.56°C
Spec. Cond → 886 µS/cm
Cond → 845 µS/cm
TDS → 0.576 g/L
D.O. → 3.40% | 0.29 mg/L
pH → 7.05
ORP → 143.5 mV
Turb → 185.9 FTU
Air Temp → 82°F

1515 - Collected samples 1010-SWMST066-(U,F)-(1,2), 1010-MST066-SD-001-(1,2)
1010-MST066-RS-001-(1,2),
1010-MST066-RS-002
1630 - Leave MST066 after cleanup/decon, photo # 100-0018
1700 - Arrive @ machine shop to prep sample shipments for tomorrow (COCs, Fedex labels)
1730 - Take equipment rinse sample
↳ 1010-ER-SD-03-U
1800 - End of day, will touch base w/ Barry + Leah in town

Location Ballard Mine Area Date 10/4/10
Project / Client Monsanto Sed/RS sampling

0715 - Arrived @ machine shop for sample packing/prep
0930 - Drop coolers off @ Monsanto plant for 3:30pm Fedex pickup

Cooler	Fedex #		
~~001~~	8620	4139	9151
~~002~~	"	"	9140
~~003~~	"	"	9130
~~004~~	"	"	9129

1030 - Picked up Trans Osher (Dog) for help sampling
1200 - Arrived @ MST095
1210 - Sampled 1010-MST095-SD-001, 1010-MST095-RS-(001,002)
1220 - Restaked station w/ tall stake and clean up/decon, photo # 100-0019
1245 - Left MST095
1330 - Arrived @ MST093 - dry*
1355 - Collected samples:
*Photo 100-0020
1010-MST093A-SD-001-(1,2)
1010-MST093A-RS-(001,002)-(1,2)
1010-MST093B-SD-001
1010-MST093B-RS-(001,002)
1455 - Left MST093 after sampling, photo, re-stake, and decon

Location Wooley Valley Date 10/4/10
Project / Client Monsanto Sed/RS 2010

1530 - Arrive @ MST092 → DRY
1540 - Collect samples:
1010-MST092-SD-001
1010-MST092-RS-001- (MS, MSD)
1010-MST092-RS-002
* rain occurred immediately prior to sampling, first moisture of 2010 sampling event
1600 - ~~Replaced~~ Ry Removed one old station stake, relabeled another existing stake, took photo
* Photo # 100-0021
1620 - Left station MST092 after cleanup, packaging, and decon.
1650 - Unload samples @ machine shop, equip rinse 1010-ZR-RS-03-U
1720 - Return Travis to mine office area
1730 - Head to town for ice, new trowels to replace broken ones
1830 - Return home - END OF DAY

Location Wooley Valley Date 10/5/10
Project / Client Monsanto Sed/RS 2010

0715 - Pickup Travis Ostler (Bag.) for help sampling today
0745 - Machine shop to pick up supplies/equipment.
0840 - Arrive @ MST089 → DRY
0910 - Collect samples:
1010-MST089-SD-001
1010-MST089-RS-(001,002)
* COC called for collection of two (2) sed samples, however, channel only 3.5 feet wide, so only one sed sample was taken
* Photo # 100-0022 Ry
0930 - Left MST089 after cleanup, sample packing and decon and placement of new stake
0945 - Arrive @ MST273 → DRY
1000 - Collect samples:
1030 - Took photo (# 100-0023 Ry) and restaked the station, cleaned up, packaged samples, decon
1035 Left site # MST273

Location Wodey Valley Date 10/5/10
Project / Client Monsanto Sed/RS 2010

1140 - Arrive @ MST272 → DRY
1150 - Collect samples:
1010 - MST272 - SD - 001 - (MS, MSD)
1010 - MST272 - RS - (001, 002)
1210 - Take photo (#100.0024), package samples, decon, cleanup, re-stake site (none found) → heavy livestock use
1220 - Leave MST272 and head back to machine shop, mine office
1300 - Meet Barry to wrap up sampling, return YSI and fluids, radios, etc...
1400 - Machine shop to unload and stow equipment, package samples
1430 - Took equipment rinsate:
1010 - ER - RS - 04 - U
- Took source water blank
1010 - B - SW - 01
1500 - Packed samples for tomorrow's shipping
1600 - Took samples to Trout Creek lodge, ice to freezer, samples/coolers in walk in fridge @ 38°F overnight
1700 - END OF DAY

Location Salt Lake City, UT Date 10/6/10
Project / Client Monsanto Sed/RS 2010

0630 - Left soda springs, after repackaging samples
1000 - Shipped samples from Ray, UT Fedex, also shipped back flow meter and core sampler

Fedex Tracking #s

8620 4139 9162 (cooler #005)
8620 4139 9173 (cooler #006)
8620 4139 9195 (flowmeter)
8620 4139 9184 (corer)

1100 - Continued drive to PCity
↳ SLC-1 tomorrow
- END OF SAMPLING

A-3 2010 Spring and Fall Groundwater and Surface Water Sampling

TABLE A-3
2010 SPRING GROUNDWATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Elevation MP (ft-AMSL)	Static Water Level (Ft-bmp)	Elevation Static Water (Ft-AMSL)	Purge Rate (L/min) or (*Gal/min)	Cumulative Purge Vol. (L) or (*Gal)	Water Temp (deg. C)	pH	ORP (mV)	D.O. (mg/L)	Spec Cond (uS/cm) @ 25 deg. C	Turbidity (NTU)	Device	Comments	Date	Time
GW	MBW006	6319.31	5.95	6313.36	0.003	6.9	9.04	7.29	N/A	7.21	774	1.65	Peristaltic	Low Flow	5/21/2010	11:48
GW	MBW009	6310.69	2.35	6308.34	0.005	4.75	7.42	6.44	80.7	1.02	1234	1.07	Peristaltic	Low Flow	5/20/2010	14:50
GW	MBW011	6339.8	0.6	6339.2	0.1	0.75	6.23	6.32	156.5	2.72	839	26.24	Peristaltic	Low Flow	5/17/2010	13:10
GW	MBW027	6313.33	8.69	6304.64	0.05	4.7	7.98	6.88	159	6.53	1242	2.2	Peristaltic	Low Flow	5/21/2010	15:40
GW	MBW028	6339.99	6.32	6333.67	0.06	5.3	6.9	6.23	227.2	1.42	1345	4.31	Peristaltic	Low Flow	5/13/2010	12:40
GW	MBW032	6499.13	10.17	6488.96	0.09	4.5	5.77	6.69	120.4	7.52	2306	2.95	Peristaltic	Low Flow	5/20/2010	19:20
GW	MBW048	6421.72	0.45	6421.27	0.11	5.4	5.63	5.74	128.5	0.97	165	147	Peristaltic	Low Flow	5/20/2010	17:08
GW	MBW085	6639.57	1.58	6637.99	0.03	2	8.24	6.37	193.5	7.32	379	1.29	Peristaltic	Low Flow	5/18/2010	18:10
GW	MBW087	6587.3	0.8	6586.5	0.08	10.7	4.27	6.81	152.6	1.11	498	4.51	Peristaltic	Low Flow	5/19/2010	18:05
GW	MBW099	6599.25	1.1	6598.15	0.04	1.71	5.99	6.92	-85.7	8.2	285	19.31	Peristaltic	Low Flow	5/20/2010	8:49
GW	MBW099	6599.25	6.83	6592.42	0.08	0.5	6.58	6.52	136.3	7.56	696	7.4	Peristaltic	Purge/Sample	5/23/2010	11:40
GW	MBW107	6486.78	Dry	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1" Bailer	Dry; TD=39.26	5/22/2010	N/A
GW	MBW112	6404	Dry	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1" Bailer	Dry; TD=17.62	5/22/2010	N/A
GW	MBW130	6416.29	1.73	6414.56	0.08	3.2	6.25	6.14	94.3	1.73	182	10.26	Peristaltic	Low Flow	5/18/2010	16:35
GW	MBW131	6468.52	2.8	6465.72	0.07	13.2	6.24	6.51	65.5	9.18	77	4.86	Peristaltic	Low Flow	5/20/2010	18:45
GW	MBW135	6290.56	1.9	6288.66	0.2	5.9	12.69	7.64	-89.7	0.31	370	1.62	Peristaltic	Low Flow	5/21/2010	15:00
GW	MBW152	6280	10.5	6269.5	N/A	N/A	4.38	6.92	199	8.6	728	36	Peristaltic	Low Flow	5/24/2010	13:00
GW	MMW006	6485.46	155	6330.46	0.25	27	10.36	7.58	554.8	5.98	936	0,73	Bladder Pump	Low Flow	5/17/2010	14:00
GW	MMW007	6619.89	35.07	6584.82	0.06	0.7	6.79	7.18	146.8	38.3	257	11.5	Electric Submersible Pump	Standard Purge	5/25/2010	9:10
GW	MMW010	6462.62	2.8	6459.82	*1	*79.6	4.71	6.58	392.5	4.05	2455	3.79	Electric Submersible Pump	Standard Purge	5/23/2010	12:21
GW	MMW011	6268.31	89.79	6178.52	0.15	9.2	8.05	7.3	367.1	8.75	776	4.27	Bladder Pump	Low Flow	5/16/2010	19:15
GW	MMW012	6488.72	Dry	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5/17/2010	N/A
GW	MMW013	6634.46	3.41	6631.05	0.62	23.4	6.3	6.93	425.7	10.83	799	0.65	Bladder Pump	Low Flow	5/20/2010	18:05
GW	MMW015A	6364.37	21.45	6342.92	0.04	2.7	5.99	6.72	547.4	5.76	1807	2.76	Bladder Pump	Low Flow	5/22/2010	13:40
GW	MW-16A	6346.71	8.1	6338.61	0.04	4.8	5.06	7.3	-15.7	1.27	1764	4.06	Peristaltic	Low Flow	5/21/2010	19:55
GW	MMW017	6313.86	37.06	6276.8	0.02	4.5	11.5	6.7	364.4	5.03	1333	0.24	Bladder Pump	Low Flow	5/16/2010	10:02
GW	MMW018	6459.52	10.37	6449.15	0.5	5.75	8.63	7.11	-390.5	7.29	814	0.62	Bladder Pump	Low Flow	5/15/2010	15:15
GW	MMW020	6525.71	285.13	6240.58	0.4	33.1	9	6.79	-145.6	0.9	796	0.41	Bladder Pump (dedicated)	Low Flow	5/17/2010	16:35
GW	MMW021	6436.3	212.27	6224.03	0.3	15.9	8.92	7.14	450.1	5.48	700	0.26	Bladder Pump	Low Flow	5/18/2010	16:50
GW	MMW022	6635.85	207.09	6428.76	0.48	21.7	6.26	7.07	291.3	4.42	1770	4.55	Bladder Pump	Low Flow	5/22/2010	10:30
GW	MMW023	6230.92	107.72	6123.2	0.4	24	8.3	6.99	-220.9	0.92	1111	0.7	Bladder Pump (dedicated)	Low Flow	5/21/2010	18:45
GW	MMW025	6612.87	31.58	6581.29	N/A	N/A	2.2	7.4	236	78.8	1413	10.02	Electric Submersible Pump	Standard Purge	5/22/2010	18:11
GW	MMW027	6491.07	102.37	6388.7	0.6	10.6	6.95	6.93	330.4	4.23	1032	0.6	Bladder Pump	Low Flow	5/17/2010	18:30
GW	MMW028	6316.91	75.28	6241.63	0.1	29.1	10.71	7.6	240.5	2.49	1098	0.43	Bladder Pump	Low Flow	5/16/2010	16:30
GW	MMW029	6498.67	18.63	6480.04	0.5	20	6.43	7.06	-376	6.59	3006	0.59	Bladder Pump	Low Flow	5/15/2010	17:12
GW	MMW030	6355.25	25.42	6329.83	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5/16/2010	10:58
GW	MMW031	6346.42	97.1	6249.32	0.2	12.8	9.49	7.67	297.5	8.44	513	0.3	Bladder Pump (dedicated)	Low Flow	5/17/2010	10:45
GW	MMW032	6446.39	16.42	6429.97	0.02	6	8.23	7.43	516.1	5.88	429	4.52	Bladder Pump	Low Flow	5/20/2010	15:45
GW	MMW033	6489.84	11.09	6478.75	0.02	13.3	5.46	8.49	213.9	2.11	584	7.23	Bladder Pump	Low Flow	5/20/2010	12:10
GW	MMW034	6640.31	11.59	6628.72	0.16	11.2	6.68	7.25	478.8	8.74	848	0.33	Bladder Pump	Low Flow	5/21/2010	10:10
GW	MMW035	6500.34	103.05	6397.29	0.26	13.7	7.41	6.89	564.4	3.28	1487	1.35	Bladder Pump (dedicated)	Low Flow	5/21/2010	12:40
GW	MMW036	6425.18	113.83	6311.35	0.24	10.4	8.18	7.39	219.1	8.26	518	1,48	Bladder Pump	Low Flow	5/21/2010	14:50

deg. C	degrees Celsius	L	liters
ft-AMSL	feet above mean sea level	L/min	liters per minute
ft-bmp	feet below measuring point	mg/l	milligrams per liter
Gal	gallons	mV	millivolts
Gal/min	gallons per minute	NTU	Nephelometric Turbidity Units
GW	Groundwater	uS/cm	microSiemens per centimeter

TABLE A-4
2010 SPRING SURFACE WATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Static Water Level (Feet)	Water Temp (deg. C)	pH	Spec Cond (uS/cm) @ 25 deg. C	Cond (uS/cm)	D.O. (% sat.)	D.O. (mg/l)	ORP (mV)	TDS (g/L)	Turbidity (NTU)	Air Temp (deg. F)	Discharge (cfs)	Comments	Date	Time
SW	MSG007	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	Dry	5/17/2010	16:35
SW	MST069	N/A	13.33	7.74	2406	N/A	N/A	7	35.4	N/A	21.9	N/A	N/A	N/A	5/17/2013	17:45
SW	MST096	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	Dry	5/17/2013	15:00
SW	MST136	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	Dry	5/17/2010	12:10
SW	MST144	N/A	9.05	7.01	807	N/A	N/A	7.76	-2.2	N/A	3.07	63	N/A	Pond	5/16/2010	14:45
SW	MDS025	N/A	11.74	6.8	1677	N/A	N/A	4.41	-21.8	N/A	8.69	63	0.0012	Seep	5/16/2010	14:00
SW	MDS026	N/A	12.23	7.76	1715	N/A	N/A	5.43	-67.2	N/A	5.38	60	N/A	PVC pipe flow	5/16/2010	13:30
SW	MDS030	N/A	8.06	7.08	903	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dump Seep	5/17/2010	13:15
SW	MDS034	N/A	15.09	7.66	898	N/A	N/A	5.46	-20.8	N/A	8.85	N/A	N/A	Dump Seep	5/16/2010	16:40
SW	MSG004	N/A	14.24	7.92	591	N/A	N/A	8.23	25	N/A	9.35	N/A	N/A	Spring	5/17/2010	15:30
SW	MSG005	N/A	11.3	7.44	566	N/A	N/A	7.38	39.8	N/A	2.01	N/A	N/A	Spring	5/17/2010	16:00
SW	MSG006	N/A	12.48	7.72	1204	N/A	N/A	5.93	4.8	N/A	3.99	N/A	N/A	Spring	5/17/2010	17:00
SW	MST019	N/A	9.16	8.18	439	306	61.1	7.02	-227	0.286	10.78	43	190	River (Blackfoot)	5/15/2010	10:45
SW	MST020	N/A	7.18	8.35	372	245	87.6	10.57	-270.9	0.242	10.87	59	98	River (Blackfoot)	5/14/2010	10:25
SW	MST044	N/A	16.81	8.64	678	572	101.1	9.79	-248.5	0.441	6.65	59	4.83	Creek	5/14/2010	14:10
SW	MST045	N/A	14.85	8.49	685	552	101.1	10.22	-192.1	0.445	9.5	59	6.04	River (Blackfoot)	5/14/2010	15:00
SW	MST050	N/A	13.32	7.21	0.387	300	75	7.82	-281.9	0.251	13.6	60	0.02	Creek	5/14/2010	11:40
SW	MST051	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	Dry	5/14/2010	12:10
SW	MST057	N/A	13.01	8.2	463	359	92	9.75	-106.9	0.301	3.69	59	0.31	Stream	5/14/2010	16:45
SW	MST063	N/A	7.36	7.36	694	487	80.6	9.18	-83	0.451	0.94	53	0.021	N/A	5/15/2010	11:30
SW	MST066	N/A	4.93	7.55	457	282	86.9	11.11	-252	0.297	7.31	53	0.18	River (Blackfoot)	5/14/2010	9:00
SW	MST067	N/A	1.63	7.08	1485	822	30.5	4.2	-206.8	0.965	1.06	50	N/A	Creek	5/14/2010	8:15
SW	MST069	N/A	15.62	8.24	2.261	1854	68.2	6.75	296.2	1.472	9	45	N/A	Creek	5/13/2010	16:40
SW	MST089	N/A	9.02	7.54	345	240	77.3	8.91	259.8	0.224	3.98	43	0.46	Creek	5/13/2010	11:30
SW	MST090	N/A	10.43	7.72	385	278	75.3	8.39	-310.6	0.25	0.79	45	0.28	Creek	5/13/2010	12:15
SW	MST092	N/A	4.69	7.51	447	274	65.6	9.33	-307	0.282	1.49	38	0.11	Creek	5/13/2010	10:20
SW	MST093	N/A	7.98	7.06	276	186	42.1	4.99	-312.3	0.179	3.84	40	0.0099	N/A	5/13/2010	15:30
SW	MST094	N/A	7.75	8.42	0.278	186	72.3	8.58	-297.3	0.181	1.02	35	0.0014	Spring fed	5/13/2010	14:30
SW	MST095	N/A	12.83	7.65	0.858	658	56.6	5.97	-292.5	0.558	0.98	38	0.01	Spring fed	5/13/2010	13:20
SW	MST128	N/A	8.14	7.99	434	294	78.8	9.29	-112.8	0.282	5.21	57	5.44	Channel	5/16/2010	11:15
SW	MST131	N/A	5.59	7.69	345	217	76.3	9.58	-176.8	0.224	4.76	58	0.55	Channel	5/16/2010	10:20
SW	MST132	N/A	4.87	7.83	414	255	73.7	9.43	-134.3	0.269	6.14	52	5.86	Channel	5/16/2010	9:10
SW	MST133	N/A	14.78	7.77	259	208	69.1	7	-36	0.168	5	60	0.78	Small Stream	5/15/2010	16:20
SW	MST136	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	Stream(Dry)	5/15/2010	12:10
SW	MST143	N/A	13.97	8.36	371	293	69.7	7.19	-42.3	0.241	10.4	57	2.02	Channel	5/15/2010	17:00
SW	MST269	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	Dry	5/16/2010	8:55
SW	MDS025	N/A	9.66	6.58	1903	1345	34.4	3.89	-59.2	1.237	2.23	63	0.0012	Seep	5/15/2010	15:30
SW	1005ER-SW-03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Equipment Blank	5/15/2010	17:30
SW	1005-ER-SW-03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Equipment Blank	5/15/2010	14:30
SW	1005-ER-SW-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Equipment Blank	5/16/2010	11:45
SW	ER-SW-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Water Blank	5/16/2010	12:00

cfs	cubic feet per second	mV	millivolts	% sat.	percent saturation
deg. C	degrees Celsius	NTU	Nephelometric Turbidity Units		
deg. F	degrees Fahrenheit	N/A	Parameter not required / not collected		
g/L	grams per liter	SW	Surface Water		
mg/l	milligrams per liter	uS/cm	microSiemens per centimeter		

TABLE A-5
2010 FALL GROUNDWATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Elevation MP (ft-AMSL)	Static Water Level (ft-bmp)	Elevation Static Water (Ft-AMSL)	Purge Rate (L/min)	Cumulative Purge Vol. (L)	Water Temp (deg. C)	pH	ORP (mV)	D.O. (mg/L)	Spec Cond (uS/cm) @ 25 deg. C	Turbidity (NTU)	Device	Comments	Date	Time
GW	MMW010	6462.62	11.15	6451.47	1	5	9.59	6.22	109.8	2.76	1694	55.82	Electric Submersible Pump	Standard Purge	9/17/2010	12:12
GW	MMW013	6634.46	8	6626.46	0.55	17.75	7.56	7.07	141.1	6.41	760	1.91	Bladder	Low Flow	9/17/2010	9:30
GW	MMW029	6498.67	24.68	6473.99	0.2	6	9.94	6.71	129.2	5.47	1471	1,72	Bladder	Low Flow	9/17/2010	14:05

deg. C	degrees Celsius	L/min	liters per minute
ft-AMSL	feet above mean sea level	mg/l	milligrams per liter
ft-bmp	feet below measuring point	mV	millivolts
GW	Groundwater	NTU	Nephelometric Turbidity Units
L	liters	uS/cm	microSiemens per centimeter

TABLE A-6
2010 FALL SURFACE WATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Static Water Level (Feet)	Water Temp (deg. C)	pH	Spec Cond (uS/cm) @ 25 deg. C	Cond (uS/cm)	D.O. (% sat.)	D.O. (mg/l)	ORP (mV)	TDS (g/L)	Turbidity (NTU)	Air Temp (deg. F)	Discharge (cfs)	Comments	Date	Time
SW	MSP023	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	9/28/10	12:30
SW	MSP031	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	9/28/10	14:40
SW	MSP018	N/A	11.41	7.19	2316	1714	67.6	7.15	117	1.506	7.98	44	N/A	Pond	9/29/10	9:30
SW	MSP017	N/A	10.94	8.68	1426	1042	326.5	36.25	52.6	0.927	4.12	66	N/A	Pond	9/29/10	11:30
SW	MSP014	N/A	15.28	9.65	883	719	310	31.89	-44	0.574	2.41	N/A	N/A	Pond	9/29/10	14:20
SW	MSP015	N/A	7.05	7.82	1038	680		28.6	164.9	0.672	41.97	55	N/A	Pond	9/30/10	10:30
SW	MSP016	N/A	16.03	9.34	689	571	361.3	40.2	-72.4	0.448	17.58	80	N/A	Pond	9/30/10	16:40
SW	MST275	N/A	9.18	8.36	849	593	48.1	5.35	101.9	0.552	478.2	74	N/A	Pond	10/1/10	9:25
SW	MST274	N/A	12.24	7.68	420	317	65	6.94	139.6	0.273	7.24	76	0.21	Creek	10/1/10	16:00
SW	MSP021	N/A	13.98	8.84	1476	1165	68.5	7.02	90.4	0.96	1.98	53	N/A	Pond	10/2/10	9:30
SW	MSP020	N/A	14.52	9.1	319	244	83.1	8.21	60.2	0.027	16.68	60	N/A	Pond	10/2/10	12:20
SW	MST131	N/A	13.83	9.39	430	338	74.2	7.74	80.4	0.28	7.63	76	N/A	Creek	10/2/10	14:10
SW	MST277	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	68	N/A	Dry	10/3/10	12:10
SW	MST053	N/A	6.3	7.68	394	253	38.1	4.68	48.2	0.255	14.84	78	N/A	Creek	10/3/10	9:45
SW	MST066	N/A	22.56	7.05	886	845	3.4	0.29	143.5	0.576	185.9	82	N/A	No Flow In Creek	10/3/10	15:15
SW	MST067	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	10/3/10	14:15
SW	MST095	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	10/4/10	12:10
SW	MST093	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	10/4/10	13:55
SW	MST092	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	10/4/10	15:40
SW	MST089	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	10/5/10	9:10
SW	MST272	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	10/5/10	11:50
SW	MST273	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	10/5/10	10:00
SW	MDS025	N/A	16.19	5.64	1435	1194	34.1	3.31	97.9	0.932	190.8	77	N/A	Seep	9/15/10	14:05
SW	MDS026	N/A	9.11	7.3	1672	1166	47.5	5.43	71.9	1.087	66.71	69	0.0003	Seep	9/15/10	11:40
SW	MDS030	N/A	9.36	6.61	864	605	58.1	6.69	125	0.561	186	80	N/A	None	9/14/10	15:30
SW	MDS034	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	9/15/10	15:25
SW	MSG004	N/A	11.5	6.18	524	N/A	18.7	2.02	66.4	0.34	183	75	N/A	Spring	9/14/10	13:05
SW	MST144	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	9/15/10	13:10
SW	MST069	N/A	12.67	7.44	2334	1783	80.9	8.5	162	1.517	319.7	69	0.0012	Channel	9/14/10	16:45
SW	MST019	N/A	14.69	7.59	316	254	86.5	8.77	191.3	0.205	4.78	73	56	Creek	9/15/10	16:50
SW	MST020	N/A	14.15	7.46	317	251	84	8.63	180.6	0.206	5.34	84	55	Creek	9/16/10	15:10
SW	MST044	N/A	14.46	8.29	803	641	87.9	8.95	81.8	0.522	3.85	78	1.97	Channel	9/16/10	12:05
SW	MST045	N/A	11.66	7.58	816	608	78.7	8.53	111.11	0.53	3.11	70	2.6	River	9/16/10	10:25

cfs	cubic feet per second	mg/l	milligrams per liter	SW	Surface Water
deg. C	degrees Celsius	mV	millivolts	uS/cm	microSiemens per centimeter
deg. F	degrees Fahrenheit	NTU	Nephelometric Turbidity Units	% sat.	percent saturation
g/L	grams per liter	N/A	Parameter not required / not collected		

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5 / 17 / 10 **Arrival Time** 1635

Field Personnel

Sally Staley **Signatures**

Tyler Browning

SITE DESCRIPTION

Station Name Ballard Mine - S of SE Spring **Station Number** MSG007

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description DRY

Surface Water Characteristics (color, odor, appearance): Spongy in places

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5 / 17 / 10 **Time** 1635 **Station Number** MSG007

Completed by: S. Staley **Checked by:** T. Browning

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5	DRY					
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5/17/10 **Arrival Time** 1745

Field Personnel

S. Staley **Signatures**

T. Browning

SITE DESCRIPTION

Station Name Short Ck. below Ballard Mine **Station Number** MST069

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005GWMST069-U/F **Sample Time:** 1745

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time		1800			1745		
Water Temperature (°C)		21.5			13.33		
Specific Conductivity (µS/cm) @ 25° C		1455			2406		
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)		5.95			7.00		
pH		7.00 4.08			7.74		
ORP (mV)		221.2			35.4		
Turbidity (FTU)		20.1			21.9		
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5 / 17 / 10 **Time** 1745 **Station Number** MST069

Completed by: S. Staley **Checked by:** T. Browning

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	6.2	1/4
2	6.6	1/4
3	6.3	1/4

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5 / 17 / 10 **Arrival Time** 1500

Field Personnel

S. Staley **Signatures**

T. Browning

SITE DESCRIPTION

Station Name Trib. of N.Fk. Wooley Valley Ck. Below Ballard Mine **Station Number** MST096

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description DRY

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5 / 17 / 10 **Time** 1500 **Station Number** MST096

Completed by: S. Staley **Checked by:** T. Browning

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

DRY

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 15 / 2010 **Arrival Time** 1210

Field Personnel

S. STAVEY **Signatures**

T. BROWNING

SITE DESCRIPTION

Station Name RASMUSSEN CR. HOWTES NR. ENOCH VALLEY MINE SHOP **Station Number** MST136

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description STREAM DRY - HARD TO TELL WHEN IT MAY HAVE FLOWED?

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

DRY

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05/16/2010 **Arrival Time** 1430

Field Personnel

S. STACEY

T. BROWNING

Signatures

SITE DESCRIPTION

Station Name W. POND CR. HOWTES BL. W. POND **Station Number** MST144

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description SMALL DISCHARGE - SILTY BOTTOM - ALGAE

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(X). Up-stream / Across-stream

Sample ID: MST144 **Sample Time:** 1445

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1445		
Water Temperature (°C)					9.05		
Specific Conductivity (µS/cm) @ 25° C					807		
Conductivity (µS/cm)					NA		
TDS (g/L)					NA		
Dissolved Oxygen (% sat.)					NA		
Dissolved Oxygen (mg/L)					7.76		
pH					7.01		
ORP (mV)					-2.20		
Turbidity ~~(FTU)~~ NTU					3.07		
Air Temperature ~~(°C)~~ °F					63°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 16 / 2010 **Time** ~~1315~~ 1450 **Station Number** MST144

Completed by: S. STAVEY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.6	2/3c
2	1.9	3/4c
3	1.8	3/4c

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 16 / 2010 **Arrival Time** 1345

Field Personnel

S. STACEY

T. BROWNING

Signatures

SITE DESCRIPTION

Station Name ENOCH VALLEY MINE-W. DUMP SEEP **Station Number** MDS025

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description MINE DUMP SEEP

Surface Water Characteristics (color, odor, appearance): RUST STAINING SLIGHT OFF COLOR- ORGANIC ODOR

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(X). Up-stream / Across-stream

Sample ID: MDS-025 **Sample Time:** 1400

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1400		
Water Temperature (°C)					11.74		
Specific Conductivity (µS/cm) @ 25° C					1677		
Conductivity (µS/cm)					NA		
TDS (g/L)					NA		
Dissolved Oxygen (% sat.)					NA		
Dissolved Oxygen (mg/L)					4.41		
pH					6.90		
ORP (mV)					-21.8		
Turbidity ~~(FTU)~~ NTU					8.69		
Air Temperature ~~(°C)~~ °F					63°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date ___/___/___ **Time** _____ **Station Number** _____

Completed by: _____ **Checked by:** _____

Flow by Capture Method USE 5/15/2010 SW MUT

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): ≤2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05/16 / 2010 **Arrival Time** 1345

Field Personnel

S. STACEY

T. BROWNING

Signatures Sally Stacey

SITE DESCRIPTION

Station Name ENOCH JACKY MINE S. DUMPS **Station Number** MDS026

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description FLOWING - PVC PIPE x 3/4 FULL

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(X). Up-stream / Across-stream

Sample ID: MDS026 **Sample Time:** 1330

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1330		
Water Temperature (°C)					12.23		
Specific Conductivity (µS/cm) @ 25° C					1715		
Conductivity (µS/cm)					NA		
TDS (g/L)					NA		
Dissolved Oxygen (% sat.)					NA		
Dissolved Oxygen (mg/L)					5.34		
pH					7.76		
ORP (mV)					-67.2		
Turbidity ~~(FTU)~~ NTU					5.38		
Air Temperature (°C)					60°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 16 / 2010 **Time** 1340 **Station Number** MDS026

Completed by: S. STAVEY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.6	1c.
2	1.8	1c.
3	1.7	1c.

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5 / 17 / 10 **Arrival Time** 1315

Field Personnel

S. Staley **Signatures**

T. Browning

SITE DESCRIPTION

Station Name Ballard Mine, Pit #2 Upper Dump Seep **Station Number** MDS030

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description

Surface Water Characteristics (color, odor, appearance): Stagnant

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(peri), Up-stream / Across-stream

Sample ID: 1005GWMDS030-U/F **Sample Time:** 1315

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	1147				1315		
Water Temperature (°C)		18.35			8.06		
Specific Conductivity (µS/cm) @ 25° C	1413	1435			903		
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)	78.6%	78.6% @ 598.9 mmHg					
Dissolved Oxygen (mg/L)							
pH	7.0/4.0	7.08/ 4.05			7.08		
ORP (mV)	220	208.2					
Turbidity (FTU)	800/100 20/0.02						
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5 / 17 / 10 **Time** ~~1755~~ 1315 **Station Number** MD5030

Completed by: S. Staley **Checked by:** T. Browning

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
No Flow to measure		

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5 / 16 / 2010 **Arrival Time** 1640

Field Personnel

Sally Staley **Signatures**

Tyler Browning

SITE DESCRIPTION

Station Name Henry Mine Dump Seep #3 **Station Number** MDS034

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description

Surface Water Characteristics (color, odor, appearance): Slightly tea-colored, sm. macroinvertebrae just below surface

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(peri). Up-stream / Across-stream

Sample ID: 1005GWMDS034-01F **Sample Time:** 1640

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1640		
Water Temperature (°C)		19.90			15.09		
Specific Conductivity (µS/cm) @ 25° C		1406			898		
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)	6.02 @ sat. 6	6.02 @ 592.6			5.46		
pH		7.14			7.66		
ORP (mV)		221.3			-20.8		
Turbidity (FTU)		19.79			8.85		
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5 / 16 / 2010 **Time** 1640 **Station Number** MDS034

Completed by: S. Staley **Checked by:** T. Browning

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
NO Flow to measure		

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5/17/10 **Arrival Time** 1530

Field Personnel

S. Staley **Signatures**

T. Browning

SITE DESCRIPTION

Station Name Ballard Mine - Holmgren Spring **Station Number** MSG004

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(per), Up-stream / Across-stream

Sample ID: 1005GWMSG004-1/2-U/F **Sample Time:** 1530/1540

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1530	1540	
Water Temperature (°C)					14.24	14.21	
Specific Conductivity (µS/cm) @ 25° C					591	519	
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)					8.23	8.35	
pH					7.92	7.87	
ORP (mV)					25	15.3	
Turbidity (FTU)					9.35	10.96	
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5/17/10 **Time** 1530 **Station Number** MSG004

Completed by: S. Staley **Checked by:** T. Browning

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
No measureable flow		

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5/17/10 **Arrival Time** 1600

Field Personnel

Sally Staley **Signatures**

Tyler Browning

SITE DESCRIPTION

Station Name Ballard Mine, Cattle Spring **Station Number** MSG005

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(pipe). Up-stream / Across-stream

Sample ID: 1005GWMSG005 **Sample Time:** 1600

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1600		
Water Temperature (°C)					11.30		
Specific Conductivity (µS/cm) @ 25° C					566		
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)					7.38		
pH					7.44		
ORP (mV)					39.8		
Turbidity (FTU)					2.01		
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5 / 17 / 10 **Time** 1600 **Station Number** MSD005

Completed by: S. Staley **Checked by:** T. Browning

Flow by Capture Method

Measurement Number	Time (sec)	Volume (~~ft~~ c.
1	2.3	1 3/4
2	2.4	2
3	2.6	2 1/4

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5 / 17 / 10 **Arrival Time** 1700

Field Personnel

Sally Staley **Signatures**

Tyler Browning

SITE DESCRIPTION

Station Name Ballard Mine - Southeast Spring **Station Number** MSG006

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description Several springs form a smallchannel

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(peri). Up-stream / Across-stream

Sample ID: 1005GWMSG006-U/F **Sample Time:** 1700

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1700		
Water Temperature (°C)					12.48		
Specific Conductivity (µS/cm) @ 25° C					1204		
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)					5.93		
pH					7.72		
ORP (mV)					4.8		
Turbidity (FTU)					3.99		
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 5/ / **Time** 1700 **Station Number** MSG006

Completed by: S. Staley **Checked by:** T. Browning

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

W=0.8'
D=0.2'
V=0.7 ft/s

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

273 OPI : [illegible]

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 15/7/15 / 10 **Arrival Time** 0859 [illegible] 0102 01 00

Field Personnel

L. Fuhrig

S. Staley, T. Browning

Signatures [illegible]

SITE DESCRIPTION

Station Name Blackfoot River Below Ballard Ck. **Station Number** MST019

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description

Surface Water Characteristics (color, odor, appearance): turbulent

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SWMST019 - U/F **Sample Time:** 1045

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time		0842			1040		
Water Temperature (°C)		7.97			9.16		
Specific Conductivity (µS/cm) @ 25° C	1413	1372 7.97C			439		
Conductivity (µS/cm)					306		
TDS (g/L)					0.286		
Dissolved Oxygen (% sat.)	79.7%	605.5 79.7%			61.1		
Dissolved Oxygen (mg/L)					7.02		
pH	10/7	10.13/7.16			8.18		
ORP (mV)	231	234.1			-227.0		
Turbidity (FTU)	800/100 20/0.02	800/100 20/0.02			10.70		
Air Temperature (°C)		43°			43°		

SURFACE WATER FLOW MEASUREMENT FORM

USGS FLOW : 190 CFS

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 15 / 2010 **Time** 1640 **Station Number** MSTO19

Completed by: SAM STAUBY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5/14/10 **Arrival Time** 1010

Field Personnel

C. Fahrig **Signatures**

S. Staley T. Browning

SITE DESCRIPTION

Station Name Blackfoot R. Below State Land Ck **Station Number** MST020

Latitude N 42 ° 48 ' 30.9 " **Longitude** W 111 ° 29 ' 58.6 "

Elevation 6285 ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description willow/grass on S. bank, cobbles/steeper bank on N. side

Surface Water Characteristics (color, odor, appearance): slightly muddy but otherwise clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SW MST020 - U/F **Sample Time:** 1025

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1025		
Water Temperature (°C)					7.18		
Specific Conductivity (µS/cm) @ 25° C					372		
Conductivity (µS/cm)					245		
TDS (g/L)					0.242		
Dissolved Oxygen (% sat.)					87.6		
Dissolved Oxygen (mg/L)					10.57		
pH					8.35		
ORP (mV)					-270.9		
Turbidity (FTU)					10.87		
Air Temperature (°C)					15 c		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 14 / 10 **Time** 1040 **Station Number** MST020

Completed by: L. Fuhrig **Checked by:** S. Staley

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 54 ft **L.E.W.** 1.7 ft **Total Width** 52.3 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			1-15 ft/s	16-18 ft/s
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)		
2	1	0.95	0.25	39	16	1.22	0.62	0.82	2.03
6	2	1.75	0.67	44	17	0.9	0.74	2.20	2.43
10	3	1.8	0.85	49	18.	0.55	0.31	2.79	1.02
14	4	1.95	0.94					3.08	
16	5	1.95	0.96					3.15	
17	6	1.95	1.00					3.28	
18	7	2.1	0.97					3.18	
19	8	2.05	0.89					2.92	
20	9	2	1.01					3.31	
21	10	1.95	0.98					3.21	
23	11	1.82	0.96					3.15	
25	12	1.02	1.02					3.35	
28	13	1.6	1.05					3.44	
31	14	1.5	0.98					3.21	
35	15	1.3	0.85					2.79	

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 14 / 10 **Arrival Time** 1400

Field Personnel

Leland Fuhrig **Signatures**

Sally Staley,

SITE DESCRIPTION

Station Name Immediately Below Henry Mine **Station Number** MST044

Latitude N 42 ° 53 ' 50.3 " **Longitude** W 111 ° 29 ' 28.8 "

Elevation 6265 ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description Boulders/grass along banks. Rocky, mossy creek bed.

Surface Water Characteristics (color, odor, appearance): slightly yellow, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SWMST044 **Sample Time:** 1410

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1410		
Water Temperature (°C)					16.81		
Specific Conductivity (µS/cm) @ 25° C					678		
Conductivity (µS/cm)					572		
TDS (g/L)					0.441		
Dissolved Oxygen (% sat.)					101.1		
Dissolved Oxygen (mg/L)					9.79		
pH					8.64		
ORP (mV)					-218.5		
Turbidity (FTU)					6.65		
Air Temperature (°C)					15		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 14 / 10 **Time** 1415 **Station Number** MST044

Completed by: T. Browning **Checked by:** L. Fohrig

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 1 ft **L.E.W.** 8.5 ft **Total Width** 7.5 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1		m/s	ft/s			
8	2	0.55	0				
7.5	3	0.65	0				
7	4	0.65	0.18	0.59			
6.5	5	0.9	0.29	0.95			
6	6	0.85	0.51	1.67			
5.5	7	0.95	0.55	1.8			
5	8	1.0	0.41	1.34			
4.5	9	0.9	0.42	1.38			
4	10	0.85	0.39	1.28			
3.5	11	0.6	0.47	1.54			
3.0	12	0.82	0.25	0.82			
2.5	13	0.65	0.01	0.03			
2.0	14	0.55	0				
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5/14/10 **Arrival Time** 1500

Field Personnel

L. Fuhrig

S. Staley, T Browning

Signatures

SITE DESCRIPTION

Station Name Little Blackfoot R. above Henry Ck **Station Number** MS ~~Tout~~ 045

Latitude N 42 ° 54 ' 10.2 " **Longitude** W 111 ° 29 ' 30.8 "

Elevation 6292 ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description Meandering creek, grass banks and rock / sediment creek bed

Surface Water Characteristics (color, odor, appearance): yellowish, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SWMS~~Tout~~045-1/2/3-U/F **Sample Time:** 1500

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1500	1515	1530
Water Temperature (°C)					14.75	14.72	14.63
Specific Conductivity (µS/cm) @ 25° C					685	687	690
Conductivity (µS/cm)					552	552	553
TDS (g/L)					.445	.446	.448
Dissolved Oxygen (% sat.)					101.1	101.7	100.6
Dissolved Oxygen (mg/L)					10.22	10.29	10.21
pH					8.49	8.46	8.44
ORP (mV)					-209.1	-199.9	-192.1
Turbidity (FTU)					9.5	4.5	4.55
Air Temperature (°C)					15C	15C	15C

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 14 / 10 **Time** 1540 **Station Number** MST 045

Completed by: L. Fuhrig **Checked by:** T. Browning

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 9.6 ft **L.E.W.** 0.7 ft **Total Width** 8.9 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec) m/s	ft/s	Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
9	1	0.42	0.02	0.07			
8	2	0.65	0.26	0.85			
7.5	3	0.6	0.39	1.28			
7	4	0.8	0.39	1.28			
6.5	5	1.22	0.29	0.95			
6	6	1.72	0.43	1.41			
5.5	7	1.15	0.36	1.18			
5	8	0.7	0.44	1.44			
4.5	9	0.75	0.35	1.15			
4	10	0.78	0.29	0.95			
3.5	11	0.7	0.20	0.66			
3	12	0.7	0.24	0.79			
2.5	13	0.6	0.22	0.72			
1.5	14	0.55	0.15	0.49			
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5/14/10 **Arrival Time** 1135

Field Personnel

L. Fahrig **Signatures**

S. Staley, T. Browning

SITE DESCRIPTION

Station Name Long Valley Ck. below Ballard mine **Station Number** MST050

Latitude N 42° 50' 55.8" **Longitude** W 111° 29' 51.5"

Elevation 6270 ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description grassy banks and streambed. oxides present, ~200 ft DS of reservoir, location at outfall used previously

Surface Water Characteristics (color, odor, appearance): mostly clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(peri), Up-stream / Across-stream

Sample ID: 1005SWMST050-U|F **Sample Time:** 1140

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1140		
Water Temperature (°C)					13.32		
Specific Conductivity (µS/cm) @ 25° C					0.387		
Conductivity (µS/cm)					300		
TDS (g/L)					0.251		
Dissolved Oxygen (% sat.)					75		
Dissolved Oxygen (mg/L)					7.82		
pH					7.21		
ORP (mV)					-281.9		
Turbidity (FTU)					13.6		
Air Temperature (°C)					16C		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 14 / 10 **Time** 1150 **Station Number** MSF050

Completed by: L. Fehrig **Checked by:** T. Browning

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. ft **L.E.W.** ft **Total Width** 1.8 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec) m/s	ft/s	Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
mid	1	.21	0.04	0.1312			
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 14 / 10 **Arrival Time** 1210

Field Personnel

L. Fahrig

T. Browning, S. Staley

Signatures

SITE DESCRIPTION

Station Name E.FK Long Valley Ck below Henry Mine **Station Number** MST051

Latitude N 42° 52' 18.23" **Longitude** W 111° 28' 58.49"

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description Dry grass, no water

Surface Water Characteristics (color, odor, appearance): –

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: – **Sample Time:** –

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

DRY

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5/14/10 **Arrival Time** 1630

Field Personnel

L. Fuhrig **Signatures**

S. Staley, T. Browning

SITE DESCRIPTION

Station Name W. Fk Lone Pine Ck above Lone Pine Ck **Station Number** MST057

Latitude N 42° 51' 59.49" **Longitude** W 111° 26' 21.78"

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description Grassy banks, scattered willows & grass / sediment stream bed

Surface Water Characteristics (color, odor, appearance): clear / slightly yellow, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SW MST057 - U/F **Sample Time:** 1645

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time		2130			1645		
Water Temperature (°C)		21			13.01		
Specific Conductivity (µS/cm) @ 25° C		1389			463		
Conductivity (µS/cm)					357		
TDS (g/L)					0.301		
Dissolved Oxygen (% sat.)		@601.5 78.9			92		
Dissolved Oxygen (mg/L)					9.75		
pH		7.08			8.20		
ORP (mV)		225			-166.9		
Turbidity (FTU)		19.76@20			3.69		
Air Temperature (°C)					15C		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 14 / 10 **Time** 1650 **Station Number** MST057

Completed by: T. Browning **Checked by:** S. Staley

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 2.7 ft **L.E.W.** 1.1 ft **Total Width** 1.6 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
1.1	1	-	in/s	ft/s			
1.4	2	0.4	0.09	0.30			
1.7	3	0.42	0.22	0.72			
2.1	4	0.45	0.23	0.75			
2.3	5	0.45	0.24	0.79			
2.6	6	0.2	0.05	0.16			
2.7	7	-	-				
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date: 05/15 /2010 **Arrival Time** 1120

Field Personnel

S. STAUBY

T. BROWNING

Signatures

SITE DESCRIPTION

Station Name STRIP MINE Cr. BL. HENRY MINE **Station Number** MST063

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description STRIP MINE Cr. BL. HENRY MINE

Surface Water Characteristics (color, odor, appearance): CLEAR, SLIGHT ORGANIC ODOR, SOME IRON STAINING

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(X). Up-stream / Across-stream

Sample ID: 1005SW MST063 W/F **Sample Time:** 1130

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1130		
Water Temperature (°C)					7.36		
Specific Conductivity (µS/cm) @ 25° C					694		
Conductivity (µS/cm)					487		
TDS (g/L)					0.451		
Dissolved Oxygen (% sat.)					80.6		
Dissolved Oxygen (mg/L)					9.18		
pH					7.36		
ORP (mV)					-83.0		
Turbidity ~~(FTU)~~ NTU					0.94		
Air Temperature ~~(°C)~~ °F					53°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 15 / 2010 **Time** 1150 **Station Number** MST063

Completed by: SAM STACY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

FLOAT METHOD: W=0.9' / D=0.07'
LENGTH = 1.0' TIME: 3.12s/2.90s/2.8s

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 14 / 10 **Arrival Time** 0850

Field Personnel

L. Fuhrig **Signatures**

S. Staley T. Browning

SITE DESCRIPTION

Station Name Ballard Ck. above B'foot Riv. **Station Number** MST066

Latitude N 42 ° 48 ' 50.4 " **Longitude** W 111 ° 30 ' 08.4 "

Elevation 6785 ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description Muddy, scattered grass

Surface Water Characteristics (color, odor, appearance): yellowish, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SW MST066 - 0/4 **Sample Time:** 0900

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					0900		
Water Temperature (°C)					4.93		
Specific Conductivity (µS/cm) @ 25° C					457		
Conductivity (µS/cm)					232		
TDS (g/L)					0.297		
Dissolved Oxygen (% sat.)					86.9		
Dissolved Oxygen (mg/L)					11.11		
pH					7.55		
ORP (mV)					-252.0		
Turbidity (FTU)					7.31		
Air Temperature (°C)					12 C		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5/14/10 **Time** 0915 **Station Number** MST066

Completed by: T. Browning **Checked by:** S. Staley

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 3.10 ft **L.E.W.** 1.50 ft **Total Width** 1.60 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
1.5	1	–	m/s	ft/s			
2.0	2	0.2	0.12	0.394			
2.10	3	0.25	0.18	0.591			
2.2	4	0.28	0.22	0.721			
2.3	5	0.30	0.27	0.885			
2.4	6	0.30	0.32	1.05			
2.5	7	0.32	0.39	1.28			
2.6	8	0.35	0.28	0.919			
2.7	9	0.32	0.02	0.066			
2.8	10	0.30	0.02	0.066			
2.9	11	0.30	0.0	0			
3.10	12	–	-	-			
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 20 Sep 14 / '10 **Arrival Time** 0740

Field Personnel
Leland Fehrig
Sally Staley
Tyler Browning

Signatures

SITE DESCRIPTION

Station Name Ballard Ck headwaters **Station Number** MST067

Latitude N 42 ° 49 ' 22.6 " **Longitude** W 111 ° 29 ' 41.1 "

Elevation 6342 ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description Grassy banks, algae on water surface

Surface Water Characteristics (color, odor, appearance): algae, otherwise clear

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Peri), Up-stream / Across-stream

Sample ID: 1005SWMST067 - U/F **Sample Time:** 815

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0730	0800			815		
Water Temperature (°C)		9.9C			1.63		
Specific Conductivity (µS/cm) @ 25° C	1413	1356 @ 9.9C			1485		
Conductivity (µS/cm)					822		
TDS (g/L)					0.965		
Dissolved Oxygen (% sat.)	79.5	79.5 @ 6.08.8			30.5		
Dissolved Oxygen (mg/L)					4.20		
pH	4.0 7.0	3.93 7.03			7.08		
ORP (mV)	220	229.5			-206.8		
Turbidity (FTU)	800/100 20/0.02	800/100 20/0.02			1.06		
Air Temperature (°C)	10 C	10 C			10 C		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 14 / 10 **Time** **Station Number** MS7067

Completed by: **Checked by:**

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. ft **L.E.W.** ft **Total Width** ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5/13/10 **Arrival Time** 1630

Field Personnel
Leland Fuhrig
Sally Staley

Signatures

SITE DESCRIPTION

Station Name Short Creek below Ballard Mine **Station Number** MST069

Latitude N 42° 49' 11.6" **Longitude** W 111° 29' 22.2"

Elevation 6370 ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description grass banks / muddy bottom, just downstream from waste pile

Surface Water Characteristics (color, odor, appearance): clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SWMST069 - U/F **Sample Time:** 1640

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time		1846			1640		
Water Temperature (°C)		10.3			15.62		
Specific Conductivity (µS/cm) @ 25° C		1292			2.261		
Conductivity (µS/cm)					1854		
TDS (g/L)					1.472		
Dissolved Oxygen (% sat.)		86.9% @591 mmHg			68.2		
Dissolved Oxygen (mg/L)					6.75		
pH		7.17			8.24		
ORP (mV)		230.2			296.2		
Turbidity (FTU)					9.0		
Air Temperature (°C)					45F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 13 / 10 **Time** 1150 **Station Number** M57069

Completed by: L. Fishing **Checked by:** S. Stanley

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	5.9	1.0
2	8	1.55
3	11	1.6

Flow by Meter

R.E.W. ft L.E.W. ft Total Width ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 13 / 10 **Arrival Time** 1125

Field Personnel

Leland Fuhrig
Sally Staley

Signatures Leland Fuhrig

SITE DESCRIPTION

Station Name Wooley Valley CK, below N Fk. WVC **Station Number** MST 089

Latitude N 42 ° 49 ' 28.7 " **Longitude** W 111 ° 26 ' 22.5 "

Elevation 6397 ft **Datum** NAD 27 **Photo Number** 55 camera

Site & Stream Description Grassy banks, grass streambed

Surface Water Characteristics (color, odor, appearance): yellowish, no color

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SWMST089 -U/F **Sample Time:** 1130

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1130		
Water Temperature (°C)					9.02		
Specific Conductivity (µS/cm) @ 25° C					345		
Conductivity (µS/cm)					240		
TDS (g/L)					0.224		
Dissolved Oxygen (% sat.)					77.3		
Dissolved Oxygen (mg/L)					8.91		
pH					7.54		
ORP (mV)					259.8		
Turbidity (FTU)					3.98		
Air Temperature (°C)					43 F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 13 / 10 **Time** 1145 **Station Number** MST089

Completed by: T. Browning **Checked by:** S. Staley

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 11.9 ft **L.E.W.** 3.2 ft **Total Width** 8.7 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
4	1	0.2	0				
4.5	2	0.3	~~0.03~~	~~0.098~~			
5	3	0.32	0.02	0.065			
5.5	4	0.35	0.03	0.098			
6	5	0.35	0.02	0.065			
6.5	6	0.4	0.03	0.098			
7	7	0.48	0.03	0.098			
7.5	8	0.65	0.07	0.229			
8	9	0.7	0.10	0.328			
8.5	10	0.6	0.11	0.361			
9	11	0.5	0.03	0.098			
9.5	12	0.5	0.02	0.065			
10	13	0.45	0.02	0.065			
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 13 / 10 **Arrival Time** 1215

Field Personnel

Leland Fehring **Signatures** [signature]

Sally Staley

SITE DESCRIPTION

Station Name Wooley Valley Ck, above N.Fk. WVC **Station Number** MST090

Latitude N 42 ° 49 ' 27.6 " **Longitude** W 111 ° 26 ' 52.1 "

Elevation 6400 ft **Datum** NAD 27 **Photo Number** SS camera

Site & Stream Description Grass/mud banks, grass-lined streambed

Surface Water Characteristics (color, odor, appearance): yellowish, no odor, some grass

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SWMST090-U/F **Sample Time:** 1215

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1215		
Water Temperature (°C)					10.43		
Specific Conductivity (µS/cm) @ 25° C					385		
Conductivity (µS/cm)					278		
TDS (g/L)					0.250		
Dissolved Oxygen (% sat.)					75.3		
Dissolved Oxygen (mg/L)					8.39		
pH					7.72		
ORP (mV)					-310.6		
Turbidity (FTU)					0.79		
Air Temperature (°C)					45 F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 13 / 10 **Time** 1230 **Station Number** MST090

Completed by: Tyler Browning **Checked by:** S. Staley

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 4.35 ft **L.E.W.** 2.1 ft **Total Width** 2.25 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
2.5	1	0.25	m/s 0.03	ft/s 0.098			
2.7	2	0.32	0.01	0.032			
2.9	3	0.38	0.09	0.295			
3.1	4	0.4	0.14	0.459			
3.3	5	0.4	0.13	0.426			
3.5	6	0.44	0.22	0.722			
3.7	7	0.35	0.24	0.787			
3.9	8	0.3	0.26	0.853			
4.1	9	0.3	0.03	0.098			
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 13 / 10 **Arrival Time** 1000

Field Personnel
Leland Fuhrig
Sally Staley

Signatures

SITE DESCRIPTION

Station Name N. Fk Wooley Valley Ck above WVC **Station Number** MST092

Latitude N 42 ° 49 ' 40.00" **Longitude** W 111 ° 27 ' 04.30"

Elevation 6305 ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description Grassy banks, near ponded area (200 yds), possibly from new dam

Surface Water Characteristics (color, odor, appearance): yellowish, no odor, grassy

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SWMST092-U/F **Sample Time:** 1020

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0800	0800			1020		
Water Temperature (°C)	5.9	5.9			4.69		
Specific Conductivity (µS/cm) @ 25° C	1413	447 1434			447		
Conductivity (µS/cm)		274			274		
TDS (g/L)					0.282		
Dissolved Oxygen (% sat.)	@ 595.6 76.1				65.6		
Dissolved Oxygen (mg/L)	5936	9.33			9.33		
pH	4.0, 6.99 9.93	7.21			7.51		
ORP (mV)	220.0	230.0			-307		
Turbidity (FTU)	200/100/ 20/0.02	1.49			1.49		
Air Temperature (°C)		38 F			38 F		

3.332

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 13 / 10 **Time** 1044 **Station Number** MST092

Completed by: L. Fuhrig **Checked by:** Sally Staley

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 13 ft **L.E.W.** 5.5 ft **Total Width** 7.5 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
5.50	1	–	m/s	ft/s			
7.0	2	0.22	0.01	0.032			
7.5	3	0.3	0.01	0.032			
8	4	0.35	0.02	0.064			
8.5	5	0.42	0.03	0.096			
9	6	0.4	0.06	0.196			
9.5	7	0.38	0.04	0.131			
10	8	0.45	0.0	0			
11	9	0.35	0.01	0.032			
REW 13	10	–	–				
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5/13/10 **Arrival Time** 1520

Field Personnel

Leland Fuhrig **Signatures** Leland Fuhrig

Sally Staley

SITE DESCRIPTION

Station Name N. Fk. WVC above Ballard Mine **Station Number** MST093

Latitude N 42 ° 50 ' 28.2 " **Longitude** W 111 ° 28 ' 37.5 "

Elevation 6490 ft **Datum** NAD 27 **Photo Number** SS camera

Site & Stream Description Muddy, ponded area at head of small reservoir

Surface Water Characteristics (color, odor, appearance): Muddy / yellowish, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1530		
Water Temperature (°C)					7.98		
Specific Conductivity (µS/cm) @ 25° C					276		
Conductivity (µS/cm)					186		
TDS (g/L)					0.179		
Dissolved Oxygen (% sat.)					42.1		
Dissolved Oxygen (mg/L)					4.99		
pH					7.06		
ORP (mV)					-312.3		
Turbidity (FTU)					3.84		
Air Temperature (°C)					40 F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 13 / 10 **Time** 1540 **Station Number** MST093

Completed by: Leland Fuhrig **Checked by:** Sully Staley

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	4.3	1.25
2	3.7	1.1
3	3.8	1.0

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 13 / 10 **Arrival Time** 1410

Field Personnel

Leland Fuhrig **Signatures** [signature]

Sally Staley

SITE DESCRIPTION

Station Name Spring-fed trib #1 of NWUC below Ballard Mine **Station Number** MST094

Latitude N 42 ° 49 ' 55.5 " **Longitude** W 111 ° 28 ' 13.5 "

Elevation 6,470 ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description Dry at previous station, water collected just downstream from pipe outlet. Grassy / mossy area

Surface Water Characteristics (color, odor, appearance): ~~yellowish~~ / clear

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SW MST094 - U/F **Sample Time:** 1430

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1430		
Water Temperature (°C)					7.75		
Specific Conductivity (µS/cm) @ 25° C					0.278		
Conductivity (µS/cm)					186		
TDS (g/L)					0.181		
Dissolved Oxygen (% sat.)					72.3		
Dissolved Oxygen (mg/L)					8.58		
pH					8.42		
ORP (mV)					-297.3		
Turbidity (FTU)					1.02		
Air Temperature (°C)					35F		

7.22C

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 13 / 10 **Time** 1440 **Station Number** MST094

Completed by: K. Foley **Checked by:** S. Staley

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	3	1/2 L
2	6	.1 L
3	6	1.2 L

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 13 / 10 **Arrival Time** 1315

Field Personnel

Leland Fahrig **Signatures** [signature]

SITE DESCRIPTION

Station Name Spring-fed trib #2 of NWVC below Ballard **Station Number** MST095

Latitude N 42 ° 49 ' 38.8 " **Longitude** W 111 ° 28 ' 08.3 "

Elevation 6,470 ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description Grass-lined banks and streambed

Surface Water Characteristics (color, odor, appearance): slightly yellow, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SW MST095-U/F **Sample Time:** 1320

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1320		
Water Temperature (°C)					12.83		
Specific Conductivity (µS/cm) @ 25° C					0.858		
Conductivity (µS/cm)					658		
TDS (g/L)					0.558		
Dissolved Oxygen (% sat.)					56.6		
Dissolved Oxygen (mg/L)					5.97		
pH					7.65		
ORP (mV)					-292.5		
Turbidity (FTU)					0.98		
Air Temperature (°C)					38 F		

↳ 3.53

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5 / 13 / 10 **Time** 1327 **Station Number** MS↑095

Completed by: Sally Staley **Checked by:** Leland Fuhrig

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 0 ft **L.E.W.** 1.2 ft **Total Width** 1.2 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0.8	1	0.2	m/s 0	ft/s 0			
0.8	2	0.2	0.04	0.131			
~~0.9~~	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05/16 / 2010 **Arrival Time** 1053

Field Personnel
S. STAUFF
T. BROWNING

Signatures Sally Stauff

SITE DESCRIPTION

Station Name ANGUS CR. AB. RASMUSSEN CR. **Station Number** NST128

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description CHANNEL - NORMAL

Surface Water Characteristics (color, odor, appearance): NO ODOR, CLEAR

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1005SWNST128 **Sample Time:** 1115
MATRIX SPIKE @ 1130

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1115		
Water Temperature (°C)					8.14		
Specific Conductivity (µS/cm) @ 25° C					434		
Conductivity (µS/cm)					294		
TDS (g/L)					0.282		
Dissolved Oxygen (% sat.)					78.8		
Dissolved Oxygen (mg/L)					9.29		
pH					7.99		
ORP (mV)					-112.8		
Turbidity ~~(FTU)~~ NTU					5.21		
Air Temperature ~~(°C)~~ °F					57°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 16 / 2010 **Time** **Station Number** MST128

Completed by: S. STALEY **Checked by:**

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 5.30 ft L.E.W. 0.6 Total Width 4.70 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0.6	1		ft/s				
0.8	2	0.4	0				
1.0	3	0.4	0.01				
1.5	4	0.55	0.02				
2.0	5	0.95	0.89				
2.3	6	1.05	2.12				
2.60	7	1.15	2.20				
2.90	8	1.15	2.12				
3.20	9	1.10	2.01				
3.50	10	1.05	1.90				
3.80	11	1.00	1.76				
4.10	12	1.60	1.63				
4.40	13	0.95	1.47				
4.70	14	0.75	0.94				
5.00	15	0.55	0.28				

5.30 REW

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date: 05/26 / 2010 **Arrival Time** 1000/1001

Field Personnel

S. STACEY

T. BROWNING

Signatures

SITE DESCRIPTION

Station Name RASMUSSEN Cr. AB ANGUS Cr. **Station Number** MST131

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description CHANNEL - NORMAL

Surface Water Characteristics (color, odor, appearance): NO ODOR - CLEAR

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1005SWMST132 **Sample Time:** 1020

MATRIX SPIKE @ 1030

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1020		
Water Temperature (°C)					5.59		
Specific Conductivity (µS/cm) @ 25° C					345		
Conductivity (µS/cm)					217		
TDS (g/L)					0.224		
Dissolved Oxygen (% sat.)					76.3		
Dissolved Oxygen (mg/L)					9.58		
pH					7.69		
ORP (mV)					-176.8		
Turbidity ~~(FTU)~~ NTU					4.76		
Air Temperature ~~(°C)~~ °F					58°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 16 / 2010 **Time** 1031 **Station Number** MSF131

Completed by: S STAUB **Checked by:**

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 4.50 ft L.E.W. 1.00 ft Total Width 3.50 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1		ft/s				
1.00	2						
1.80	3	0.90	0				
2.00	4	0.90	0.14				
2.20	5	1.00	0.27				
2.40	6	1.00	0.17				
2.60	7	1.00	0.40				
2.80	8	0.88	0.88				
3.00	9	1.00	1.22				
3.20	10	1.10	1.45				
3.40	11	1.05	1.29				
3.60	12	1.10	0.82				
3.80	13	1.00	0.52				
4.00	14	1.00	0.35				
4.20	15	0.50	0.36				

4.50

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 06 / 16 / 2010 **Arrival Time** 0810

Field Personnel
S. STACKY
T. BROWNING

Signatures

SITE DESCRIPTION

Station Name ANGUS CR. AB. NO NAME TRIB. BL RASMUSSEN CR. **Station Number** MST132

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description CHANNEL - CLEAR

Surface Water Characteristics (color, odor, appearance):
NO ODOR - CLEAR

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SWMST132-1U/F **Sample Time:** 0910/0930/0940
" " 132-2 U/F
132-3 U/F

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0750	0800			0910	0930	0940
Water Temperature (°C)		8.48			4.87	5.20	
Specific Conductivity (µS/cm) @ 25° C	1413	1595@8.5°			414	414	
Conductivity (µS/cm)					255	258	
TDS (g/L)					0.269	0.269	
Dissolved Oxygen (% sat.)		79%@6.0.5			73.7	73.5	
Dissolved Oxygen (mg/L)					9.43	9.33	
pH	7.0/4.0	6.97/3.99			7.53	7.80	
ORP (mV)	220	230@10°C			-134.3	-146.9	
Turbidity ~~(FTU)~~ NTU					6.14	6.10	
Air Temperature ~~(°C)~~ °F					52°F	52°F	52°F

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 16 / 2010 **Time** 0950 **Station Number** MST132

Completed by: S. STACY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 5.50 ft L.E.W. 0.6 ft Total Width 4.90 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec) ft/s		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0.6	1	0	LEW				
0.8	2	1.10	0.27				
1.0	3	1.20	0.58				
1.5	4	1.40	0.64				
2.0	5	1.45	1.11				
2.5	6	1.50	1.51				
3.0	7	1.50	1.20				
3.5	8	1.42	1.12				
4.0	9	1.45	1.07				
4.5	10	1.45	0.92				
5.0	11	1.45	0.81				
5.5	12	0	REW				
	13						
	14						
	15						

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 16 / 2010 **Time** 0950 **Station Number** MST132

Completed by: S. STANGY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 5.50 ft L.E.W. 0.6 ft Total Width 4.90 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec) ft/s		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0.6	1	0	LEW				
0.8	2	1.10	0.27				
1.0	3	1.20	0.58				
1.5	4	1.40	0.64				
2.0	5	1.45	1.11				
2.5	6	1.50	1.51				
3.0	7	1.50	1.20				
3.5	8	1.42	1.12				
4.0	9	1.45	1.07				
4.5	10	1.45	0.92				
5.0	11	1.45	0.81				
5.5	12	0	REW				
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05/15 / 2010 **Arrival Time** 1600

Field Personnel

S. STACEY

T. BROWNING

Signatures

SITE DESCRIPTION

Station Name RASMUSSEN CR. BL. ENOCH VALLEY MINE **Station Number** MST 133

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description SMALL STREAM · DEFINED CHANNEL

Surface Water Characteristics (color, odor, appearance): CLEAR, NO ODOR

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream, Across-stream

Sample ID: 1005SWMST133 **Sample Time:** 1620

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1612		
Water Temperature (°C)					14.78		
Specific Conductivity (µS/cm) @ 25° C					259		
Conductivity (µS/cm)					208		
TDS (g/L)					0.168		
Dissolved Oxygen (% sat.)					69.1		
Dissolved Oxygen (mg/L)					7.00		
pH					7.77		
ORP (mV)					-360		
Turbidity ~~(FTU)~~ NTU					5.00		
Air Temperature ~~(°C)~~ °F					60°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 15 / 2010 **Time** [illegible] **Station Number** MST133

Completed by: S. STACY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 0.60 ft L.E.W. 1.90 ft Total Width 3.8 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
[illegible]	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
2	1	0.22	0.03				
2.5	2	0.42	0.00				
3	3	0.40	0.02				
3.5	4	0.68	0.07				
4	5	0.70	0.33				
4.2	6	0.70	0.39				
4.4	7	0.70	0.39				
4.6	8	0.65	0.16				
4.8	9	0.60	0.0				
5.2	10	0.50	0.0				
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 15 / 2010 **Arrival Time** 1210

Field Personnel

S. STAVEY **Signatures** [signature]

T. BROWNING

SITE DESCRIPTION

Station Name RASMUSSEN CR. HOWTES NR. ENOCH VALLEY MINE SHOP **Station Number** MST136

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description STREAM DRY - HARD TO TELL WHEN IT MAY HAVE FLOWED?

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

DRY

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05/25/2010 **Arrival Time** 1640 017 010.5 21 20

Field Personnel

S. STAVEY **Signatures**

T. BROWNING

SITE DESCRIPTION

Station Name E. FK. RASMUSSEN CK. AB. RASMUSSEN CK **Station Number** ~~0143~~ MST143

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description CHANNEL - INCISED - STAGE ON END @ SITE

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1005SWMST143 **Sample Time:** 1700

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time		1840			1700		
Water Temperature (°C)		15.7			13.97		
Specific Conductivity (µS/cm) @ 25° C		1594			371		
Conductivity (µS/cm)					293		
TDS (g/L)					0.241		
Dissolved Oxygen (% sat.)		60.2% @ 592.0 mmHg			69.7		
Dissolved Oxygen (mg/L)					7.19		
pH		7.03			8.36		
ORP (mV)		223			-42.3		
Turbidity ~~(FTU)~~ NTU		19.76			10.4		
Air Temperature ~~(°C)~~ °F					57°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 15 / 2010 **Time** 1702 **Station Number** MST143

Completed by: S. STAUB **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 0.70 ft L.E.W. 2.50 ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 (0.6) 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec) m/s	ft/s	Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0.7	1	0.70	0.36	1.18			
0.9	2	0.72	0.38	1.25			
1.1	3	0.85	0.39	1.28			
1.3	4	1.05	0.48	1.57			
1.5	5	1.15	0.43	1.41			
1.7	6	1.05	0.46	1.51			
1.9	7	0.90	0.41	1.34			
2.1	8	0.80	0.24	0.79			
2.3	9	0.70	0.23	0.75			
2.5	10	0	LEW				
	11						
	12						
	13						
	14						NTU
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5/16/10 **Arrival Time** 0855

Field Personnel

L. Fuhrig **Signatures**

SITE DESCRIPTION

Station Name East Fork Rasmussen Ck. Headwaters **Station Number** MST269

Latitude N 42° 52' 16.4" **Longitude** W 111° 23' 43.9"

Elevation 6671 ft **Datum** NAD 27 **Photo Number** LF camera

Site & Stream Description DRY / grassy banks

Surface Water Characteristics (color, odor, appearance): DRY

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

DRY

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 5/16/10 **Time** 0855 **Station Number** MST269

Completed by: C. Fuhrig **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 2010 **Arrival Time** 1520

Field Personnel
S. STALEY
T. BROWNING

Signatures

SITE DESCRIPTION

Station Name ENOCHS VALLEY MINE W. DUMP SEEP **Station Number** MDS025

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description SEEP LOTS OF IRON STAINING

Surface Water Characteristics (color, odor, appearance): ORGANIC SMELL - H_2O IS FAIRLY CLEAR

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(X). Up-stream / Across-stream

Sample ID: 1005SWMDS025 U/F **Sample Time:** 1530

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	+5 Sec				1540		
Water Temperature (°C)					9.66		
Specific Conductivity (µS/cm) @ 25° C					1903		
Conductivity (µS/cm)					1345		
TDS (g/L)					1.237		
Dissolved Oxygen (% sat.)					34.4		
Dissolved Oxygen (mg/L)					3.89		
pH					6.58		
ORP (mV)					-59.2		
Turbidity ~~(FTU)~~ NTU					2.23		
Air Temperature ~~(°C)~~ °F					63°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 15 / 2010 **Time** 1545 **Station Number** WDS025

Completed by: S. STACY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	4.5	2/3 c.
2	4.8	3/4 c.
3	4.2	2/3 c.

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
1 - 2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 15 / 2010 **Arrival Time** 1720

Field Personnel

S. STAUFF

T. BROWNING

Signatures

SITE DESCRIPTION

Station Name _____ **Station Number** _____

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation _____ ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description EQUIPMENT RINSEATE BLANK

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005 ER-SW-04 W/F **Sample Time:** 1730

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 15 / 2010 **Arrival Time** 1425

Field Personnel

S. STACEY

T. BROWNING

Signatures [illegible]

SITE DESCRIPTION

Station Name WATER BLANK **Station Number** 1005ER-SW-03

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005ER-SW-03 **Sample Time:** 1430

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 16 / 2010 **Arrival Time** 1135

Field Personnel

S. STALEY

T. BROWNING

Signatures Sally Staley

SITE DESCRIPTION

Station Name EQUIPMT. RINSEATE BLANK **Station Number** ER SW-05

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(X). Up-stream / Across-stream

Sample ID: 1005ER-SW-05 **Sample Time:** 1145

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2008 SW Sampling (1005813.020101)

Date 05 / 16 / 2010 **Arrival Time** 1150

Field Personnel

S. STACEY

T. BROWNING

Signatures

SITE DESCRIPTION

Station Name WATER BLANK **Station Number** ER-SW-06

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(X). Up-stream / Across-stream

Sample ID: 1005~~ER~~ B-SW-06 **Sample Time:** 1200

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

WELL SAMPLING FORM

Page: 1 of

Project No.: _____ Client: MONSANTO Date: 5/21/10 Well ID: 1005GWMBW006

Task: SAMPLING Field Crew: T. BROWNING

Measuring Point (MP): TOC Water Level (WL): 5.95 ft below MP

Sampling Method (see applicable calculations below): LOW FLOW Device: PERI PUMP

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 12.85 ft below MP Water Height (H): 5.95 ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0955	5.95 BELOW PUMPING								
1005	6	0.03	0.25	7.53	7.29	-1.4	7.50	764	42.1
1015	6	0.05	0.75	7.34	7.29	-44.0	7.74	753	17.95
1025	6	0.06	1.3	7.68	7.30	-33.0	7.90	755	6.87
1035	6	0.09	2.2	7.48	7.33	-14.0	7.88	745	3.14
1045	6	0.06	2.75	7.79	7.30	-1.6	8.01	751	2.28
1050	6	0.07	3.1	7.90	7.31	6.1	8.36	756	1.82
1100	6	0.07	3.8	8.34	7.33	21.0	8.01	763	2.93
1110	6	0.07	4.5	8.31	7.30	29.6	8.59	760	2.13
1115	6	0.03	4.8	8.46	7.30	34.3	8.39	764	1.62
1120	6	0.04	5.2	8.90	7.34	35.7	9.52	734	2.68
1125	6	0.04	5.6	8.49	7.32	41.7	8.05	766	2.11

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1145	6	0.03	6.9	9.04	7.29	49.4	7.21	774	1.65

SAMPLE ID: 1005GWMBW006 **TIME:** 1148

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: MONSANTO Date: 5/21/10 Well ID: 1005GWMBW006

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1130	6	0.04	6	8.88	7.27	45	6.28	774	1.78
1135	6	0.03	6.26	8.83	7.30	45.5	7.24	771	2.16
1140	6	0.03	6.6	8.96	7.29	47.2	7.24	775	2.86
1145	6	0.03	6.9	9.04	7.29	49.4	7.21	774	1.65

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/20/12 Well ID: MBW009

Task: GW Sampling Field Crew: L. Fuhrig

Measuring Point (MP): TOC Water Level (WL): 2.35 ft below MP

Sampling Method (see applicable calculations below): low flow Device: peristaltic

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1215	2.35	cal		10	7.06, 10.12	230	79.6 @605.2	1413	1000/10/0.02
1250	2.35	check		10	10.17	228.6	82.8%	1414	10.0/1002
1315	2.35	began purge							
1320	2.71		0	8.46	6.49	94.4	5.50	1278	2.83
1330	3.60		0.35	8.14	6.29	102.4	2.06	1291	2.11
1335	3.85		0.7	7.00	6.24	100.2	1.96	1283	2.26
1340	3.99	0.085	1.1	6.53	6.16	101.2	1.87	1269	1.83
1345	4.09	0.07	1.4	6.64	6.09	102.2	1.77	1261	1.50
1350	4.16	0.07	1.8	7.41	6.18	98.9	1.64	1253	2.37
1355	4.23	0.07	2.1	7.54	6.27	95.0	1.50	1266	1.34
1400	4.27	0.07	2.5	8.01	6.30	90.7	1.33	1251	2.04
1405	4.28	0.065	2.75	8.00	6.36	87.4	1.26	1258	2.20

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1440	4.19	0.05	4.75	7.42	6.44	80.7	1.02	1234	1.07

SAMPLE ID: 1005GWMBW009 -U/F **TIME:** 1450

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/20/10 Well ID: MBW009

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1410	4.30	0.06	3.1	7.71	6.37	84.3	1.21	1258	1.55
1415	4.29	0.06	3.35	8.22	6.38	83.8	1.10	1238	1.03
1420	4.27	0.06	3.7	8.414	6.424	81.2	1.12	1243	1.43
1425	4.25	0.06	3.95	8.43	6.48	78.7	1.07	1215	2.02
1430	4.23	0.06	4.25	8.52	6.50	77.7	1.01	1236	1.08
1435	4.20	0.055	4.5	7.66	6.50	77.2	1.11	1252	0.99
1440	4.19	0.05	4.75	7.42	6.44	80.7	1.02	1234	1.07

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/17/10 Well ID: MBW011

Task: GW Sampling Field Crew: L. Fuhrig

Measuring Point (MP): Top of casing Water Level (WL): 0.6 ft below MP

Sampling Method (see applicable calculations below): low flow Device: peristaltic

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

cal 5/18 1150 12.9 10:11 7.05 229 @600.5 1413 1000/10/0.02

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
cal 12:30		—	—	22	7.01	221	600.2 78.8	1413	1000, 10, 0.02
check	1225			23.27	6.92 9.44	224.8	602.1 mV 90.8	1392	10.09
1255	toc								
1812	0.6								
1845	1.07		flow-thru	11.60	6.42	100.3	111.1	675	—
1850	1.19			9.18	5.62	148.2	3.61	639	6.61
1855	1.27		0.5	8.38	5.49	156.5	2.84	660	
1900	1.29		0.7	8.06	5.48	158.1	2.63	653	11.86
1905	1.31	0.03	0.8	7.95	5.54	155.4	3.73	650	11.70
1910	1.34	0.04	1.1	7.63	5.60	152.7	2.71	648	11.38
1915	1.40	0.05	1.3	7.52	5.64	151.5	2.55	644	11.68
1920	1.40	0.04	1.5	7.60	5.69	149.6	2.45	643	10.57

TD = 14.77

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
5/18 1302	2.50	0.1	0.75	6.23	6.32	156.5	2.72	839	26.24

SAMPLE ID: 1005GWMBW011-U/F TIME: 1310

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/13/10 Well ID: MBW011

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1207	check			12.50	10.07	229.8	79.0	1413	10.10
1252	0.58	Start	-						
1257	1.73		0.25	6.2	6.69	149.3	12.0	870	26.57
1302	2.50	0.1	0.75	6.23	6.32	156.5	2.72	839	26.24

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/21/10 Well ID: MBW027

Task: GW Sampling Field Crew: L. Fahmy

Measuring Point (MP): TOC Water Level (WL): 8.69 ft below MP

Sampling Method (see applicable calculations below): low-flow Device: peristaltic

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1310	8.69	0.01		17.5	7.04 10.06	225	78.5 @ 598.0	1413	1000.14 0.02
1340		check		15.8	7.02 10.55	229.4	81.3	1447	10:9.91
1400	began purge								
1405	9.01								
1425	9.02	-	1.1	8.78	6.62	167.4	8.69	1240	11.46
1440	9.02		2.0	8.86	6.68	165.8	7.57	1240	4.14
1445	9.02	0.06	2.3	8.81	6.71	164.9	7.66	1255	4.74
1450	8.99		2.70	8.35	6.71	165.4	7.27	1246	3.44
1455	9.00	0.07	3.0	7.94	6.74	164.4	7.15	1249	2.84
1500	9.01	0.05	3.25	8.06	6.73	165.2	6.91	1241	3.34
1505	9.00	0.05	3.5	8.3	6.77	163.4	6.69	1238	3.01
1510	9.00		3.8	8.15	6.81	161.7	6.76	1249	3.13

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1525	8.98	0.05	4.7	7.98	6.88	159.0	6.53	1242	2.25

SAMPLE ID: 1005GWMBW027-U/F **TIME:** 1540

Final low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/21/10 Well ID: MBW027

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1515	8.99	0.05	21.2	8.17	6.84	160.2	6.55	1242	1.98
1520	8.99	0.05	21.4	8.11	6.87	159.0	6.51	1243	2.24
1525	8.98	0.05	4.7	7.98	6.88	159.0	6.53	1239	2.20

Karen at lab

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/18/10 Well ID: MBW028

Task: GW Sampling Field Crew: L. Fuhrig

Measuring Point (MP): TOC Water Level (WL): 6.32 ft below MP

Sampling Method (see applicable calculations below): purge + sample Device: peristaltic

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 21 ft below MP Water Height (H): 6.4 ft below MP Casing Radius (r): 0.172 ft

3(3.14×(.172×.172)×14.6×7.48) 30.4×3.46 =

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 105.2 gal = 115.02 gal Required Run Time: _____ min/ hr

H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

14.6

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1735 (5/18)	6.32								
EOD 1856	check			13.5	10.22	220	83.5%	7122	10.01
5/19 1030	cal			8.62	7/10	220	97.1%	1413	100.10 0.02
1100	check			10.18	7.01	230	8.78 mg/L	5570	10.2
1105	6.4								
1123	7.1								
1130	7.7		1.1	6.78	6.09	243.1	1.98	1357	8.49
1140	7.95	0.03	1.4	6.73	6.12	238.8	2.14	1358	5.45
1150	8.00		2.3	6.75	6.17	234.8	1.77	1355	4.92
1200	8.00	0.095	3.25	6.84	6.20	231.4		1351	4.65
1210	8.00	0.05	3.30	6.78	6.21	230.0	2.03	1353	4.52

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1230	8.0	006	5.3	6.90	6.23	227.2	1.42	1345	4.31

SAMPLE ID: 1005GWMBW028 - U/F TIME: 1240

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

2.3L / 5 min = 0.46L/min

45 min = 20.2L

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: ______ Client: Monsanto Date: 5/19/10 Well ID: MBW028

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1215	8.0	0.07	4.25	6.82	6.21	229.1	1.72	1348	4.18
1220	8.0	0.07	4.6	6.81	6.22	228.6	1.62	1347	4.59
1225	8.0	0.08	5	6.80	6.22	228.0	1.50	1346	4.59
1230	8.0	0.08	5.3	6.90	6.23	227.2	1.42	1345	4.31

WELL SAMPLING FORM

Page: 1 of ___

Project No.: _____ Client: Monsanto Date: 5/20/10 Well ID: MBW032

Task: GW Sampling Field Crew: L. Fuhrig

Measuring Point (MP): TOC Water Level (WL): 10.17 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: peristaltic

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1810	10.17	began purge							
1815	10.69			8.18	7.02	89.5	10.15	2290	~~[illegible]~~
1820	10.69		0.7	7.11	6.66	116.6	8.25	2292	730 *
1830	10.70		1.35	6.24	6.63	117.7	7.91	2300	74.11
1835	10.70		1.8	6.19	6.59	119.4	7.58	2300	
1845	10.70	0.11	2.9	6.34	6.80	108.8	8.15	2266	24.92
1850	10.70	0.1	3.15	6.08	6.66	118.0	7.84	2291	4.72
1855	10.70	0.1	3.6	5.99	6.65	119.0	7.58	2299	2.52
1900	10.70	0.09	4.05	5.94	6.66	120.5	7.43	2300	4.37
1905	10.70	0.09	4.5	5.77	6.67	120.4	7.52	2306	2.95
1945	check			13	7.07	217.2	63.5 @60.0	18.68	10.44 0.03

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1905	10.70	0.09	4.5	5.77	6.67	120.4	7.52	2306	2.95

SAMPLE ID: 1005GWMBW032-1/2-0/F **TIME:** 1920

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

*Very muddy for first 10 mins of purge
emptied water in flow-thru cell at 1823 and 1840, rinse
allowed cell to refill before taking more readings

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: Monsanto Date: 5/20/10 Well ID: MBW048

Task: GW Sampling Field Crew: L. Fuhrig

Measuring Point (MP): TOC Water Level (WL): 0.45 ft below MP

Sampling Method (see applicable calculations below): low flow Device: peristaltic

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1605	0.45	begun purge							
1615	0.70		0.2	6.92	5.79	121.0	2.75	176	6.76
1620	0.72			5.79	5.29	144.6	1.66	163	6.91
1625	0.73	0.1	1.25	5.17	5.25	147.7	1.45	159	6.26
1630	0.73	0.09	1.7	5.45	5.16	161.5	1.28	157	4.81
1635	0.73	0.1	2.25	5.47	5.35	156.4	1.24	158	4.63
1640	0.75	0.1	2.75	5.56	5.42	153.9	1.22	159	3.07
1645	0.79	0.1	3.25	5.57	5.48	149.3	1.17	160	2.63
1650	0.76	0.1	3.75	5.80	5.53	144.0	1.11	161	2.30
1655	0.76	0.1	4.25	5.65	5.64	136.8	1.04	163	2.41
1700	0.76	0.11	4.85	5.51	5.69	133.3	0.99	164	2.00
1705	0.76	0.11	5.4	5.63	5.74	128.5	0.97	165	1.47

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1705	0.76	0.11	5.4	5.63	5.74	128.5	0.97	165	1.47

SAMPLE ID: 1005GWMBW048-UF **TIME:** 1708

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/19/10 Well ID: MBW035

Task: GW Sampling Field Crew: L. Fuhrig

Measuring Point (MP): TOC Water Level (WL): 1.58 ft below MP

Sampling Method (see applicable calculations below): low-flow Device: peristaltic

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1636	1.58								
1642	1.99								
1655	2.23		0.25	8.50	5.23	255.7	9.01	398	2.89
1705	2.29	0.04	0.65	8.13	5.45	242.9	7.94	393	2.81
1710	2.29	0.02	0.75	8.25	5.51	236.2	7.71	391	3.11
1715	2.29	0.02	0.85	8.41	5.74	228.0	7.55	390	1.90
1720	2.29	0.03	1.0	8.41	5.83	222	7.55	391	2.08
1725	2.29	0.03	1.15	8.28	5.95	215.8	7.68	390	2.36
1730	2.25	0.03	1.3	8.50	6.01	211.6	7.40	386	1.91
1735	2.22	0.02	1.4	8.63	6.12	206.4	7.32	385	1.72
1740	2.24	0.03	1.55	8.59	6.23	200.8	7.33	383	1.53
1745	2.24	0.03	1.7	8.36	6.29	197.5	7.51	384	1.39

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1755	2.20	0.03	2.0	8.24	6.37	193.5	7.32	379	1.29

SAMPLE ID: 1005GWMBW035-U/F **TIME:** 1810

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/19/10 Well ID: MBW035

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1750	2.23	0.03	1.95	7.28	6.34	195	7.39	381	1.55
1755	2.20	0.03	2.0	7.24	6.37	193.5	7.32	379	1.24
1855	check			14.64	10.03	218.6	80.5% 0.59 5.6	7564	10.25

WELL SAMPLING FORM

Page: 1 of

Project No.: _____ Client: MONSANTO Date: 5-19-10 Well ID: MBW087

Task: GW SAMPLING Field Crew: TYLER BROWNING

Measuring Point (MP): TOC Water Level (WL): 0.8 ft below MP

Sampling Method (see applicable calculations below): LOW FLOW Device: PERASTOLIC

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 12.1 ft below MP Water Height (H): 0.8 ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = [Pi * r² * H * 7.48]: _____ gal Required Run Time: _____ min/hr,
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1600	CAL				7.03/	222.6	8.06	410	
						18.16C	598.6		
1635	0.8		BEGAN	LOW	VOLUME	PUMP			
1640	0.95	~~0.5~~	0.5	4.12	6.74	-171.2	2.00	0507	37.8
1650	0.97	0.13	1.75	4.0	6.80	-147.2	2.02	0500	24.8
1700	0.97	0.13	3.00	3.97	6.80	-166.0	1.18	0498	12.37
1710	0.97	0.1	4.00	4.01	6.78	-158.0	1.97	0500	~~5.88~~ 5.88
1720	0.97	0.1	5.0	4.41	6.78	-188.4	1.77	0496	7.98
1730	0.97	0.13	6.25	4.19	6.88	-180.6	1.36	499	5.02
1740	0.97	0.1	7.25	4.35	6.88	-178.6	1.31	498	~~7.57~~ 4.43

Continue stabilization readings on additional pages if necessary

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1805	0.97	0.08	10.70	4.27	6.81	152.6	1.11	498	4.51

SAMPLE ID: _____ TIME: _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM
Continued Stabilization Readings

Page: _____ of _____

Project No.: _____ Client: _____ Date: _____ Well ID: _____

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1750	0.97	0.8	8.0	3.97	6.8	-157.6	1.14	498	4.67
1755	0.97	0.11	8.55	3.87	6.81	-159.9	1.19	499	4.48
1800	0.97	0.11	9.10	3.85	6.87	-147.3	1.19	500	4.55
1805	0.97	0.08	9.70	4.27	6.81	-152.6	1.11	498	4.51
1810	CHECK	–	–	–	4.03/7.11	222.9 @14C	8.13 @597.6	0.881 @14C	20.03

WELL SAMPLING FORM

Page: 1 of ___

Project No.: _____ Client: MONSANTO Date: 5-20-10 Well ID: MBW-099

Task: SAMPLING Field Crew: T. BROWNING

Measuring Point (MP): TOC Water Level (WL): 1.1 ft below MP

Sampling Method (see applicable calculations below): LOW FLOW Device: PART PUMP

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 17.5 ft below MP Water Height (H): 1.1 ft below MP Casing Radius (r): 1½ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0935	CAL YSI				7.03, 4.01	231.1	9.81 @ 25	1414 µS/cm	1.20
							595.2 mV	@ 10°C	19.93
1010	BEGAN	LOW FLOW	PUMPING						
1020	0.8		1.0	5.25	6.72	-192.5	1.92	141 µS/cm	2.59
1030	5.3	0.19	2.9	4.93	6.61	-208.5	2.31	299	5.83
1040	5.7	0.11	4	5.65	6.62	-166.3	2.71	409	4.41
1050	9.2	0.12	5.2	5.60	6.64	-158.9	3.17	493	5.25
1100	11.3	0.11	6.75	5.69	6.72	-189.3	3.40	518	12.35
1110	13.53	0.13	7.5	5.92	6.68	-231.4	3.62	512	10.67
1120	14.42	0.11	8.6	6.02	6.69	-233.8	3.52	500	12.37
1130	15.31	0.12	9.75	6.04	6.67	-233.1	3.87	470	7.46
1140	16.50	0.13	11	6.31	6.80	231.4	3.68	484	5.35

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0846	14.5	0.04	17.1 18.8	5.99	6.92	-85.7	8.20	285	19.31

SAMPLE ID: 1005GWMW099 TIME: 0849

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM
Continued Stabilization Readings

Page: _____ of _____

Project No.: _____ Client: Monsanto Date: 5/21/10 Well ID: 1005GWMBW099

	STABILIZATION READINGS									
	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
	Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
	1150	17.25		12.1	6.95	6.87	-230.1	5.92	429	—
5/21/10	0810	11.2	CAL		2.30	6.98/4.98	235.5	10.45 ~~7.6~~	1435 C	1.20
					~~5.78~~			78.2% @ 592.5	2.32 C	
	0833	START	LOW FLOW PUMPING							
	0833	13.6	0.2	1L	5.28	6.93	-89.3	6.98	848	5.08
	0843	14.2	0.03	1.25	5.8	6.95	-88.3	64.8	453	10.76
	0846	14.5	0.05	1.4	5.99	6.92	-85.7	8.20	285	19.31
	~~0847~~									

* ONLY DISSOLVED METALS WAS COLLECTED @ 1005GWMBW099.

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/23/10 Well ID: MBW099

Task: GW sampling Field Crew: L. Fushrig

Measuring Point (MP): TOC (PVC) Water Level (WL): 6.83 ft below MP

Sampling Method (see applicable calculations below): purge + sample Device: peristaltic

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1100	6.83								
1108	-	~~0.7~~	0						
1122	7.90		0.1	6.78	6.71	126.2	8.10	793	6.54
1129	8.75	0.08	0.5	6.58	6.52	136.3	7.56	696	7.40
1153	11.3	post-sample depth							

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1129	8.75	0.08	0.5	6.58	6.52	136.3	7.56	696	7.40

SAMPLE ID: 1005GWMBW099 - U/F **TIME:** 1140

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/22/10 Well ID: MBW107

Task: GW Sampling Field Crew: L. Fehrig

Measuring Point (MP): TOC (PVC) Water Level (WL): 39.03 ft below MP

Sampling Method (see applicable calculations below): 1" bailer Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1050	39.03								
1115	39.22		0.1						
Well dry, 100mL collected. Water purged is most likely stagnant water in bottom cap from condensation.									

TD= 39.26'

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)

SAMPLE ID: _____ **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/22/10 Well ID: MBW112

Task: GW Sampling Field Crew: K. Fuhrig, T. Browning

Measuring Point (MP): TOC (PVC) Water Level (WL): 17.35 ft below MP

Sampling Method (see applicable calculations below): 1" bailer Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

TD= 17.62'

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1436	17.35								
1459	17.56								
Well dry, >100mL collected. Water purged is most likely stagnant water in bottom cap from condensation.									
Continue stabilization readings on additional pages if necessary									

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)

SAMPLE ID: _____ **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/18/10 Well ID: MBW130

Task: GW Sampling Field Crew: L. Fuhrig

Measuring Point (MP): TOC Water Level (WL): 1.73 ft below MP

Sampling Method (see applicable calculations below): low-flow Device: peristaltic

Low Flow Sampling drawdown exceeded 0.3' below initial WL but stabilized within an hour

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1450	1.73								
1500	2.53	—	~~0.2~~	8.48	6.23	111.1	3.00	244	28.13
1512	3.25		0.6	8.01	5.91	109.3	1.10	232	12.53
1520	3.58	0.03	1.0	7.86	5.95	100.4	1.34	205	9.71
1525	3.70	0.04	1.2	7.73	5.94	101.6	1.41	202	6.55
1530	3.85	0.05	1.5	7.52	5.99	101.0	1.60	194	6.23
1540	3.91	0.55	1.75	7.42	6.01	100.7	1.75	192	8.38
1545	3.91	0.05	2.0	7.45	6.03	100.4	1.67	190	8.97
1550	3.87	0.04	2.2	7.54	6.09	98.0	1.63	188	8.76
1602	3.78		2.55	7.03	6.21	91.2	1.68	187	9.27
1610	3.73	0.03	2.80	6.59	6.22	91.4	1.65	184	9.54
1620	3.70	0.04	3.20	6.25	6.14	94.3	1.78	182	10.76 *

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1620	3.70	0.04	3.20	6.25	6.14	94.3	1.73	182	10.76

SAMPLE ID: 1005GWMBW130-U/F **TIME:** 1635

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

* Turbidity decreased, then increased once WL stabilized. No indication that turbidity would drop below 5NTU so sample was taken and sample was filtered

WELL SAMPLING FORM

Page: 1 of

Project No.: _____ Client: MONSANTO Date: 5/20/10 Well ID: MBW131

Task: SAMPLE Field Crew: T. BROWNING

Measuring Point (MP): TOC Water Level (WL): 2.8 ft below MP

Sampling Method (see applicable calculations below): LOW FLOW Device: PERI PUMP

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 8.05 ft below MP Water Height (H): 2.8 ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1415	2.8		Ø						
1425	3.2	0.09	0.85	5.96	6.51	-125.8	9.26	97	82.1
1435	3.2	0.09	1.75	5.54	6.54	-128.9	9.56	79	86.3
1445	3.2	0.11	2.9	6.04	6.46	-122.4	6.47	77	49
1455	3.2	0.12	4.1	5.38	6.45	-118.4	9.59	75	32.2
1505	3.2	0.1	5.1	6.01	6.42	-117.5	9.44	76	18.75
1515	3.2	0.11	6.2	6.12	6.49	120.3	9.43	76	14.94
1525	3.2	0.09	7.1	6.27	6.52	-120.1	9.52	77	12.21
1535	3.2	0.09	8.0	6.35	6.53	-119.4	9.47	77	13.85
1545	3.2	0.1	9.0	6.44	6.65	-122.0	9.51	78	
STOPPED PUMPING DUE TO EQUIPMENT FAILURE									

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1840	3.15	0.07	19.2	6.24	6.51	-65.5	9.18	77	4.86

SAMPLE ID: 1005GWMBM131 **TIME:** 1845

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM
Continued Stabilization Readings

Page: 2 of ____

Project No.: ____ Client: MONSANTO Date: 5-20-10 Well ID: MBW131

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1706	27		9	BEGAN	PUMPING		WITH	PERI.	PUMP
1715	3.1	0.08	9.75	6.82	6.54	-66	9.29	79	29.2
1725	3.15	0.11	10.8	6.55	6.53	-86.7	9.42	78	18.83
1735	3.15	0.12	12	6.60	6.50	-90.3	8.99	77	16.61
1745	3.15	0.1	13	6.47	6.53	-76.3	9.21	77	13.09
1755	3.15	0.11	14.1	6.32	6.52	-78.8	9.27	77	9.06
1805	3.15	0.12	15.25	6.79	6.49	-70.0	9.17	78	6.65
1815	3.15	0.1	16.25	6.53	6.54	-72.5	9.17	77	6.29
1825	3.15	0.11	17.3	6.53	6.48	-67.9	9.19	77	5.30
1830	3.15	0.05	17.8	6.40	6.52	-67.4	9.18	77	4.91
1835	3.15	0.07	18.5	6.39	6.50	-64.8	9.12	77	4.95
1840	3.15	0.07	19.2	6.24	6.51	-65.5	9.18	77	4.86
POST CHECK					7.01	219.6 e	85.5%	1399e	22 20.03
					4.05	16.81°C	600.5 mV	12.82°C	

WELL SAMPLING FORM

Project No.: _____ Client: MONSANTO Date: 5/21/10 Well ID: 1005GWMBW135

Task: SAMPLING Field Crew: T. BROWNING

Measuring Point (MP): TOC Water Level (WL): 1.9 ft below MP

Sampling Method (see applicable calculations below): LOW FLOW Device: PERI PUMP

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 19.8 ft below MP Water Height (H): 1.9 ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1300	1.9		Ø						
1310	3.2	0.07	0.7	11.61	7.67	46.5	0.49	351	10.06
1320	3.55	0.05	1.2	11.80	7.55	4.1	0.52	352	8.74
1330	3.65	0.06	1.75	11.80	7.59	-15.9	0.51	354	5.62
1340	3.75	0.05	2.25	12.32	7.59	-34.1	0.28	362	14.98
1350	3.75	0.05	2.75	11.97	7.60	-52.9	2.21	359	~~2.98~~ 11.09
~~1400~~ 1400	3.75	0.05	3.25	11.72	7.60	-69.8	0.41	358	3.45
1410	3.75	0.05	3.7	12.18	7.61	-80.6	0.30	363	1.87
1420	3.75	0.06	4.25	12.75	7.63	-81.6	0.30	370	2.34
1425	3.75	0.02	4.35	12.76	7.63	-83.6	1.71	370	2.06
1430	3.75	0.02	4.5	13.70	7.64	-86.7	1.60	377	1.53
1440	3.75	0.05	5	12.50	7.64	-86.2	1.83	369	2.54

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1500	3.75	0.2	5.9	12.69	7.64	-89.7	0.31	370	1.62

SAMPLE ID: 1005GWMBW135 **TIME:** 1500

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: MONSANTO Date: 5/21/10 Well ID: 1005GWM13W135

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1450	3.75	0.2	5.5	13.06	7.64	-89.6	0.28	374	3.03
1455	3.75	0.2	5.75	12.68	7.65	-91.5	0.28	371	1.65
1500	3.75	0.2	5.9	12.69	7.64	-89.7	0.31	370	0.62
1530	POST CHECK				7-6.00 4-4.06	232.6@		1411@	20.86
						11.0°C		8.16°C	

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/22-24/10 Well ID: MBW152

Task: GW SAMPLING Field Crew: T. BROWNING

Measuring Point (MP): TOC Water Level (WL): 10.5 ft below MP

Sampling Method (see applicable calculations below): LOW FLOW Device: MINI PUMP

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 14.5 ft below MP Water Height (H): 10.5 ft below MP Casing Radius (r): ~~[illegible]~~ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1000	~~[illegible]~~10.5	CAL	YSI	8.40	7.0/9.9	230.0 @ 7°C	9.40 ~~[illegible]~~ @ 590.8	1410 @ 7°C	✓ 20 @ 19.58
1027	10.5	~~[illegible]~~ PURGE START							
1035	10.5		0.5	2.65	7.01	-48.8	6.85	453	3.62
1040	11.5		0.75	2.22	7.06	-57.9	6.79	447	5.18
~~[illegible]~~ 1050	12.2		1.2	3.46	7.05	-64.9	6.43	462	25.2
~~[illegible]~~ 1100	12.7		1.5	3.81	7.03	-66.8	6.50	473	35.7
~~[illegible]~~ 1110	13.4		1.8	4.41	7.06	-71.4	6.64	486	31.0
~~[illegible]~~ 1120	14		2.3	4.48	7.10	-74.9	6.08	490	~~[illegible]~~ 28.9
~~[illegible]~~ 1130	14.7		2.8	4.39	7.09	-62.2	5.90	482	
~~[illegible]~~ 1230 POST	CHECK	–	–	10.58	6.8/9.7	229.3 @ 10°C	8.96 ~~[illegible]~~ @ 592.6	1318 @ 11°C	✓ 20 @ 19.95
See back for 5/23/10, 5/24/10									

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1255	11.51			4.38	6.92	199.0	8.60	728	36

SAMPLE ID: ~~MBWNSA~~ 1005GWMBW152-W/F **TIME:** 1300

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/23/10 Well ID: MBW152

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
5/23/10 ~~0855~~	~~MAC~~			3.5	7.10, 4.00	235	79.0 @600.1	1413	1000, 19, 0.02
0910	check			2.77	7.04	243.9	79.3 @600.0	7582	9.94/0.03
0933	12.14	Not within 10% of 5/22/10 drawdown, will return.							
1440	11.75	"		"		"		"	
~~1~~1520	POST CHECK			11.92	7.06	227.1	73.8 @534.5	7494	10.03 0.01
							766 mV		
5/24/10 1035	CAL			5°C	7.00 4.00	232	78.8 @598.5	1413	~~10.20~~ 1000
1054	✓			5.43	6.89	246.4	64.80 @598.9	7397	9.98 1000.02
1237	10.78								
1248	11.00								
1255	11.51			4.38	6.92	199.0	8.60	728	36
1320	13.8	post-sample depth							
1325	14.7	purged dry							

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/17/10 Well ID: MMW006

Task: _____ Field Crew: Levi McKay, Wilhelm Welzenbach

Measuring Point (MP): ~~Top of PVC well casing~~ pump connection plate (0.13 ft lower than top of PVC well casing) Water Level (WL): 265.48 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: dedicated bladder pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 20.6 Starting PSI = (½ WL + 20): 155

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (Not Applicable)

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr

H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
11:35	calibration		~~0.75~~	~~10.4~~	7.00→7.00 4.00→4.00 10.00→10.00	227→227	7.37 (79.0%)	1413→1414	1000→1000 0.02→0.02
12:10	265.60	—	0.75	10.47	7.42	300.2	9.25	891	0.26
12:15	265.59	0.2	1.6	10.29	7.30	305.4	10.88	905	1.03
12:20	265.59	0.2	2.5	9.95	7.34	305.0	9.74	919	1.12
12:25	265.58	0.2	3.5	10.01	7.41	311.0	8.50	930	0.75
12:30	265.60	0.22	4.6	9.89	7.46	300.9	7.02	936	0.41
12:35	265.63	0.2	5.6	9.72	7.48	298.1	6.64	937	0.32
12:40	265.60	0.28	7.0	10.00	7.51	298.6	6.40	937	0.29
12:45	265.61	0.24	8.2	10.17	7.55	296.5	6.24	939	0.39
12:50	265.63	0.26	9.5	10.12	7.55	298.8	6.26	938	0.20
12:55	265.60	0.26	10.8	9.94	7.54	301.6	6.27	937	0.58
13:00	265.63	0.28	12.2	10.05	7.55	302.4	6.22	936	1.02

Continue stabilization readings on additional pages if necessary

Ambient air = 74°F

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
14:00	265.60	0.25	27.0	10.36	7.58	554.8	5.98	936	0.73

SAMPLE ID: 1005GWMMW006-U/F **TIME:** 14:05

Final Low Flow Sampling Settings: PSI: 175 Charge: 8 sec Exhaust: 15 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Page: 2 of ____

Project No.: ____ Client: Monsanto Date: 5/17/10 Well ID: MMW06

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
13:05	265.60	0.25	13.4	10.37	7.59	318.3	6.48	937	1.16
13:10	265.60	0.25	14.6	10.39	7.59	409.2	6.41	938	1.01
13:15	265.60	0.25	15.8	10.11	7.56	423.9	6.45	937	0.16
13:20	265.63	0.25	17.0	10.01	7.55	438.8	6.35	936	0.95
13:25	265.60	0.26	18.3	10.02	7.56	458.9	6.17	936	0.55
13:30	265.60	0.23	19.4	10.03	7.56	440.4	6.23	936	0.30
13:35	265.59	0.28	20.8	10.31	7.56	504.8	6.11	933	0.15
13:40	265.58	0.28	22.2	10.36	7.59	551.9	6.06	937	0.67
13:45	265.59	0.26	23.5	10.18	7.58	594.0	6.00	935	1.16
13:50	265.59	0.25	24.7	10.47	7.59	548.2	5.90	934	0.82
13:55	265.60	0.22	25.8	10.19	7.61	548.5	5.99	938	0.23
~~13~~ 14:00	265.60	0.25	27.0	10.36	7.58	554.8	5.98	936	0.73

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: Monsanto Date: 5/~~23~~-25/2010 Well ID: MMW007

Task: GW Sampling Field Crew: W. Welzenbach, L. McKay

Measuring Point (MP): Top of pump connector plate Water Level (WL): 35.07 ft below MP

Sampling Method (see applicable calculations below): High Volume Purge Device: Subm. Electric Pump (Grundfos Rediflo2)

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 94 ft below MP Water Height (H): 35 ft below MP Casing Radius (r): 0.3 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 116 gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

* Pump set @ 89 ft below MP

STABILIZATION READINGS

	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
	Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
	8:10	calibration			7.24	7.00→6.97 4.00→4.00 10.00→10.00	232→232	9.35 (7.8→9.0)	1413→1413	0.02→0.02 1000→1000
	(2nd)	35.07								
	9.08	~~85.5~~	→ Water level after Pump set in well							
begin pumping	9:10	45.02	3.5	3.5	6.72	—	—	1.85	252	—
	9:13	54.85	3.5	14	6.81	7.10	239.3	1.28	248	18.32
	9:15	64.25	3.5	17.5	6.82	7.09	236.0	1.39	243	2.70
	9:17	73.15	3.5	24.5	6.86	7.03	226.7	1.61	243	2.53
	9:18	77.25	3.5	28	6.88	7.00	217.0	1.73	245	2.88
	9:20	81.00	3.5	35	6.91	6.97	203.7	1.80	247	25.82
	9:22	86.30	3.5	42	7.01	6.92	168.2	1.84	242	37.18
end pumping	9:23	88.50	→	→	→	Pumped Dry				
	5/24 1420	37.6								

Continue stabilization readings on additional pages if necessary

5/24 1708 36.75

FINAL READINGS

	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
5/25	0910	36.4	0.06	0.7	6.79	7.18	146.8	38.3	257	11.50

Air temp. = 10°F

SAMPLE ID: 1005GWMMW007-0 TIME: 0915

Final Low Flow Sampling Settings: PSI: 50 Charge: 5 sec Exhaust: 20 sec

5/25 MMW007

time	WL	Purge Rt	Cum. Vol	Temp	pH	ORP	DO mg/L	SC	Turb
cal / ~~[illegible]~~	on	MMW025	sheet						
0827	35.72								
0845	check			3.3	7.15	241.5	78.0	7610	10.09
0905	36.1		6.4	6.42	7.13	156.7	48.1	260	9.57
0910	36.~~4~~	0.06	6.7	6.79	7.18	146.8	38.3	257	11.80
1158	check			14.06	7.15	229.9	91.3 @ ~~#~~ 596.6	7644	10.14

LF/TB

181.04
120.36
61

7'9
181.04
29.37
151.7
6.8
120.36

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/23/10 Well ID: MMW010

Task: _____ Field Crew: W. Welzenbach, L. McKay

Measuring Point (MP): Top of PVC Water Level (WL): 2.80 ft below MP

Sampling Method (see applicable calculations below): Purge Sampling Device: Grundfos "Redi-flow 2" pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 30 ft below MP Water Height (H): 27.2 ft below MP Casing Radius (r): 0.3 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 43.14 gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
10:41	Calibration →			8.61	7.00→7.02 10.00→10.04 4.00→3.98	(230) 229.8	78.37%	(1413) 1414	1000→999.6 0.02→0.04
11:08	2.72	Water	level	after	pump	was	set	in well	
11:15	8.75	2 gpm	5	5.86	6.16	290.2	9.52	2602	52.75
11:19	12.05	1.5	11	~~6.42~~	~~6.31~~	~~294.3~~	~~10.15~~	—	—
11:20	12.75	1.5	12.5	5.14	6.83	266.2	10.82	2117	20.90
11:23	12.78	1.7	17.6	—					
11:24	→			stopped	pumping				
11:25	16.30	3.0	20.6	5.14	6.93	272.0	9.29	2040	53.47
11:26	20.70	3.0	~~20~~ 23.6	4.91	6.72	284.0	6.23	2146	27.42
11:30	25.0	3.0	35.6	4.85	6.66	289.1	5.72	2170	14.62
11:33	→			Pump		turned	off		
(LM) ~~12~~			44.6						

100.00 Hz (LM)

Begin pumping @ 175.00 Hz

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
12:21	12.65	1.0	79.6	4.71	6.58	392.5	4.05	2455	3.79

SAMPLE ID: ~~MW~~ 1005GWMMW010-U/F-MS/MSD **TIME:** 12:25

Final Low Flow Sampling Settings: PSI: — Charge: — sec Exhaust: — sec

Grundfos pump @ 85.00 Hz for last 40 minutes of purge.

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/23/10 Well ID: MMW010

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
11:36	24.43	] - recovery;	pump	turned	off				
11:38:12	21.28								
11:41		→	Pump	turned	on;	no	water	purged	
11:43	12.90	(Recovery)							
11:46	11.27	1 gpm	44.6	5.80	6.78	365.2	10.76	2311	37.18
11:48	11.72	1.0	46.6	6.96	6.71	365.7	6.24	2330	33.60
11:50	11.60	1.0	48.6	5.95	6.71	392.1	6.01	2344	26.98
11:51	11.58	1.0	49.6	5.74	6.70	384.5	6.01	2355	24.51
11:53	11.52	1.0	51.6	5.67	6.68	375.1	5.88	2362	21.33
11:56	11.48	1.0	54.6	5.62	6.68	370.8	5.51	2369	18.09
11:59	11.43	1.0	57.6	5.43	6.67	369.5	5.33	2411	16.76
12:04	11.42	1.0	63.6	5.07	6.63	370.7	4.87	2431	11.10
12:09	11.40	1.0	68.6	4.90	6.60	397.1	4.44	2443	8.82
12:13	11.39	1.0	72.6	4.83	6.59	388.6	4.24	2447	5.11
12:17	12.75	1.0	76.6	4.72	6.58	388.1	4.11	2452	4.70
12:21	12.65	1.0	79.6	4.71	6.58	392.5	4.05	2455	3.79

WELL SAMPLING FORM

Page: 1 of ____

Project No.: ____ Client: Monsanto Date: 5/16/2010 Well ID: MMW011

Task: (GW Sampling) Field Crew: W. Welzenbach, L. McKay

Measuring Point (MP): Plate for pump connector Water Level (WL): ~~12.50~~ 89.79 ft below MP

Sampling Method (see applicable calculations below): Low Flow Sampling Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 7.72 Starting PSI = (½ WL + 20): 65
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): ____ ft below MP Water Height (H): ____ ft below MP Casing Radius (r): ____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ____ gal Required Run Time: ____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
17:43	Calibration/Reading check				7.04 4.04 10.07	230.0 (230)	7.22 mg/L 80.3 %	1413	(0.02) 0.01
18:10	89.82		0.25	11.71	7.82	289.7	8.73	801	3.71
18:15	89.83	0.1	0.75	9.94	7.39	292.4	8.97	788	3.35
18:20	89.83	0.07	1.1	9.63	7.37	298.7	8.72	784	3.29
18:25	89.84	0.13	1.75	9.02	7.35	298.2	8.65	783	4.83
18:30	89.85	0.1	2.2	8.75	7.34	311.3	9.05	783	2.81
18:35	89.86	0.2	3.0	8.66	7.34	321.9	9.05	781	3.60
18:38	89.86	0.2	3.5	8.55	7.34	326.8	9.04	781	3.93
18:45	89.87	0.15	4.5	8.31	7.32	337.1	9.04	781	3.45
18:50	89.87	0.2	5.4	8.31	7.32	342.9	8.71	779	3.60
18:55	89.88	0.15	6.1	8.25	7.31	346.9	8.75	778	3.29
19:00	89.89	0.15	6.8	8.17	7.31	352.5	8.76	778	4.51

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
19:15	89.90	0.15	9.2	8.05	7.30	367.1	8.75	776	4.27

SAMPLE ID: 1005GWMMW011-4/F **TIME:** 19:20

Final Low Flow Sampling Settings: PSI: 75 Charge: 4 sec Exhaust: 15 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/16/10 Well ID: MMW011

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
19:05	89.88	1.5	7.6	8.08	7.30	358.9	8.71	777	3.16
19:10	89.89	0.2	8.5	8.09	7.31	364.4	8.67	777	4.49
19:15	89.90	0.15	9.2	8.05	7.30	367.1	8.75	776	4.27

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/17/10 Well ID: MMW012

Task: _____ Field Crew: W. Welzenbach, L. McKay

Measuring Point (MP): Pump plate connector Water Level (WL): Dry @ 60.97 ft below MP

Sampling Method (see applicable calculations below): N/A Device: N/A

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): N/A Starting PSI = (½ WL + 20): N/A
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)

SAMPLE ID: _____ **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/20/10 Well ID: MMW013

Task: _____ Field Crew: Levi McKay, Wilhelm Welzenbach

Measuring Point (MP): Top of pump connector plate Water Level (WL): 3.41 ft below MP

Sampling Method (see applicable calculations below): low flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2.86 Starting PSI = (½ WL + 20): 22
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
17:00	Calibration			12.71	7.00→7.00 4.00→4.00 10.00→10.01	227→227	8.46mg/L 7.01	1413→1413	1000→994.3/1002 0.02→0.05
17:17	3.43	—	0.7	7.02	7.10	321.0	10.69	801	1.00
17:20	3.45	0.27	1.5	6.33	7.03	323.2	10.56	803	0.59
17:25	3.44	0.18	2.4	6.16	7.00	325.7	10.40	803	0.29
17:30	3.44	0.22	3.5	6.17	6.99	330.5	10.35	803	0.44
17:35	3.45	0.2	4.5	6.10	6.97	339.0	10.27	803	0.73
17:40	3.46	0.34	6.2	6.02	6.96	363.6	11.16	804	0.26
17:45	3.49	0.76	10.0	6.18	6.95	389.1	10.98	802	0.31
17:50	3.51	0.74	13.7	6.20	6.94	408.4	10.87	801	0.39
17:55	3.53	0.52	16.3	6.28	6.94	422.1	10.81	800	0.37
18:00	3.51	0.60	19.3	6.28	6.93	428.9	10.82	799	1.34

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
18:05	3.51	0.62	22.4	6.30	6.93	425.7	10.83	799	0.65

SAMPLE ID: 100SGWMMW013-U/F-MS-MSD **TIME:** 18:10

Final Low Flow Sampling Settings: PSI: 15 Charge: 5 sec Exhaust: 10 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: _____ Date: 5/20/10 Well ID: MMW013

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
18:05	3.51	0.62	22.4	6.30	6.93	425.7	10.83	799	0.65

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/22/10 Well ID: MW015A

Task: _____ Field Crew: Levi McKay, Wilhelm Welzenbach

Measuring Point (MP): Top of Pump Connector Plate Water Level (WL): 21.45 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2.7 Starting PSI = (½ WL + 20): 30

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

Pump set at 28 ft. below mp.

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr

H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
12:15 ~~14.05~~	21.33*	calib	ration	9.5	7.00→7.00 4.00→4.00	230→230	9.67 (75.3%)	1413→1413	1000→1002 0.02→0.01
12:40	21.70	—	0.9	5.25	10.00→9.99 6.70	521.6	7.52	1780	2.00
12:45	21.68	0.02	1.0	5.20	6.67	515.1	4.87	1784	2.31
12:50	21.64	0.04	1.2	4.92	6.65	509.3	5.71	1785	2.13
12:55	21.64	0.02	1.3	4.71	6.64	508.8	5.60	1789	2.88
13:00	21.64	0.02	1.4	4.55	6.63	505.3	5.84	1790	2.77
13:05	21.64	0.02	1.5	4.50	6.68	510.6	5.81	1794	2.57
13:10	21.65	0.04	1.7	4.49	6.64	518.7	5.92	1795	2.34
13:15	21.65	0.04	1.9	4.52	6.67	542.9	5.89	1797	3.25
13:20	21.65	0.04	2.1	5.00	6.66	552.9	5.99	1795	2.86
13:25	21.65	0.04	2.3	5.36	6.70	557.9	6.09	1800	2.32
13:30	21.65	0.03	2.45	5.58	6.69	549.6	5.90	1802	2.62

Continue stabilization readings on additional pages if necessary

* Prior to pumping, after placing decon'd pump into well.

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
13:40	21.64	0.04	2.7	5.99	6.72	547.4	5.76	1807	2.76

Air temp. = 39°F

SAMPLE ID: 1005 GW MW015A-U/F **TIME:** 13:50

Final Low Flow Sampling Settings: PSI: 30 Charge: 3 sec Exhaust: 20 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/22/10 Well ID: MMW015A

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
13:35	21.64	0.02	2.5	5.84	6.71	549.7	5.95	1804	2.71
13:40	21.64	0.04	2.7	5.99	6.72	547.4	5.76	1807	2.76

WELL SAMPLING FORM

Page: 1 of ____

Project No.: ____ Client: Monsanto Date: 5/21/10 Well ID: MW-16A

Task: GW Sampling Field Crew: L. Fahey, T. Browning

Measuring Point (MP): TOC Water Level (WL): 8.1 ft below MP

Sampling Method (see applicable calculations below): low flow Device: peristaltic

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): ____ Starting PSI = (½ WL + 20): ____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): ____ ft below MP Water Height (H): ____ ft below MP Casing Radius (r): ____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ____ gal Required Run Time: ____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

TD= 37.75

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1828	8.10	begin purge							
1833	8.27			5.55	7.10	91.3	8.10	1872	53
1838	8.45								
1843	8.53			5.72	6.79	39.1	2.00	2012	76.4
1848	8.58			5.60	6.84	25.5	1.81	2012	26.7
1853	8.51		1.7	5.56	6.90	14.7	1.68	2013	23.2
1910	8.48		2.8	5.34	7.01	1.8	2.10	1918	15.46
1915	8.47	0.04	3	5.40	7.08	-1.9	1.65	1906	10.17
1920	8.47	0.04	3.2	5.47	7.13	-6.0	1.57	1865	12.06
1925	8.47	0.05	3.5	5.49	7.17	-11.0	1.48	1862	10.58
1930	8.45	0.05	3.75	5.42	7.20	-13.7	1.44	1838	8.11
1935	8.45	0.05	4	5.36	7.22	-12.2	1.38	1800	6.06

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1955	8.41	0.04	4.8	5.06	7.30	-15.7	1.27	1764	4.06

SAMPLE ID: 1005GWMW-16A-U/F TIME: 2010

Final Low Flow Sampling Settings: PSI: ____ Charge: ____ sec Exhaust: ____ sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/21/10 Well ID: MW-16A

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1940	8.44	0.04	4.2	5.30	7.25	-13.0	1.35	1780	8.11
1945	8.42	0.04	4.4	5.24	7.28	-14.6	1.34	1778	4.40
1950	8.42	0.04	4.6	5.13	7.29	-14.7	1.31	1770	4.01
1955	8.41	0.04	4.8	5.06	7.30	-15.7	1.27	1764	4.06
ck.soln 2200		check		17.9	7.13	244.5	64.0 @ 583.4	7872	

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/16/10 Well ID: MMW017

Task: (GW Sampling) Field Crew: W. Walzenbach, L. McKay

Measuring Point (MP): Plate for pump connector Water Level (WL): 37.06 ft below MP

Sampling Method (see applicable calculations below): Low flow Device: Bladder pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 4.36 Starting PSI = (½ WL + 20): 50
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (Not Applicable)

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
8:00	calibration	—	—	8.5	4.00, 7.00, 9.19	230.0	9.47 (80%)	1413	1000 0.02
8:22	37.32	~~0.75L~~	0.75L	6.94	7.01	325.5	5.86	1300	1.47
8:28	37.24	0.04	1.0 L	7.16	6.80	333.6	5.54	1308	0.83
8:38	37.36	0.10	2.0	7.32	6.66	346.1	5.80	1337	0.51
8:48	37.34	0.02	2.2	7.69	6.65	350.6	5.27	1338	0.58
8:58	37.30	0.01	2.3	8.69	6.66	354.4	5.22	1335	0.34
9:03	37.30	0.01	2.4	8.95	6.66	355.6	5.31	1335	0.31
9:08	37.31	0.01	2.5	9.34	6.66	356.9	5.30	1336	0.17
9:13	37.31	0.01	2.6	9.20	6.66	358.5	5.27	1339	0.22
9:18	37.34	0.02	2.8	9.04	6.66	360.7	5.33	1338	0.30
9:23	37.34	0.02	3.0	9.30	6.66	361.9	5.21	1336	0.26
9:28	37.33	0.02	3.2	9.69	6.66	362.1	4.84	1336	0.52

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
10:02	37.34	0.02	4.5	11.50	6.70	364.4	5.03	1333	0.24

SAMPLE ID: 1005 GW MMW017 - U/F **TIME:** 10:10

Final Low Flow Sampling Settings: PSI: 40 Charge: 1.5 sec Exhaust: 25 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/16/10 Well ID: MMW017

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
9:33	37.34	0.02	3.4	10.29	6.67	362.7	5.13	1335	0.24
9:38	37.34	0.02	3.6	10.35	6.67	362.9	5.08	1336	0.34
9:44	37.35	0.02	3.8	10.34	6.67	363.7	5.03	1336	0.24
9:48	37.35	0.02	4.0	10.43	6.68	364.4	4.93	1336	0.16
9:53	37.34	0.02	4.2	10.81	6.68	364.8	4.93	1330	0.71
9:58	37.33	0.02	4.4	11.26	6.69	364.7	4.95	1332	0.34

WELL SAMPLING FORM

Page: 1 of ____

Project No.: ____ Client: Monsanto Date: 5/15/10 Well ID: MMW01B

Task: (GW Sampling) Field Crew: L. Fohrig, W. Welzenbach, L. McKay

Measuring Point (MP): Plate for pump connection Water Level (WL): 10.37 ft below MP

Sampling Method (see applicable calculations below): low-flow Device: bladder pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2.8 Starting PSI = (½ WL + 20): ____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): ____ ft below MP Water Height (H): ____ ft below MP Casing Radius (r): ____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ____ gal Required Run Time: ____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10 (250.0)	+/- 0.2 (604.5 mg/L)	+/- 3%	≤ 5
1400	cal			12.72	7.00	229.7	79.4	1412	1000
1405	check				10.01				0.01 0.02
					4.02				
1416	10.45	0							
1419	10.54								
1433	10.63	750 ml	0.75	8.1	6.96	-454.5	7.36	814	0.57
1443	10.54	0.125	2	9.9	7.05	-445.2	7.12	817	0.65
1450	10.44		2.2	11.61	7.16	-438.5	6.93	819	0.51
1455	10.58	0.16	3	9.52	7.18	-430.1	7.00	816	0.96
1500	10.5	0.12	3.6	11.29	7.17	-401.9	6.83	818	
1505	10.57	0.04	3.8	9.47	7.19	-399.3	7.02	818	1.03
1510	10.61	0.14	4.5	8.67	7.18	-393.5	7.06	816	1.02
Continue stabilization readings on additional pages if necessary									
1515	10.61	0.15	5.75	8.63	7.11	-390.5	7.21	814	0.62

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1515	10.61	0.15	5.75	8.63	7.11	-390.5	7.21	814	0.62

SAMPLE ID: 1005GWMMW01B-1-2-U/F **TIME:** 1520(1) 1530(2)

Final Low Flow Sampling Settings: PSI: 35 Charge: 2 sec Exhaust: 24 sec

WELL SAMPLING FORM

Page: 1 of ____

Project No.: ____ Client: Monsanto Date: 5/17/10 Well ID: MMW020

Task: ____ Field Crew: Vilhelm Welzenbach, Levi McCay

Measuring Point (MP): Top of PVC casing Water Level (WL): 285.13 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: dedicated bladder pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 25.2 Starting PSI = (½ WL + 20): 163
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (Not Applicable)

Total Depth (TD): ____ ft below MP Water Height (H): ____ ft below MP Casing Radius (r): ____ ft

Three Purge Volumes = 3*[Pi * r^2* H * 7.48]: ____ gal Required Run Time: ____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
15:03	Calibration/Readings			17.22	7.0→6.99 10.0→10.01 4.0→4.01	(230) 236	78.1 % 7.23	(1413) 1411	1000→998 0.02→0.01
15:24	285.15	—	1.8	9.92	6.25	-362.3	4.12	828	0.44
15:30	285.15	0.5	4.7	9.20	6.45	-378.5	1.35	826	0.38
15:35	285.15	0.4	6.7	9.12	6.62	-377.6	1.33	797	2.55
15:40	285.15	0.4	8.7	9.08	6.67	-378.3	1.40	794	1.53
15:45	285.14	0.5	11.0	9.05	6.70	-379.2	1.30	794	1.22
15:50	285.14	0.5	13.2	9.07	6.72	-378.5	1.23	794	0.80
15:55	285.15	0.4	15.3	9.10	6.76	-379.2	1.17	795	1.63
16:00	285.14	0.4	17.5	9.09	6.78	-377.0	1.11	795	3.15
16:05	285.14	0.5	20.0	9.07	6.81	-374.2	1.08	794	1.21
16:10	285.14	0.4	22.1	8.97	6.80	-363.1	1.02	795	0.75
16:15	285.15	0.4	24.2	8.99	6.80	-276.8	0.97	796	0.53

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
16:35	285.15	0.4	33.1	9.00	6.79	-145.6	0.90	796	0.41

SAMPLE ID: 1005GWMMW020-1/2/MS-U/F ~~-1/2/MS U/F~~ TIME: 16:40

Final Low Flow Sampling Settings: PSI: 190 Charge: 9 sec Exhaust: 20 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Page: 2 of ____

Project No.: _____ Client: Monsanto Date: 5/17/10 Well ID: MW-020

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
16:20	285.15	0.4	26.4	9.07	6.79	-122.0	0.96	796	0.47
16:25	285.15	0.4	28.5	9.07	6.80	-136.1	0.94	798	0.49
16:30	285.15	0.5	31.0	9.03	6.81	-142.9	0.89	796	0.45
16:35	285.15	0.4	33.1	9.00	6.79	-145.6	0.90	796	0.41

WELL SAMPLING FORM

Page: 1 of ____

Project No.: ____ Client: Monsanto Date: 5/18/10 Well ID: MMW021

Task: ____ Field Crew: W. Welzenbach, L. McKay

Measuring Point (MP): Top of pump connector plate Water Level (WL): 212.27 ft below MP

Sampling Method (see applicable calculations below): Low flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 15.5 Starting PSI = (½ WL + 20): 126
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (Not Applicable)

Total Depth (TD): ____ ft below MP Water Height (H): ____ ft below MP Casing Radius (r): ____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ____ gal Required Run Time: ____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
15:37	Calibration / Reading			11.37	7.0 → 6.98 10.0 → 9.99 4.0 → 3.98	(230) 228.0	78.7% 7.84 mg/L	(1413) 1412	1000 → 1020 0.02 → 0.02
16:05	212.54	—	0.500	8.64	6.62	239.4	7.04	695	0.64
16:10	212.54	0.3	2.0	8.80	6.82	313.1	5.89	699	0.89
16:16	212.54	0.3	4.7	8.91	7.02	383.8	5.60	701	0.95
16:20	212.54	0.3	5.7	8.90	7.05	377.7	5.60	701	0.50
16:25	212.54	0.3	7.4	8.89	7.08	377.0	5.49	701	0.22
16:30	212.54	0.3	9.0	8.87	7.10	385.9	5.49	701	0.27
16:35	212.55	0.3	10.7	8.87	7.11	460.5	6.22	701	1.49
16:40	212.54	0.4	12.5	8.89	7.12	441.5	5.52	700	0.14
16:45	212.55	0.3	14.2	8.91	7.13	446.5	5.58	700	0.20
16:50	212.54	0.3	15.9	8.92	7.14	450.1	5.48	700	0.26

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
16:50	212.54	0.3	15.9	8.92	7.14	450.1	5.48	700	0.26

SAMPLE ID: 1005 GW MMW021-U/F **TIME:** 16:55

Final Low Flow Sampling Settings: PSI: 150 Charge: 7 sec Exhaust: 15 sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/22/10 Well ID: MMW022

Task: _____ Field Crew: W. Welzenbach, L. Mokay

Measuring Point (MP): Top of pump plate connection Water Level (WL): 207.09 ft below MP
207.23 ft, btc

Sampling Method (see applicable calculations below): Low flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 20.4 Starting PSI = (½ WL + 20): 124
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
9:10	Calibration →			10.36	7.0→7.00 10.0→10.00 4.0→4.00	(230) 223.2	77.3 %	(1413) 1409	100.0 → 100.0 0.00 → 0.01
9:45	207.27	—	0.9	5.98	6.42	268.2	4.89	1721	7.50
9:50	207.29	0.42	3.0	6.23	6.75	263.2	4.95	1748	3.32
9:55	207.33	0.54	5.7	6.43	6.92	266.7	5.06	1769	2.56
10:00	207.35	0.36	7.5	6.43	6.96	268.9	4.93	1773	3.27
10:05	207.35	0.50	10.0	6.42	6.99	272.2	4.81	1773	3.83
10:10	207.35	0.46	12.3	6.83	7.02	275.9	4.78	1773	3.37
10:15	207.36	0.46	14.6	6.38	7.04	280.0	4.71	1772	4.38
10:20	207.34	0.54	17.3	6.31	7.06	282.9	4.62	1772	4.34
10:25	207.35	0.42	19.3	6.20	7.07	285.2	4.48	1771	4.60
10:30	207.35	0.48	21.7	6.26	7.07	291.3	4.42	1770	4.55

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
10:30	207.35	0.48	21.7	6.26	7.07	291.3	4.42	1770	4.55

SAMPLE ID: 100560 MMW022-UIF-MS/MSD **TIME:** 10:35

Final Low Flow Sampling Settings: PSI: 125 Charge: 9 sec Exhaust: 13 sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/21/2010 Well ID: MMW 023

Task: _____ Field Crew: Levi McCay, Wilhelm Welzenbach

Measuring Point (MP): Top of Pump Connector Plate Water Level (WL): 107.72 ft below MP

Sampling Method (see applicable calculations below): ~~Bla~~ Low Flow Device: Dedicated Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 22.1 L Starting PSI = (½ WL + 20): 74
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (Not Applicable)

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
17:20	calibration			13.22	7.00→7.00 4.00→4.00 10.00→10.00	227→222	8.55 mg/L (78.6%)	1413→1413	0.02→0.01 1000→1003
17:40	107.72	—	0.80	8.54	7.04	191.1	1.89	1168	20.19
17:45	107.72	0.14	1.60	8.39	6.98	48.4	1.01	1108	5.69
17:50	107.74	0.37	3.25	8.34	6.98	-45.1	0.77	1084	3.09
17:55	107.74	0.53	5.9	8.36	6.98	-106.2	0.61	1072	2.89
18:00	107.74	0.84	9.1	8.40	7.00	-163.8	0.51	1077	17.19
18:05	107.72	0.32	10.7	8.41	6.99	-193.9	0.52	1079	3.42
18:10	107.72	0.20	11.7	8.36	7.02	-194.4	0.85	1084	1.71
18:15	107.72	0.22	12.8	8.31	6.97	-199.5	0.76	1094	1.18
18:20	107.72	0.20	13.8	8.27	6.97	-205.4	0.58	1111	0.99
18:25	107.74	0.44	16.0	8.31	6.97	-217.6	0.57	1115	1.50
18:30	107.73	0.40	18.0	8.33	6.98	-218.6	0.54	1120	0.80

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
18:45	107.74	0.40	24.0	8.30	6.99	-220.9	0.52	1111	0.70

SAMPLE ID: 1005 GW MMW 023-U/F **TIME:** 18:50

Final Low Flow Sampling Settings: PSI: 75 Charge: 5.5 sec Exhaust: 9 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/21/10 Well ID: MMW023

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
18:35	107.73	0.36	19.8	8.33	6.98	-219.5	0.53	1120	1.17
18:40	107.73	0.44	22.0	8.32	6.98	-220.2	0.53	1117	0.92
18:45	107.74	0.40	24.0	8.30	6.99	-220.9	0.52	1111	0.70

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/22/2010 Well ID: MMW025

Task: GW Sampling Field Crew: Lee McKay, W. Wehrenbach, T Fehrig, T Browning

Measuring Point (MP): Top of PVC casing Water Level (WL): 31.58 ft below MP

Sampling Method (see applicable calculations below): 3-Vol. Purge Device: Redi-flo 2 Grundfos pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 200 ft below MP Water Height (H): ~~3~~ 29.31 ft below MP Casing Radius (r): 0.3 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 330 gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
					700→700 4.00→4.00 10.00→10.00	230→230	980 (77.7%)	1413→1413	1000 → 991.8 0.02 → 0.03
16:55	29.31	Ø	Ø	(after removing bladder pump + installing electric pump)					
17:11	72.25	2.5	15	7.58	7.82	191.6	2.31	327	—
17:15	87.52	2.5	25	7.60	7.84	188.9	2.06	326	17.02
17:20	→	Pump	increased	to	400	Hz	—	—	—
↳	98.20	5.0	37.5	7.71	7.84	178.2	2.03	326	10.82
17:25	122.37	5.0	62.5	7.91	7.72	198.0	2.49	327	25.13
17:30	163.10	5.0	87.5	7.93	7.84	204.1	2.15	327	11.58
17:35	→	Pump	decreased	to	250.00	Hz	—	—	—
~~17:40~~									
17:37	→	Pump stopped;	dtw	=	180.04;	Cum purge	vol =	122.5 gal	
17:39	180.96								

7:05 – begin pumping @ 250.00 Hz

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)

SAMPLE ID: _____ **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

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WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/22/10 Well ID: MMW025

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
17:47	180.64	—	—	—	—	—	—	—	—
18:00	180.28	→ Pump set to 250.00 ltz							
18:01	180.50	→ Pump turned off							
18:11	179.90								

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/24/10 Well ID: MMW025

	STABILIZATION READINGS									
	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
	Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
5/24	1415	113.75								
5/25	0807	92.83								
5/25	0820	5/24 check			2.2	7.07	240.0	84.5% 9.49.5	7894	10.07
5/25	0830	cal			2.2	7.10	236	78.8	1413	10.01 =0.02

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/17/10 Well ID: MMW 027

Task: _____ Field Crew: Levi McKay, Wilhelm Welzenbach

Measuring Point (MP): top of pump connector plate Water Level (WL): 102.37 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: dedicated bladder pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 7.9 L Starting PSI = (½ WL + 20): 71
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (Not Applicable)

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL; Pi=3.1415; 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
18:00	Calibration	—	—	18.39*	7.00→7.06 4.00→7.48 10.00→9.99	238→230.0	7.41 7.98	1413→1413	1000→1000 0.02→0.02
18:10	102.41	—	—	9.08	7.16	317.2	5.91	1047	0.96
18:15	102.43	—	2.3	7.46	6.97	315.1	4.60	1033	0.86
18:20	102.45	0.5	4.6	7.24	6.94	321.7	4.42	1032	0.57
18:25	102.44	0.6	7.5	7.06	6.93	327.4	4.38	1032	0.83
18:30	102.45	0.6	10.6	6.95	6.93	330.4	4.23	1032	0.60

Continue stabilization readings on additional pages if necessary

* Ambient air temperature.

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
18:30	102.45	0.6	10.6	6.95	6.93	330.4	4.23	1032	0.60

SAMPLE ID: 1005GWMMW027-U/F **TIME:** ~~1835~~ 18:35 LM

Final Low Flow Sampling Settings: PSI: 80 Charge: 7 sec Exhaust: 11 sec

WELL SAMPLING FORM

Page: 1 of 2

Project No.: _____ Client: Monsanto Date: 5/16/10 Well ID: MMW 028

Task: (Groundwater Sampling) Field Crew: L. McKay, W. Welzenbach

Measuring Point (MP): top of pump connector plate Water Level (WL): 75.28 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: dedicated bladder pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 6.4 L Starting PSI = (½ WL + 20): ~~48~~ 58
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (Not Applicable)

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
	Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
	10:58	calibration	—	—	15.44	7.00 10.01, 4.00	228.9	7.16 (77.6%)	1411	0.02 1000
14:58	~~14:58~~	75.28	—	3.0	7.62	7.74	-148.4	22.87	1099	2.47
15:03	~~14:03~~	75.28	—	—	7.99	7.55	-17.2	8.56	1107	1.27
15:05	~~14:05~~	75.28	1.0	10.0	7.95	7.59	-7.3	8.57	1100	0.80
15:08	~~14~~	75.28	1.0	13.0	7.87	7.59	-5.5	8.85	1100	0.27
	15:10	75.28	0.5	14.0	7.92	[illegible]8	3.7	8.81	1099	0.31
	15:15	75.28	0.3	15.5	8.00	7.57	1.4	8.33	1100	0.20
	15:20	75.28	0.4	17.7	7.93	7.55	-7.2	8.10	1101	0.17
	15:25	75.28	0.2	18.8	8.50	7.57	-10.7	7.89	1097	0.18
	15:30	75.28	0.1	19.3	9.39	7.56	-125.5	7.71	1096	0.13
	15:35	75.28	0.1	19.8	9.78	7.57	-114.4	7.45	1098	0.20
	15:40	75.28	0.1	20.3	10.10	7.61	110.8	7.87	1104	0.35

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)

SAMPLE ID: 1005GWMMW028-U/F (and MS) **TIME:** 16:35

Final Low Flow Sampling Settings: PSI: 60 Charge: 3 sec Exhaust: 21 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/16/10 Well ID: MMW028

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
15:45	75.28	0.1	20.8	10.18	7.58	236.2	7.75	1102	0.48
15:50	75.28	0.1	21.3	10.15	7.60	250.6	7.74	1102	0.16
15:55	75.27	0.1	21.8	9.95	7.58	262.1	7.61	1102	0.22
16:00	75.28	0.1	22.2	10.02	7.58	262.8	7.54	1101	0.18
16:05	75.28	0.1	22.7	9.93	7.56	240.4	7.73	1098	0.97
16:10	75.27	0.1	23.1	10.17	7.59	257.2	7.81	1098	0.91
16:15	75.27	0.1	23.5	10.14	7.71	256.8	7.72	1099	0.36
16:20	75.27	0.1	24.1	10.33	7.56	242.1	7.53	1098	0.36
16:25	75.27	0.1	24.6	10.53	7.56	246.3	7.38	1097	0.31
16:30	75.27	0.1	25.1	10.71	7.60	240.5	7.49	1098	0.43

WELL SAMPLING FORM

Page: 1 of ____

Project No.: ____ Client: Monsanto Date: 5/15/10 Well ID: MMW029

Task: (GW Sampling) Field Crew: L. Fuhrig, W. Welzenbach, L. McKay

Measuring Point (MP): plate for pump connector Water Level (WL): 18.63 ft below MP @ 16:14

Sampling Method (see applicable calculations below): low flow Device: bladder

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 4.3 Starting PSI = (½ WL + 20): 50
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): ____ ft below MP Water Height (H): ____ ft below MP Casing Radius (r): ____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ____ gal Required Run Time: ____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1614	18.63	0	0						
1625	18.71		1	8.02	7.36	-522.1	6.70	3996	0.49
1632	18.78		2.25	7.15	7.20	-494.4	6.63	3008	0.53
1637	18.79	0.33	3.9	7.01	7.16	-481.7	6.60	3009	0.35
1642	18.81	0.38	5.8	6.72	7.14	-466.1	6.70	3011	0.26
1647	18.82	0.38	7.7	6.43	7.12	-456.1	6.55	3010	0.24
1652	18.83	0.38	10	6.44	7.1	-447.6	6.53	3008	0.27
1657	18.84	0.50	12.5	6.47	7.09	-364	6.60	3009	0.20
1702	18.84	0.50	15	6.48	7.08	-371.2	6.67	3008	0.23
1707	18.85	0.50	17.5	6.44	7.07	-374.7	6.68	3007	0.45
1712	18.85	0.50	20	6.43	7.06	-376.0	6.59	3006	0.59

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1712	18.85	0.50	20	6.43	7.06	-376.0	6.59	3006	0.59

SAMPLE ID: 1005 GW MMW029-U/F **TIME:** 1720

Final Low Flow Sampling Settings: PSI: 50 Charge: 5 sec Exhaust: 17 sec

WELL SAMPLING FORM

Page: 1 of ____

Project No.: _____ Client: Monsanto Date: 5/16/10 Well ID: MMW-030

Task: _____ Field Crew: _____

Measuring Point (MP): _____ Water Level (WL): 25.42 ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Total Depth = 159.1 ft.

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 159.1 ft below MP Water Height (H): 133.7 ft below MP Casing Radius (r): 0.33 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ~~2.54~~ 262 gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
10:58	Calibration	—	—	15.44	7.00 10.01 4.00	228.9	7.66 (77.6%)	1411	0.02 1000

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)

SAMPLE ID: _____ **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of ____

Project No.: ____ Client: Monsanto Date: 5/17/10 Well ID: MMW031

Task: (Groundwater Sampling) Field Crew: Levi McKay, Wilhelm Welzenbach

Measuring Point (MP): top of pump connector plate Water Level (WL): 97.10 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: dedicated bladder pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 12.7 Starting PSI = (½ WL + 20): 69
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (Not Applicable)

Total Depth (TD): ____ ft below MP Water Height (H): ____ ft below MP Casing Radius (r): ____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ____ gal Required Run Time: ____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
9:20	Calibration				7.0→6.99 10.0→10.00 4.0→4.00	230→229.0	~~(1413)~~ 60.9 (1413) ~~1411~~ (998) 1411	0.02→0.01 1000→1001	
9:40 ~~9:29~~	97.14	—	0.8	9.99	6.52	323.8	10.28	533	2.30
9:46	97.17	0.2	1.7	9.47	6.66	321.0	10.40	518	1.17
9:50	97.18	0.3	3.0	9.15	6.99	312.4	9.21	515	6.28
9:55	97.15	0.2	3.9	9.47	7.23	304.1	8.81	509	10.60
10:00	97.14	0.1	4.5	10.02	7.33	299.6	8.06	508	0.71
10:05	97.12	0.1	4.8	10.85	7.44	294.7	8.20	511	0.74
10:10	97.14	0.2	5.6	9.91	7.53	292.9	8.28	510	0.49
10:15	97.15	0.1	6.3	9.88	7.56	292.9	8.51	514	1.53
10:20	97.15	0.2	7.2	9.61	7.56	294.5	8.58	514	1.21
10:25	97.15	0.2	8.2	9.27	7.58	296.1	8.63	512	0.88
10:30	97.15	0.2	9.4	9.43	7.62	296.0	8.53	512	0.49

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
10:45	97.15	0.2	12.8	9.49	7.67	297.5	8.44	513	0.30

SAMPLE ID: 1005GWMMW031 - U/F **TIME:** 10:50

Final Low Flow Sampling Settings: PSI: 120 Charge: 5 sec Exhaust: 14 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Page: 2 of ____

Project No.: _____ Client: Monsanto Date: 5/17/10 Well ID: MMW 031

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
10:35	97.15	0.2	10.5	9.78	7.62	297.1	8.33	512	1.08
10:40	97.15	0.2	11.6	9.50	7.66	296.2	8.48	513	0.50
10:45	97.15	0.2	12.8	9.49	7.67	297.5	8.44	513	0.30

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/20/10 Well ID: MMW032

Task: _____ Field Crew: W. Welzenbach, L. McKay

Measuring Point (MP): Top of Pump Connector Plate Water Level (WL): 16.42 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 4.8 Starting PSI = (½ WL + 20): 28
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (Not Applicable)

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
13:22	Calibration →			12.72	7.0→6.99 10.0→10.01 4.0→3.98	(227) 226.9	79.4% 9.01 mg/L	(1413) 1414	1000→994.2 0.02→0.01
13:33	17.09	—	0	→ Water level after removing pump					
					to	check	seals / decon.		
13:48	17.38	—	0.7	6.62	7.63	235.6	16.42	118	3.47
13:56	17.66	0.1	1.3	6.42	7.17	324.1	8.30	360	6.55
14:01	17.85	0.1	1.7	~~7.25~~ 6.31	7.25	319.5	7.14	410	9.77
14:05	18.01	0.1	2.3	6.38	7.29	318.1	7.01	420	11.63
14:10	18.26	0.1	2.7	6.32	7.31	318.8	6.63	424	13.76
14:15	18.34	0.06	3.0	6.73	7.35	320.6	6.43	425	12.63
14:20	18.39	0.02	3.1	6.94	7.37	328.9	6.37	425	10.18
14:25	18.44	0.06	3.4	7.00	7.38	390.6	6.49	427	12.78
14:30	18.50	0.02	3.5	7.08	7.38	369.5	6.34	427	12.65

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
15:45	19.30	0.02	6.00	8.23	7.43	516.1	5.88	429	4.52

SAMPLE ID: 1005GWMMW032-U/F **TIME:** 15:55

Final Low Flow Sampling Settings: PSI: 40 Charge: 3 sec Exhaust: 20 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: _____ Date: 5/20/2010 Well ID: MMW032

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
14:37	18.61	0.04	3.75	7.19	7.39	373.6	6.31	427	12.29
14:40	18.63	0.03	3.90	7.20	7.39	376.6	6.20	428	12.76
14:46	18.69	~~0.06~~ 0.05	4.20	7.13	7.40	384.9	6.26	428	13.70
14:51	18.74	0.01	4.24	7.28	7.40	390.5	6.28	428	13.72
14:56	18.79	0.03	4.40	7.28	7.41	399.8	6.24	428	12.61
15:00	18.84	0.02	4.50	7.12	7.43	424.1	6.22	428	9.43
15:05	18.89	0.04	4.70	7.07	7.38	415.2	6.32	428	9.85
15:10	18.94	0.02	4.80	7.15	7.40	420.7	6.29	428	8.32
15:15	18.99	0.04	5.00	7.28	7.40	428.8	6.23	428	~~8.58~~ 6.24
15:20	19.03	0.05	5.25	7.42	7.41	430.4	6.21	428	~~6.2~~ 5.66
15:25	19.04	0.03	5.40	7.61	7.43	479.0	5.97	428	5.63
15:30	19.14	—	~~5.57~~	7.72	7.43	496.7	5.89	428	5.57
15:35	19.23	0.03	5.70	7.87	7.42	514.5	~~2.58~~ 5.70	429	~~5.30~~ 4.76
15:40	~~19.50~~	0.02	5.80	8.07	7.42	520.7	5.86	429	4.56
15:45	19.30	0.02	6.00	8.23	7.43	516.1	5.88	429	4.52

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/20/10 Well ID: MMW033

Task: _____ Field Crew: W. Welzenbach, L. McKay

Measuring Point (MP): Top of Pump Connector Plate Water Level (WL): 11.09 ft below MP

Sampling Method (see applicable calculations below): Low flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 9.7 Starting PSI = (½ WL + 20): 20.5
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (Not Applicable)

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
7:37	Calibration →			14.14	7.0→7.00 10.0→10.00 4.0→3.98	(227) 225.0	~~97.6%~~ 8.88 mg/L	(1413) 1415	1000→1002 0.02→0.05
9:33	11.13	—	0						
9:40	11.36	0.2	1.1	4.63	6.92	-165.9	5.21	497	0.75
9:45	11.37	0.04	1.3	4.50	7.09	-88.5	4.31	500	1.25
9:50	11.48	0.04	1.5	4.47	7.26	-40.2	4.08	507	3.64
9:55	11.51	0.05	1.75	4.61	7.44	-7.5	3.92	521	5.83
10:00	11.64	0.10	2.25	4.79	7.81	-7.0	3.42	546	11.63
10:05	11.75	0.10	2.75	4.70	8.09	-23.3	3.32	565	11.89
10:10	11.87	0.10	3.25	4.63	8.25	-7.8	3.21	575	11.55
10:15	11.98	0.10	3.75	4.49	8.33	6.2	3.11	581	10.59
10:20	12.05	0.10	4.25	4.46	8.36	5.9	2.94	582	10.63
10:25	12.13	0.10	4.75	4.48	8.38	10.5	2.84	582	9.24

Calibrated @ MMW032 (not used)

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
12:10	12.60	0.02	13.3	5.46	8.49	213.9	2.11	584	7.23

SAMPLE ID: ~~MMW033~~ 1005GWMMW033-W/F **TIME:** 12:15

Final Low Flow Sampling Settings: PSI: 90 Charge: 3.5 sec Exhaust: 20 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/20/10 Well ID: MMW033

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
10:30	12.20	0.10	5.25	4.49	8.40	-1.9	2.72	582	9.14
10:35	12.29	0.10	5.75	4.48	8.40	-16.7	2.65	582	11.80
10:40	12.34	0.10	6.25	4.47	8.41	-22.0	2.60	582	4.98
10:45	12.39	0.10	6.75	4.50	8.41	-20.5	2.58	582	7.66
10:50	12.45	0.10	7.25	4.59	8.42	-14.9	2.46	582	7.53
10:55	12.52	0.10	7.75	4.69	8.44	-13.5	2.40	582	6.12
11:00	12.58	0.10	8.25	4.73	8.45	-20.7	2.36	583	6.10
11:05	12.63	0.10	8.75	4.85	8.46	-19.9	2.27	583	5.26
11:10	12.67	0.10	9.25	4.87	8.47	-18.1	2.25	584	5.77
11:15	12.72	0.10	9.75	4.89	8.47	-15.3	2.13	584	5.73
11:20	12.74	0.10	10.25	4.91	8.47	-17.1	2.14	584	5.95
11:25	12.80	0.10	10.75	5.05	8.47	-16.5	2.12	583	6.50
11:30	12.84	0.10	11.25	4.95	8.49	-15.7	2.02	584	6.97
11:35	12.85	0.13	11.9	4.99	8.48	29.3	2.09	584	7.27
11:40	12.83	0.06	12.2	5.07	8.48	36.6	2.11	584	7.02
11:45	12.83	0.08	12.6	5.09	8.49	27.8	2.09	584	7.01
11:50	12.78	0.02	12.7	5.11	8.57	130.0	2.10	584	7.19
(WW) ~~11:55~~ 12:00	12.68	~~0.02~~ 0.02	12.8	5.21	8.50	210.2	2.13	584	7.32
12:05	12.63	0.08	13.2	5.38	8.49	210.9	2.10	584	7.38
12:10	12.60	0.02	13.3	5.46	8.49	213.9	2.11	584	7.23

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/21/10 Well ID: MMW 034

Task: _____ Field Crew: Wilhelm Welzenbach, Levi McKay

Measuring Point (MP): Top of pump connector plate Water Level (WL): 11.59 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump
(150 ft. to pump intake)

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 10.0 Starting PSI = (½ WL + 20): 26
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (not applicable)

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
8:25	Calibration →			9.67	7.0→7.00 10.0→10.06 4.0→3.97	(232) 228.5	78.1 % 9.3 mg/L	(1413) 1428	1000→1001 0.02→0.01
9:05	11.71	—	0.7	5.45	6.35	268.0	9.29	877	0.80
9:10	11.69	0.22	1.8	6.06	6.83	292.2	9.17	863	4.37
9:15	11.67	0.20	2.8	6.10	6.98	311.0	9.66	852	2.89
9:20	11.67	0.12	3.4	6.14	7.06	329.6	9.72	851	1.67
9:25	11.66	0.14	4.1	6.15	7.10	336.1	9.57	850	0.91
9:30	11.66	0.18	5.0	6.06	7.14	359.4	9.27	850	0.91
9:35	11.66	0.16	5.8	6.10	7.16	360.3	9.75	849	0.94
9:40	11.66	0.14	6.5	6.15	7.18	393.4	9.08	848	0.92
9:45	11.66	0.16	7.3	6.25	7.19	412.6	8.90	846	1.12
9:50	11.66	0.14	8.0	6.39	7.21	433.9	8.91	846	0.78
9:55	11.66	0.16	8.8	6.43	7.22	475.9	8.87	846	0.50

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
10:10	11.66	0.16	11.2	6.68	7.25	478.9	8.74	848	0.33

SAMPLE ID: ~~MW~~ 1005GWMMW034-1/2-U/F **TIME:** 10:20

Final Low Flow Sampling Settings: PSI: 100 Charge: 4 sec Exhaust: 14 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5/21/2010 Well ID: MW W034

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
10:00	11.65	0.16	9.6	6.44	7.24	486.2	8.75	847	0.87
10:05	11.66	0.16	10.4	6.53	7.24	494.7	8.80	848	0.40
10:10	11.66	0.16	11.2	6.68	7.25	478.9	8.74	848	0.33

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/21/10 Well ID: MMW035

Task: _____ Field Crew: Levi McCay, Wilhelm Welzenbach

Measuring Point (MP): Top of Pump Connector Plate Water Level (WL): 103.05 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Dedicated Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 12.3 L Starting PSI = (½ WL + 20): 72
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (Not Applicable)

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
11:40	Calibration			10.91	7.00→7.01 4.00→4.00 10.00→10.00	230→230	8.17 mg/L (76.7%)	1413→1413	0.02→0.01 1000→1002
11:50	103.06	—	0.6	9.41	7.37	358.0	12.73	752	3.05
11:55	103.06	0.12	1.2	8.32	7.14	385.1	4.33	1455	5.24
12:00	103.07	0.22	2.3	7.66	6.98	426.7	3.73	1484	2.53
12:05	103.06	0.26	3.6	7.42	6.95	461.1	3.82	1489	3.83
12:10	103.06	0.28	5.0	7.49	6.95	477.9	3.98	1490	3.17
12:15	103.06	0.44	7.2	7.44	6.92	499.8	3.87	1489	2.66
12:20	103.07	0.18	8.1	7.38	6.92	508.9	3.34	1490	2.01
12:25	103.06	0.28	9.5	7.34	6.91	540.2	3.23	1489	6.69
12:30	103.06	0.36	11.3	7.22	6.89	557.7	3.21	1489	1.91
12:35	103.06	0.22	12.4	7.34	6.88	557.8	3.25	1488	1.80
12:40	103.06	0.26	13.7	7.41	6.89	564.4	3.28	1487	1.35

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
12:40	103.06	0.26	13.7	7.41	6.89	564.4	3.28	1487	1.35

SAMPLE ID: 1005GW MMW035-U/F (- MS/MSD) **TIME:** 12:45

Final Low Flow Sampling Settings: PSI: 9.0 Charge: 6 sec Exhaust: 17 sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/21/10 Well ID: MMW036

Task: _____ Field Crew: W. Welzenbach, L. McKay

Measuring Point (MP): Top of pump connector plate Water Level (WL): 113.83 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 8.8 Starting PSI = (½ WL + 20): 77
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
13:45	Calibration	→		13.01	7.0 → 7.01 10.0 → 10.01 4.0 → 4.00	1227 224.3	80.4%	(1413) 1414	1000 → 1002 0.02 → 0.02
14:10	113.83	—	0.9	9.43	7.02	176.9	12.72	484	—
14:15	113.84	0.26	2.2	8.40	7.20	183.7	8.85	517	6.79
14:20	113.88	0.20	3.2	8.41	7.22	189.1	8.73	519	6.74
14:25	113.84	0.26	4.5	8.20	7.29	210.1	8.42	520	2.86
14:30	113.85	0.3	5.7	8.12	7.31	215.0	8.50	520	2.31
14:35	113.84	0.22	6.8	8.07	7.33	210.1	8.51	519	3.07
14:40	113.85	0.24	8.0	8.16	7.35	218.8	8.34	518	1.97
14:45	113.84	0.24	9.2	8.12	7.37	221.1	8.36	518	1.25
14:50	113.84	0.24	10.4	8.18	7.39	219.1	8.26	518	1.48

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
14.50	113.84	0.24	10.4	8.18	7.39	219.1	8.26	518	1.48

SAMPLE ID: 1005GWMMW036 - D/F **TIME:** 14:55

Final Low Flow Sampling Settings: PSI: 80 Charge: 6 sec Exhaust: 10 sec

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: _____ **COOLER #:** _____ **Page:** _____ **of** _____

SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2009 MW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Sb, As, Cd, Cr, Co, Cu, Pb, Mn, Ni, Se, Ag, Tl, U, Zn (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW032-U			WATER	X	X						X	X	X						X	
	1005GWMMW032-F			WATER						X					X	X		X	X		

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
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SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2009 MW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Sb, As, Cd, Cr, Co, Cu, Pb, Mn, Ni, Se, Ag, Tl, U, Zn (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW033-U			WATER	X	X						X	X	X						X	
	1005GWMMW033-F			WATER						X					X	X		X	X		

Comments/Instructions:

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LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2009 MW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Sb, As, Cd, Cr, Co, Cu, Pb, Mn, Ni, Se, Ag, Tl, U, Zn (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW034-1-U			WATER	X	X						X	X	X						X	
	1005GWMMW034-1-F			WATER						X					X	X		X	X		
	1005GWMMW034-2-U			WATER	X	X						X	X	X						X	
	1005GWMMW034-2-F			WATER						X					X	X		X	X		

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
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SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2009 MW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Sb, As, Cd, Cr, Co, Cu, Pb, Mn, Ni, Se, Ag, Tl, U, Zn (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW035-U			WATER	X	X						X	X	X						X	
	1005GWMMW035-F			WATER						X					X	X		X	X		

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
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SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2009 MW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Sb, As, Cd, Cr, Co, Cu, Pb, Mn, Ni, Se, Ag, Tl, U, Zn (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW036-U			WATER	X	X						X	X	X						X	
	1005GWMMW036-F			WATER						X					X	X		X	X		

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
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SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Dissolved Cd, Se (EPA6020A)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMBW006-U			WATER			X						X								
	1005GWMBW006-F			WATER				X									X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
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SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMBW009-U			WATER			X						X								
	1005GWMBW009-F			WATER				X									X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		**MWH**	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

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SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Dissolved Cd, Se (EPA6020A)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMBW011-U			WATER			X						X								
	1005GWMBW011-F			WATER				X									X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condi

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES: Retained by Sampler, Sent to Office**

MWH USE ONLY:

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

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SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Dissolved Cd, Se (EPA6020A)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMBW026-U			WATER			X						X								
	1005GWMBW026-F			WATER				X									X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Dissolved Cd, Se (EPA6020A)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMBW027-U			WATER			X						X								
	1005GWMBW027-F			WATER				X									X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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158 Starlite Dr
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Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Dissolved Cd, Se (EPA6020A)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMBW028-U			WATER			X						X								
	1005GWMBW028-F			WATER				X									X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condi

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	1005GWMBW032-1-U			WATER			X						X								
	1005GWMBW032-1-F			WATER				X									X				
	1005GWMBW032-2-U			WATER			X						X								
	1005GWMBW032-2-F			WATER				X									X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condition Up

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES: Retained by Sampler, Sent to Office**
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PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

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	1005GWMBW048-U			WATER			X						X								
	1005GWMBW048-F			WATER				X									X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condi

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	1005GWMBW085-U			WATER			X						X								
	1005GWMBW085-F			WATER				X									X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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	1005GWMBW087-U			WATER			X						X								
	1005GWMBW087-F			WATER				X									X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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	1005GWMBW099-U			WATER			X						X								
	1005GWMBW099-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condi

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES: Retained by Sampler, Sent to Office**

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ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Dissolved Cd, Se (EPA6020A)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMBW107-U			WATER			X						X								
	1005GWMBW107-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condi

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	1005GWMBW112-U			WATER			X						X								
	1005GWMBW112-F			WATER				X									X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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	1005GWMBW130-U			WATER			X						X								
	1005GWMBW130-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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	1005GWMBW131-U			WATER			X						X								
	1005GWMBW131-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condi

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MWH CHAIN OF CUSTODY RECORD

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	1005GWMBW135-U			WATER			X						X								
	1005GWMBW135-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
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	1005GWMBW152-U			WATER			X						X								
	1005GWMBW152-F			WATER				X									X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
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PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW004-U			WATER			X						X								
	1005GWMMW004-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condi

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES: Retained by Sampler, Sent to Office**

MWH USE ONLY:

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: _____ **COOLER #:** _____ **Page:** _____ **of** _____

SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW006-U			WATER			X						X								
	1005GWMMW006-F			WATER													X				
	1005GWMMW018-1-U			WATER			X						X								
	1005GWMMW018-1-F			WATER													X				
	1005GWMMW018-2-U			WATER			X						X								
	1005GWMMW018-2-F			WATER													X				
	1005GWMMW020-U			WATER			X						X								
	1005GWMMW020-F			WATER													X				
	1005GWMMW027-U			WATER			X						X								
	1005GWMMW027-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		**MWH**	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condi

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES: Retained by Sampler, Sent to Office**

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SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW007-U			WATER			X						X								
	1005GWMMW007-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW008-U			WATER			X						X								
	1005GWMMW008-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total Cd, Pb, Se (SW6020A)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW009-U			WATER				X					X								
	1005GWMMW009-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
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PROJECT NUMBER: Direct bill to Monsanto

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Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW010-U			WATER			X						X								
	1005GWMMW010-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
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	1005GWMMW011-U			WATER			X						X								
	1005GWMMW011-F			WATER													X				
	1005GWMMW017-U			WATER			X						X								
	1005GWMMW017-F			WATER													X				
	1005GWMMW028-U			WATER			X						X								
	1005GWMMW028-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		**MWH**	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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	1005GWMMW012-U			WATER			X						X								
	1005GWMMW012-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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	1005GWMMW013-U			WATER			X						X								
	1005GWMMW013-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condi

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES: Retained by Sampler, Sent to Office**

MWH USE ONLY:

MWH CHAIN OF CUSTODY RECORD

MWH CONTACT: Ruth Siegmund (925) 627-4756

FED EX #: _____ **COOLER #:** _____ **Page:** _____ **of** _____

SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

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Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW014-U			WATER			X						X								
	1005GWMMW014-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condi

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES: Retained by Sampler, Sent to Office**

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	1005GWMMW017-U			WATER			X						X								
	1005GWMMW017-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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	1005GWMMW019-U			WATER			X						X								
	1005GWMMW019-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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	1005GWMMW018-1-U			WATER			X						X								
	1005GWMMW018-1-F			WATER													X				
	1005GWMMW018-2-U			WATER			X						X								
	1005GWMMW018-2-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condition Up

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES: Retained by Sampler, Sent to Office**
MWH USE ONLY:

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	1005GWMMW020-U			WATER			X						X								
	1005GWMMW020-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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	1005GWMMW021-U			WATER			X						X								
	1005GWMMW021-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Condi

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES: Retained by Sampler, Sent to Office**

MWH USE ONLY:

MWH **CHAIN OF CUSTODY RECORD** **MWH CONTACT: Ruth Siegmund (925) 627-4756**

FED EX #: _____ **COOLER #:** _____ **Page:** _____ **of** _____

SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW022-U			WATER			X						X								
	1005GWMMW022-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW023-U			WATER			X						X								
	1005GWMMW023-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
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158 Starlite Dr
Marietta, OH 45750

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PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW024-U			WATER			X						X								
	1005GWMMW024-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
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LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW025-U			WATER			X						X								
	1005GWMMW025-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
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LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW026-U			WATER			X						X								
	1005GWMMW026-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW027-U			WATER			X						X								
	1005GWMMW027-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
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PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW028-U			WATER			X						X								
	1005GWMMW028-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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PROJECT NUMBER: Direct bill to Monsanto

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Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW029-U			WATER			X						X								
	1005GWMMW029-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
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	1005GWMMW030-U			WATER			X						X								
	1005GWMMW030-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
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158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (2008/Older MW and DPBW)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMMW031-U			WATER			X						X								
	1005GWMMW031-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
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158 Starlite Dr
Marietta, OH 45750

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Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMW-15A-U			WATER			X						X								
	1005GWMW-15A-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
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158 Starlite Dr
Marietta, OH 45750

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PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Total Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMW-16A-U			WATER			X						X								
	1005GWMW-16A-F			WATER													X				

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

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MWH CHAIN OF CUSTODY RECORD

MWH CONTACT: Ruth Siegmund (925) 627-4756

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SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (Seeps, Springs, and Steams)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMDS025-U			WATER			X	X					X								
	1005GWMDS025-F			WATER					X		X					X					
	1005GWMDS026-U			WATER			X	X					X								
	1005GWMDS026-F			WATER					X		X					X					
	1005GWMDS030-U			WATER			X	X					X								
	1005GWMDS030-F			WATER					X		X					X					
	1005GWMDS034-U			WATER			X	X					X								
	1005GWMDS034-F			WATER					X		X					X					
	1005GWMSG005-U			WATER			X	X					X								
	1005GWMSG005-F			WATER					X		X					X					

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
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SAMPLER(S) PRINTED NAME AND SIGNATURE

LAB: Microbac,
158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (Seeps, Springs, and Steams)

PROJECT NUMBER: Direct bill to Monsanto

ANALYSIS REQUEST

Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMDS026-U			WATER			X	X					X								
	1005GWMDS026-F			WATER					X		X					X					

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
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Microbac ID	FIELD SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	Metals (SW6020A)	Total Al, Ba, Be, Fe Mo, V (SW6010B)	Total Cd, Se (SW6020A)	Total V (EPA6010B)	Dissolved Cd (EPA6020A)	Dissolved Ca, Fe, Mg, K, Na (EPA 6010B)	Dissolved Ca, Mg (EPA 6010B)	Total Hg (SW 7471)	TDS (E160.1)	TSS (E160.2)	(Filtered) Nitrate/Nitrite as N (EPA 353.2)	Dissolved S04, Cl (EPA 300.0)	Dissolved S04 (EPA 300.0)	(Filtered) Total Alkalinity (EPA 310.2)	Dissolved Hardness (SM2340B-Calc)	Gross Alpha, Gross Beta (EPA 900)	Comments
	1005GWMDS030-U			WATER			X	X					X								
	1005GWMDS030-F			WATER					X		X					X					

Comments/Instructions:

Signature:	Print Name:	Company Name/Title:	Date:
RELINQUISHED BY:		MWH	
RECEIVED BY:			
RELINQUISHED BY:			
RECEIVED BY:			

For Lab Use Only: Sample Con

ORIGINAL: Send with sample (sign only in blue or black ink) **COPIES: Retained by Sampler, Sent to Office**

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MWH CONTACT: Ruth Siegmund (925) 627-4756

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158 Starlite Dr
Marietta, OH 45750

PROJECT NAME: P4 Production LLC - Spring 2010 GW Sampling Event (Seeps, Springs, and Steams)

PROJECT NUMBER: Direct bill to Monsanto

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	1005GWMDS034-U			WATER			X	X					X								
	1005GWMDS034-F			WATER					X		X					X					

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	1005GWMSG004-1-U			WATER			X	X					X								
	1005GWMSG004-1-F			WATER					X		X					X					
	1005GWMSG004-2-U			WATER			X	X					X								
	1005GWMSG004-2-F			WATER					X		X					X					
	1005GWMSG006-U			WATER			X	X					X								
	1005GWMSG006-F			WATER					X		X					X					
	1005GWMSG007-U			WATER			X	X					X								
	1005GWMSG007-F			WATER					X		X					X					
	1005GWMST069-U			WATER			X	X					X								
	1005GWMST069-F			WATER					X		X					X					

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	1005GWMSG005-U			WATER			X	X					X								
	1005GWMSG005-F			WATER					X		X					X					

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	1005GWMSG006-U			WATER			X	X					X								
	1005GWMSG006-F			WATER					X		X					X					

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	1005GWMSG007-U			WATER			X	X					X								
	1005GWMSG007-F			WATER					X		X					X					

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	1005GWMST069-U			WATER			X	X					X								
	1005GWMST069-F			WATER					X		X					X					

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	1005GWMST096-F			WATER					X		X					X					
	1005GWMST136-U			WATER			X	X					X								
	1005GWMST136-F			WATER					X		X					X					
	1005GWMST144-U			WATER			X	X					X								
	1005GWMST144-F			WATER					X		X					X					

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	1005GWMST136-U			WATER			X	X					X								
	1005GWMST136-F			WATER					X		X					X					

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	1005GWMST144-U			WATER			X	X					X								
	1005GWMST144-F			WATER					X		X					X					

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				WATER																	
				WATER																	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	

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"Rite in the Rain"®

ALL-WEATHER

FIELD

No. 351

CERCLA GW Sampling

2010

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

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Phone (406) 542-0129

Project CERCLA (Monsanto) GW
sampling

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CONTENTS

PAGE	REFERENCE	DATE

Monsanto CERCLA Groundwater Sampling

5/15/2010

1400 - W. Welzenbach, L. McKay, & L. Fuhrig (MWH) onsite @ Ballard Well MMW018

Objectives: Begin CERCLA Sampling @ Wells MMW018 + MMW029

Weather: Calm + warm, partly cloudy, ~60°F

MMW018 → Ballard Mine

1400 - Begin calibrating YSI (556 MPS) [see field sheet for calibration notes]

CM ~~1515~~ → Final Parameter Readings:

- Time: 1515
- Water Level (ft): 10.61
- Purge Rate (L/min): 0.15
- Cum. Purge Vol (L): 5.75
- Temp (c): 8.63
- pH: 7.11
- ORP (mV): 390.5
- SC (mS/cm): 814
- Turbidity (NTU): 0.62

Monsanto CERCLA Groundwater Sampling

1520 - Sample collected
1530 - Duplicate collected

MMW029 → Ballard Mine

1610 - Arrive @ Well
1614 - Water Level = 18.63 ft. below plate for pump connector

Final Parameter Readings:

Time : 1712
Water Level (ft): 18.85
Purge Rate (L/min): 0.50
Cum. Purge Vol (L): 20
Temp (c): 6.43
pH : 7.06
ORP (mV): -376.0
DO (mg/L): 6.59
SC (uS/cm): 3006
Turbidity (NTU): 0.59

1720 - Sample collected

1745 - WW, LF, LM offsite

End of Day

5/16/10

0750 - W. Welzenbach + L. McKay onsite @ Ballard Well MMW017.

Objectives: Continue collecting GW samples from Ballard Mine + other CIRCLA Sites.

Weather: Warm, sunny, lightly breezy, ~65°F

MMW017 → Ballard Mine

0800 - Water Level = 37.56 ft BMP (Below Measuring point)

Final Parameter readings:

Time	10:02
WL (ft)	37.34
Purge Rate (L/min)	0.02
Cum. Purge Vol (L)	4.5
Temp (c)	11.50
pH	6.70
ORP (mV)	364.4
DO (mg/L)	5.03
SC (uS/cm)	1333
Turbidity (NTU)	0.24

Monsanto CERCLA Groundwater Sampling

1010 - Sample collected 5/16/10

↳ 1005GWMMW017-U/F

MMW031 → Ballard Mine

1030 - YSI readings checked & recalibrated where necessary. Bladder pump is pumping water to the surface but then falling back down tubing. Removed pump from well to check seals & check valves → decontaminated & rinsed with Alcnx followed by distilled water. Pump lowered into well but problem persists. Abort purging/sampling at this time. [WW note: problem was disconnected freeze protection line at ~8 ft. below TOC.]

1330 - Arrive @ MMW030; L. Fuhrig offsite. Water level = 25.42'. Total purge volume (3 well casings) is 262 gal.

MMW028 → Henry Mine

1500 - WL = 75.28 ft BMP. Sampled 16:35

Param's at 16:30: WL=75.27, Purge=0.1 L/min, Temp=10.71°, pH=7.60, ORP=240.5, DO=7.44 mg/L, Cond.=1098 µS/cm, 0.48 NTU

MMW011 → Henry Mine. ~~Initial water level = 75.28 ft.~~

Sampled at 19:20, Initial water level = 89.79 ft.

parameters on following page:

MMW011 (cont.) 5/16/2010

Final parameters at 19:15

WL = 89.90 ft, Purge rate = 0.15 L/min, Purge = 9.2 L

Temp = 8.05°C, pH = 7.30, ORP = 367.1 mV,

DO = 8.75 mg/L, Cond. = 776 µS/cm,

Turb. = 4.27 NTU

5/17/2010

Field crew: Levi McKay, Wilhelm Welzenbach (AMEC)

Start of day: move equipment from the South Rasmussen mine office to the Ranch storage.

MMW031

Water level = 97.10 ft. below M.P.

Sampling time = 10:50

Final parameter readings:

Water level = 97.15 ft, purge rate = 0.2 L/min,

Cumul. vol. = 12.8 L, temp = 9.49°C, pH = 7.67,

ORP = 297.5 mV, DO = 8.44 mg/L,

Sp. Cond. = 513 µS/cm, Turb. = 0.30 NTU

Monsanto CERCLA Groundwater Sampling

MMW006

5/17/2010 (cont.)

water level = 265.48 ft. at 14:35

Final parameter readings : water level = 265.60 ft.,
purge rate = 0.25 L/min, cumul. vol. = 27.0 L,
temp. = 10.36°C, pH = 7.58, ORP = 554.8,
DO = 5.98 mg/L, sp. cond. = 936 uS/cm,
turb. = 0.73 NTU

Sampling time = 14:05

MMW020

water level = 285.13 ft. at 15:03

final parameter readings : water level = 285.15 ft.,
purge rate = 0.4 L/min, cumul. vol. = 33.1 L,
temp. = 9.00°C, pH = 6.79, ORP = -145.6,
DO = 0.90 mg/L, sp. cond. = 796 uS/cm,
turb. = 0.41 NTU

Sampling time = 16:40

MMW012

Well dry. Total depth of 60.97 ft. below m.p. measured approx. 17:50

5/17/2010 (Cont.)

MMW027

water level = 102.37 at 18:00

final parameter readings : water level = 102.45 ft.
purge rate = 0.6 L/min, cumul. vol. = 10.6 L/min
temp. = 6.95°C, pH = 6.93, ORP = 330.4,
DO = 4.23 mg/L, sp. cond. = 1032,
turb. = 0.60 NTU

Sampling time = 18:35

5/18/2010

field crew = Levi McKay, Wilhelm Welzenbach
first half of day = finish groundwater sampling at South Rasmussen mine.

MMW021

water level = 212.27 ft. at 16:55

final parameter readings : water level = 212.54 ft.,
purge rate = 0.3 L/min, cumul. vol. = 15.9 L,
temp. = 8.92°C, pH = 7.14, ORP = 450.1,
DO = 5.48 mg/L, sp. cond. = 700 uS/cm,
turb. = 0.26 NTU

Sampling time = 16:55

Monsanto CERCLA Groundwater Sampling

5/19/2010

field crew = Levi McKay, Wilhelm Welzenbach
start of day = place new tire and wheel on truck

MMW030

water level = 25.49 ft. at 8:10
final param. readings: water level = 29.58 ft., purge rate = 0.02 L/min, cumul. purge = 11.05 L, temp. = 6.49°C, pH = 7.62, ORP = 312.2 mV, DO = 0.74 mg/L, sp. cond. = 435 uS/cm, turb. = 4.26 NTU
Sampling time = 10:45

middle of day = recon' route to MMW009 and weather forecast, get extra tire chains, get deionized water from Monsanto laboratory for field blank, put on chains, secure load, drive to MW W009

MMW009

water level = 212.25 ft. at 15:50
Sampling time = 18:20
(MS/MSD collected here)

5/19/2010 (cont.)

MMW009 (cont.)

final param. readings: water level = 212.38 ft., purge rate = 0.26 L/min, cum. vol. = 38.7 L, temp. = 8.23°C, pH = 7.09, ORP = 41.9 mV, DO = 0.66 mg/L, sp. cond. = 67 uS/cm, turb. = 1.96 NTU

end of day: unload nitrogen tanks (3 * 300 lb. tanks) and rack at Degeustron shop

5/20/2010

field crew = Levi McKay, Wilhelm Welzenbach
start of day: diagnose pump problems at MMW032 (air leaking into water purge line) and move to MMW033

MMW033

water level = 11.09 ft. at 9:33
minimum purge vol. = 9.7 L
(see next page)

Monsanto CERCLA Groundwater Sampling

5/20/2010 (continued)

MMW033 (cont.)

Minimum purge rate of approx. 0.02 L/min would take over 8 hours to purge min. purge volume. This time is greater than EPA Low Flow Method max. purge time, therefore purge rate was not set at minimum rate. After 2 hours of purging (at 11:30) and greater than the minimum purge vol., all readings were stable, except drawdown had not stabilized and turbidity was >5 NTU. At this point, pump flow rate was decreased to min. rate (0.02 L/min). Thereafter, drawdown ceased, but turbidity did not decrease for the next 40 minutes. Due to the lack of decreasing turbidity,* ~~at~~ sample was collected with turb. of 7.23 NTU. (*at lowest purge rate after 3 3/4 volumes of pump + tubing were purged)

Final param. readings: water level = 12.60 ft., purge rate = 0.02 L/min, ~~temp~~ vol. = 13.3 L, temp = 5.46°C, pH = 8.49, ORP = 213.9 mV, DO = 2.11 mg/L, sp. cond. = 584 µS/cm, turb. = 7.23 NTU

Sampling time = 12:15

5/20/2010 (cont.)

MMW032

water level = 16.42 ft. at 7:30

Pump trouble shooting: Pump initially had no response to applied air pressure. Pump removed and inspected. Both foot valves were not moving when shaken ("rusted" closed). foot valves freed, then pump replaced into well. Pump then tried for 30 min, with only air coming from discharge. Pump Crew moved to MMW033 (see prev. page), then returned to MMW032 after discussing symptoms. Pump removed, bladder seated more tightly in end fittings, and then pumping functioned properly.

~~final~~ water level after replacing pump into well: 17.09 ft at 13:33

Final param. readings: water level = 19.30 ft, purge rate = 0.02 L/min**, vol. = 6.0 L, temp. = 8.23°C, pH = 7.43, ORP = 516.1 mV, DO = 5.88 mg/L, sp. cond. = 429 µS/cm, turb. = 4.52 NTU

~~**Purge rate is~~ Sampling time = 15:55

Monsanto CERCLA Groundwater Sampling
5/20/2010
(continued)

MMW013
initial water level = 3.41 ft.
final param. readings: water level 3.52 ft.,
purge rate = 0.62 L/min, vol. = 22.4 L,
temp. = 6.30°C, pH = 6.93, ORP = 425.7 mV,
DO = 10.83 mg/L, sp. cond. = 799 µS/cm,
turb. = 0.65 NTU
sampling time = 18:10,
MS/MSD collected at MMW013.
(see page 15 for water-level-only wells 5/20/10)

5/21/2010
field crew = Levi McCay, Wilhelm Welzenbach
start of day = tag water level at
MMW016A. DTW = 8.19 ft. TD = 37.84 ft.
Borehole well crew contacted by
MW crew regarding shallow DTW, MW crew
moved to MMW034.

MMW034
initial water level = 11.59 ft. at 8:25.

water-level-only wells monitored 5/20/2010

well ID	Water level (ft.)
MMW008	19.50 below plate, 19.64 below TOC
MMW024	60.24 below plate
MMW026	235.17 below TOC, 235.03 below plate

MMW034 (cont.)
5/21/2010
(continued)
final param. readings:
water level = 11.66 ft., purge rate = 0.16 L/min,
vol. = 11.2 L, temp. = 6.68°C, pH = 7.25,
ORP = 478.9, DO = 8.74 mg/L,
sp. cond. = 548 µS/cm, turb. = 0.33 NTU
sampling time = 10:20
Duplicate collected, per 5/2010 memo.

MMW035
initial water level = 103.05 ft at 11:40
final param. readings: water level = 103.06 ft,
purge rate = 0.26 L/min, vol. = 13.7 L,
temp. = 7.41°C, pH = 6.89, ORP = 564.4 mV,
DO = 3.28 mg/L, sp. cond = 487 µS/cm,
turb. = 1.35 NTU
sampling time = 12:45

Monsanto CERCLA Groundwater Sampling
5/21/2010
(continued

MMW036
initial water level = 113.83 ft at 13:45
final param. readings: water level = 113.84 ft,
purge rate = 0.24 L/min, vol. = 10 L,
temp. = 8.18 °C, pH = 7.39,
ORP = 219.1 mV, DO = 8.26 mg/L,
sp. cond. = 518 mS/cm,
turb. = 1.58 NTU
Sampling time = 14:55

MMW023
initial water level = 107.72 ft at 17:20
final param. readings: water level = 107.74 ft,
purge rate = 0.40 L/min, vol. = 24.0 L,
temp. = 8.30 °C, pH = 6.99, ORP = 220.9 mV,
DO = 0.52 mg/L, 1111 mS/cm = sp. cond.,
turb. = 0.70 NTU
Sampling time = 18:50

water-level-only wells monitored 5/21/2010

well ID	DTW (ft)
MMW004	50.37' below top of 6"-to-4" reducer
MMW019	12.31 below top of PVC casing, 12.17 below top of pump connect plate

5/22/2010
field crew: Levi McKay, Wilhelm Weltzenbach
weather = wind and snow
Start of day: assemble all well sampling forms and chain of custody forms, confirm which remaining sites need to be sampled.

MMW022
- Initial Water level = 207.09 ft below top of gray pump plate connector (207.23 ft btc)
- Final Parameter Readings:
  - Time = 10:30, water level (ft below MP) = 207.35; purge LM ~~rate (L) = 21 0.48~~ rate (L/min) = 0.48; Cum. purge volume = 21.7 L; Tem (c) = 6.26; pH = 7.07; ORP (mV) = 291.3 DO (mg/L) = 4.42; Specific Cond. (µS/cm) = 1770; Turbidity (NTU) = 4.55

Sampling time = 10:35
(MS/MSD collected at this well)

Monsanto CERCLA Groundwater Sampling
5/22/10
(Continued)

MMW015A

initial water level = 21.45 ft. at 12:15
final parameter readings: water level = 21.64 ft.,
purge rate = 0.04 L/min, vol. = 2.7 L,
temp. = 5.99°C, pH = 6.72, ORP = 547.4 mV,
DO = 5.76 mg/L, sp. Cond. = 1807 uS/cm,
turb. = 2.76 NTU
sampling time = 13:50

MMW025

Initial water level = 31.58 ft. at 16:50
per instructions from MWH,
well was pumped "dry" (to depth of pump set at 195 ft.) after 22 min. of pumping at vol. of 122.5 gal.
DTW monitoring during recovery:
water elevation increased 1.06 ft. in 32 minutes (17:39 to 18:11).
Final DTW measured 5/22/10 was 179.90 ft. at 18:11. This includes water released into the well when pumping ceased.

5/23/2010
field crew = Levi McKay, Wilhelm Welzenbach

MMW007

Similar to MMW025, MMW007 was pumped to depth of intake set 5 ft. off of well bottom (intake at 88.5 ft.)
Approx. 42. gallons pumped in 14 minutes.

MMW010

per instructions from MWH, MMW010 was purged of >3 casing volumes prior to sampling.
initial water level = 2.80 ft. at 10:40
final parameter readings: water level = 12.65 ft.,
purge rate = 1.0 gal/min, vol. = 79.6 gal,
temp. = 4.71, pH = 6.58, ORP = 392.5 mV,
DO = 4.05 mg/L, sp. Cond. = 2455 uS/cm,
turb. = 3.79 NTU
sampling time = 12:25
(MS/MSD collected at this site

MMW014: Depth to water = 3.63 ft. below top of PVC casing.

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

ALL-WEATHER

ENVIRONMENTAL FIELD BOOK

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Project Spring Sampling 2010

This book is printed on "Rite in the Rain" All-Weather Writing Paper - A unique paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.

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Location Ballard Date 5/13/10

Project / Client Monsanto

0700 Ranch to get fire ext. and 1st aid for vehicle safety inspection

0740 Mine ofc. - HR test, veh. insp, picked up bottles

Levi McKay and Willy Weisenbach are in S. Ras working on wells for that project

0930 Sally Staley, Tyler Browning, Leland Fishrig to Wooley Valley to sample for stations - MST092,

calibration/check:

Time : 0800

Temp : 5.9

SC : 1434

DO : 593.6

pH : 4.0/6.97/9.93

Turb : 800/100/20/0.02

temp ORP : 230

Location MST092 Date 5/13/10

Project / Client Monsanto

MST092 LF, SS, TB

1000

Name: N. Fk. Wooley Valley Ck. above WWC

Latitude: N 42° 49' 40.00"

Longitude: W 111° 27' 04.30"

Elevation: 6305 ft

Site/stream Desc.: Grassy banks, near ponded area (200 yds), possibly from new dam?

Surface water characteristics: yellowish, no odor, grassy

Horiz - 1005 SW MST092-LF 1020

Time 1020

Temp 4.69 Turb 1.49

SC 447 ATemp 3.33C

Cond 274

TDS 0.282

DO% 65.6

DO mg/L 9.33

pH 7.51

ORP -307

Location MST092 Date 5/13/10

Project / Client

Flow measurement LF/TB/SS

Time: 1044

R.E.W.: 13 ft L.E.W.: 5.5 ft

Total width: 7.5 ft

Dist	Subs #	Subs Depth	Vel ft/s
5.50	1	-	-
7.0	2	0.22	0.032
7.5	3	0.3	0.032
8.0	4	0.35	0.064
8.5	5	0.42	0.098
9.0	6	0.4	0.196
9.5	7	0.38	0.131
10	8	0.45	0
11	9	0.35	0.032
13	10	-	-

Location MST089 Date 5/13/10

Project / Client

1125 Leland / Sally

Stn Name:

" # : MST089

Lat/Long N 42° 49' 28.7" W 111° 26' 22.5"

Elev: 6397

Photo #:

Grassy banks, grass streambed

yellowish, no odor

Time	1130
temp	9.02
SC	345
cond	240
TDS	0.224
DO%	77.3
DO	8.91
pH	7.54
ORP	259.8
turb	3.98
Alt	43

Horiz: 1005SW MST089 - U/T 1130

Location Date

Project / Client

1145 REW 11.9 LFW 3.2

Dist	Subs.#	Depth	m/s Vel
4	1	0.2	0
4.5	2	0.3	0.03
5	3	0.32	0.02
5.5	4	0.35	0.03
6	5	0.35	0.02
6.5	6	0.4	0.03
7	7	0.48	0.03
7.5	8	0.65	0.07
8	9	0.7	0.10
8.5	10	0.6	0.11
9	11	0.5	0.03
9.5	12	0.5	0.02
10	13	0.45	0.02

Location MST090 Date 5/13/10

Project / Client

1215 LF/SS
Site Name:
Site #: MST090
Lat N: 42° 49' 27.6"
Long W: 111° 26' 52.1" ELEV 4400
- Grass/mud banks, grass-lined streambed
- yellowish, no odor, some grass
Horiz, 1005SW MST090 - U/F
Time 1215
Temp 10.43
SC 385
Cond 278
TDS 0.250
DO% 75.3
DO 8.39
pH 7.72
ORP -316.6
Turb 0.79
ATemp 45°F

Location MST090 Date

Project / Client

REW: 4.35 LEW: 2.1

Dist	Subs #	Depth	Velocity
2.5	1	0.25	0.03
2.7	2	0.32	0.01
2.9	3	0.38	0.09
3.1	4	0.4	0.14
3.3	5	0.4	0.13
3.5	6	0.4	0.22
3.7	7	0.35	0.24
3.9	8	0.3	0.26
4.1	9	0.3	0.03

Location MST095 Date 5/13/10

Project / Client

1315 LF/SS/TB

Site Name: Spring-fed trib #2 of N. Wooley Valley Ck. below Ballard

Lat: N 42° 49' 38.8"

Long: W 111° 28' 08.3"

Elev: 6470 ft

Photo: Sally's camera

SS Desc: Grass-lined banks + streambed

SW Char: Slightly yellow, no odor

home bottle, ID: 1005SWMST095-U/F

Time: 1320

Temp: 12.83

SC: 858

Cond: 658

TDS: 0.558

DO% 56.6

DO mg/L 5.97

pH: 7.65

ORP: -292.5

Turb: 0.98

Air Temp: 3.33C

Location MST095 Date 5/13/10

Project / Client

SS/LF/TB

Flow time: 1327

REW: 0' LEW: 1.2' Total: 1.2'

Dist	Subs #	Subs Depth	Vel
0.4	1	0.2	0
0.6	2	0.2	0.131

Location MST 094 Date 5/13/10

Project / Client Monsanto

1410 MST094 LF/TB/SS

Station Name: Spring-fed trib #1 of NWVC below Ballard Mine

Latitude: N 42° 49' 55.5"

Longitude: W 111° 28' 13.5"

Elev: 6470 ft

Site/stream desc: Dry at station used previously. water collected just downstream from pipe outlet. grassy/mossy area.

SW chars: clear

Horiz/1005SWMST094 ~C/F 1430

Time	1430
Temp	7.75
SC	278
Cond	186
TDS	0.181
DO%	72.3
DO mg/L	8.58
pH	8.42
ORP	-297.3

Turb 1.02

ΔTemp 7.22 C

Location MST094 Date 5/13/10

Project / Client

Flow Measurement

1440 TB/SS/LF

Capture Method

Meas. #	Time (s)	Vol (c)
1	3	1/2
2	6	1
3	6	1.2

Location MST093 Date 5/13/10

Project / Client

1520 LF | SS | Tyler

Station Name

Station # MST093

Lat N 42° 50' 28.2"

Long W 111° 28' 37.5"

~~Lat~~ Elev 6490'

- Muddy, ponded area at head of small reservoir
- Muddy / yellowish, no odor

1005SWMST093 - U/F

Time 1530

Temp 7.98

SC 0.276

Cond 186

TDS 0.179

DO% 42.1

DO 4.99

pH 7.06

ORP -312.3

Turb 3.84

AirT 40 F

Location Date 5/13/10

Project / Client

Dist	Subs #	Depth	Vel
	T	V	
	4.3	1.25	
	3.7	1.1	
	3.8	1.0	

Location MST069 Date 5/13/10

Project / Client Monsanto

1630 MST069 LF/SS/TB

Name: Short Ck. below Ballard Mine

Station Latitude: N 42° 48' 11.6"

Longitude: W 111° 29' 22.2"

Elev: 6370 ft

Site/stream desc: grass banks/muddy bottom, just downstream from waste pile

SW chars: Clear, no odor

Horiz/ 10055WMST069 -u/E time: 1640

Time	1640
Temp	15.62
SC	2261
Cond	1854
TDS	1.472
DO%	68.2
DOmg/L	6.75
pH	8.24
ORP	296.2
Turb	9.0
ATemp	7.22

Location MST069 Date 5/13/10

Project / Client

Flow measurement - 1650

Meas #	time(s)	Vol(L)
1	5.9	1.0
2	9.8	1.55
3	11	1.6

1700 Tried to locate sampling location for MST067, found ponded water (not flowing). did not sample.

1800 LF/SS/TB offsite.

Location Ballard / Henry Date 5/14/10

Project / Client Monsanto

0700 LF / TB / SS

- No haul rd. Key and gate locked, did not sample MST019

LM / WW: Sampling South Ras wells for that project.

* All station notes, ~~[illegible]~~ calibration information for the day are in Sally Staley's field book

0740 MST067 - used peristaltic pump and tubing to collect water from small ponded area. no flow.

Cal check:

Time: 0800		pH:	3.93 / 9.03
Temp: 9.9		ORP:	pool 100 / 20 / 002
SC: 1356		Turb:	228
DO: 79.5 @ 603.8			

Location Date

Project / Client

0850 MST066

1010 MST020

→ could not find the stake from before, a location was chosen below State Land Ck. where wading could be safely done.

1135 MST050

- No water in outfall of reservoir where sample is typically taken, collected sample / flow downstream where seepage converged.

1210 MST051 - DRY

1400 MST044

1500 MST045 - collected triplicate

1630 MST057

Location _____ Date 5/14/10

Project / Client _____

1730 LF offsite, SS/TB went to S. Ras to help other crews with flat tire

1930 LM/WW, SS/TB off site.

Location Ballard / Enoch Date 5/15/10

Project / Client Monsanto

0730 - SS/TB collecting equipment rinsate first thing, will count as yesterday's ER. They will start with MST019 and get flow from USGS site.

LF/WW/LM: well sampling in Wooley Valley. WW keeping well notes in his field book.

- Tire problems on AMEC truck slowing progress, managing to get by with spares from other vehicles, etc. but a new rim is needed.

1400 MMW018

calibration:

temp: 12.72 C | DO: 79.4 604.5 mm Hg

pH: 7.00 C | SC: ~~[illegible]~~ 1413

ORP: ~~[illegible]~~ 230.0 | Turb: 1000 / 0.02

Location Ballard Date 5/15

Project / Client

1405 check
pH: 10.01, 4.02
ORP: 229.7
SC: 1412
Turb: 0.01

1614 MMW 029
1730 Showed WW / LM to MMW 033 + 32
1745 All members of AMEC / MWH off site

Location Date 5/16

Project / Client Monsanto

0730 SS / TB: Finishing SW samples on Angus / Rasmussen

0855 MST269
Name: East Fork Rasmussen Ck. Headwaters
Latitude: 42° 52' 16.4"
Longitude: 111° 23' 43.9"
Elev: 6671 ft.
Photo: LF camera
Site / stream desc: dry, grassy banks
SW chars: DRY

1030 Met WW / LM at MMW031, problems with bladder and they persisted after decontamination and rinsing procedures. Aborted sampling
1330 Showed WW / LM to MMW030, LF offsite

Location Ballard Date 5/16/10

Project / Client Monsanto

1415 Per Levi and Willy, MMW030 drawing down quickly. Spoke with Cary and Leah, ~~[illegible]~~ instead of purging this well dry we will draw down as slowly as possible and sample once the WL has stabilized.

Sally and Tyler are now working on seeps and springs.

Location Date 5/17/10

Project / Client Monsanto

0700 Fixing tire, shipping samples in town. LM and WW sampling wells, SS / TB on springs / seeps, LF assisting both crews, starting MBWs

0900 WW / LM in Ballard working on wells - MMW033 (new well), MMW006, MMW020.

1000 TB / SS in Ballard, working on MDS 030 to start, then moving to ~~wells~~ springs in Wooley Valley.

1230 calibration

Temp: 22

pH: 7.01 / 10.02

ORP: 221

DO: 78.8% @ 600.2

SC: 1413

Turb: 1000 / 10 / 0.02

Location Ballard Date 5/17/10

Project / Client Monsanto

1400 Showing SS/TB Wooley Valley Spring locations, MSG004-7

1500 Per Leah, ok to sample if WL stabilizes

1700 WW/LM to Enoch Valley wells

MBWOM

1725 Calibration check

Temp 23.27C

pH 6.92/9.94

ORP 224.8

DO 602.1 mmHg, 90.8%

SC 1392

Turb 10.09

1845 Began purge

1920 WL ~~and~~ not stabilizing, turbidity not decreasing after 45 mins, purging well dry and will sample tomorrow.

1930 all AMEC and MWH employees off site

Location Date 5/18/10

Project / Client Monsanto

0700 WW, LM, SS, TB to South Ras to work on that project LF packing and shipping coolers with S/S, well samples from weekend + Monday. 4 total coolers sent - 3 CERCLA and 1 South Ras AMEC.

0920 Met w/ Barry to discuss daily reports and check in. Filled out JSA.

1030 On the phone with Barry, Colin, Leah, Willy about Grundfos. One at ranch may be sufficient for purge + sample.

1200 MBWOM

cal time 1150

temp 12.9 turb

pH 7.05, 10.11 1000/10/0.02

ORP 229

DO 79.0 @ 600.5

SC 1413

Location Ballard Date 5/18/10

Project / Client Monsanto

1207 check temp 12.30
pH 10.09
ORP 229.8
DO 79.0
SC 1413
Turb 10.10

1252 Began purge, WL = 0.58

1302 Final Readings:
WL = 2.50 ft
rate = 0.1 L/min
Cum. V. = 0.75
Temp = 6.23
pH = 6.32
ORP = 156.5
DO = 2.72 mg/L
SC = 839
Turb = 26.24
Sample ID = 1005GWMBW01 - U/F
time = 1310

Location Ballard Date 5/18/10

Project / Client Monsanto

1450 MBW130
WL = 1.73 low-flow / peristaltic
- Drawdown exceeded 0.3' below initial water level but stabilized within an hour (2.03' below)
- Turbidity decreased, then increased once the water level stabilized. There was no indication that turbidity would drop below 5 NTUs so the sample was collected without total metals, just dissolved.

Final Readings:

time	1620	
WL	3.70'	
rate	0.04 L/min	
Cum. V.	3.20 L	
Temp	6.25 C	
pH	6.14	Turb
ORP	94.3 mV	10.76
DO	1.78 mg/L	
SC	182	

Location Ballard Date 5/18/10

Project / Client Monsanto

Sample ID: 1005GWMBW130-U/F

Time: 1635

1735 MBW028

WL = 6.32'

purge + sample, well purged dry and will be sampled tomorrow morning.

1856 cal check

Temp	13.5
pH	10.22
ORP	220 mV
DO	83.5%
SC	7922
Turb	10.01

1900 All MWH/AMEC employees off site.

Location Ballard Date 5/19/10

Project / Client Monsanto

0800 In town to get ice and water, emailed Barry with 5/18 progress report.

0900 To ranch for equipment, gas can for Willy and Levi. Met willy at MMW030, WL stabilizing at nearly 4 ft. below initial WL but stable and other readings are stable too. Called Leah, she is ok with sampling b/c WL is stable, despite high drawdown.

1030

	calibration	100 check
Temp	8.62	10.18
pH	7.10	7.0
ORP	230	230
DO	97.1%	79%
SC	1413	5570
Turb.	1000/10/0.02	10.2

Location Ballard Date 5/19/10

Project / Client Monsanto

Water level less of a concern since the well was purged dry the previous evening. Waited for DO to stabilize.

Final Readings

Time	1230
WL	8.0
rate	0.06 L/min
Cum.V.	5.3 L
Temp	6.90
pH	6.23
ORP	227.2
DO	1.42
SC	1345
Turb	4.31

Sample ID: 1005GWMBW028-U/F

Time: 1240

1200 Willy/Levi to MMW009, trouble w/ muddy road so they went to town for chains and made it in.

Location Enoch Valley Date 5/19/10

Project / Client Monsanto

1500 acquired extra set of equipment so Tyler and Leland could split and get 2 MBWs. Tyler to MBW087

MBW085

low flow / peristaltic

1636 WL: 1.58' below TOC

Final Readings:

Time:	1755
WL:	2.26
rate:	0.03
Cum.V.:	2.0
Temp:	8.24
pH:	6.37
ORP:	93.5
DO:	7.32
SC:	379
Turb:	1.29

Sample ID 1005GWMBW085-U/F

Time: 1810

Location _____ Date 5/19/10

Project / Client Monsanto

1800 Willy / Levi will collect MS/MSD for the group today

1930 All members of crew off site.

Location _____ Date 5/20/10

Project / Client Monsanto

0700 To ranch to package coolers, make COC copies / scan. Tyler to MBW099 WW/LM to Wooley Valley, MMW033/32

1000 To plant / town, shipping cooler and ordering 250 ml HNO_3 bottles, pH 7 soln, ORP check soln. through Leah / Rob. waterproof paper / pens too. Filled truck w/ gas.

1100 Per Tyler, MBW099 drawdown and turbidity unstable / high

1215 MBW009

WL = 2.35' btoc

calibration		check	
time	1215	time	1250
Temp	10	pH	10.17
pH	7.06 / 10.12	ORP	228.6
ORP	230	DO	82.8%
DO	79.6% @ 605.2	SC	1414
SC	1413	Turb	10.0 / 1002
Turb	1000 / 10 / 0.02	Temp	10

1315 Began Purge

Location Ballard Date 5/20/10

Project / Client Monsanto

Unable to keep WL within 0.3' of initial WL but stabilized roughly 2.0' below initial.

Final Readings:

Time	1440
WL	4.19
rate	0.05
Cum.V.	4.75
Temp	7.42
pH	6.44
ORP	80.7
DO	1.02
SC	1234
Turb	1.07

Sample ID: 1005GWMBW099-U/F

Time: 1450

1300 MBW099 purged dry, Tyler going to MBW131.

Location Ballard Date 5/20/10

Project / Client Monsanto

1530 Tyler having problems w/ peri pump at MBW131 but resolved them by getting another from GM + WW.

MBW048 low flow / peristaltic

1605 WL = 0.45' btoc

Began purge

Final Readings:

Time	1705
WL	0.76
rate	0.11
Cum.V.	5.4
Temp	5.63
pH	5.74
ORP	128.5
DO	0.97
SC	165
Turb	1.47

Sample ID: 1005GWMBW048-U/F

Time: 1708

Location Bellard Date 5/20/10

Project / Client Monsanto

MBW032 low flow (peristaltic

1810 WL = 10.17' btoc

Began purge

- very muddy discharge for first 10 mins of purge, emptied water in flow-thru cell into 5L pitcher at 1823 and 1840, rinsed suspended sediment out and allowed to refill before taking more readings.

Final Readings:

Time	1905	Check:	
WL	10.70' btoc	time	1945
rate	0.09 L/min	temp	13
Cum V.	4.5 L	pH	7.07
Temp	5.77	ORP	217.2
pH	6.67	DO	63.5 60.0 mg/L
ORP	120.4	SC	7868
DO	7.52	Turb	10.44 0.03
SC	2306		
Turb	2.95		

Sample ID 1005GWMBW032-12-01F

Time: 1920

Location Date 5/21/10

Project / Client Monsanto

0700 To ranch to pack coolers, sending one sample set from EPA via Elizabeth

1000 Taking bottles, ice to LM/WW in Enoch, then 2 coolers to plant, labels to Tyler, bags in town. WW + LM have 2 pgs of MBW labels.

1200 Arrived at MBW5026 + 027. Per Carl, ok to use peristaltic at MW-15A/16A as long as tubing reaches into screened interval

MBW026

1300 WL = 7.83', TD = 10.83'

MBW027

WL = 8.69'

Calibration

Temp	17.5	DO	78.5% @ 598.0
pH	7.04/10.06	SC	1413
ORP	225	Turb	1000/10/0.02

Location Ballard Date 5/21/10

Project / Client Monsanto

1340 cal check

time	1340
temp	15.8
pH	7.02/10.05
ORP	229.4
DO	81.3
SC	1447
Turb	9.91

Final Readings

Time	1525
WL	8.98
rate	0.05
Cum.V.	4.7
Temp	7.98
pH	6.88
ORP	159.0
DO	6.53
SC	1242
Turb	2.20

Sample ID: 1005GWMBW027-U/F

Time: 1540

Location Henry Date 5/21/10

Project / Client Monsanto

1600 Tyler finished MBW006/135/099, WW + LM finished MMW034/035/036.

Per Willy, 0.91' of water in MBW 107. Could not find MBW112. Both groups to Henry for wells.

1740. TB + LF walked out to MBW152 to confirm location and take WL. Driving to 152 is possible but would be difficult. Showed WW + LM MMW022 + 023, they stayed to sample 023.

1810 LF, TB to MW-16A, set up and began purge, TB off site.

MW-16A low flow / peristaltic

1828 Began purge, WL = 8.10

WL dropped well below 0.3 from static but recovered to 0.31' from static

Location Ballard Date 5/21/10

Project / Client Monsanto

Final readings:

Time	1955
WL	8.41
rate	0.04
Cum.V.	4.8
Temp	5.06
pH	7.30
ORP	-15.7
DO	1.27
SC	1764
Turb	4.06

Sample ID: 1005GWMW-16A-U/F
Time: 2010

cal check:

Time	2200	SC	7872
Temp	17.9	Turb	
pH	7.13		
ORP	244.5	All OFF Site	
DO	64.0	@ 2030	
	@ 583.4		

Location Date 5/22/10

Project / Client Monsanto

cold, snowing. 6" accumulation overnight

0700 Met at lodge to confirm well list.
5 MWs left: 022, 15A, 3 purge + samp
3 BWs: 112, 107, 152
all others are accounted for - field forms and COCs (or samples in possession)

0900 Tyler to MBW152 (Henry)
LM+WW to MMW022 (Henry)
LF to MBW112 + 107 (Enoch)

1045 Arrived at MBW107
WL = 39.03', TD = 39.26'
wrong size bailer - 1" needed.
likely just stagnant water in casing

1115 WL (after bailing) = 39.22'
approx. 100mL of water purged
2 photos taken of water in pitcher.

1436 MBW112

1440 DTW = 17.35', TD = 17.62'
likely just stagnant water in casing.

Location Enoch Valley Date 5/22/10

Project / Client Monsanto

1459 WL = 17.56' after bailing w/ 1" bailer
> 100mL of water purged
photo taken

1600 willy / Levi to MMW025 w/ Grundfos, LF / TB moving equipment from ranch to shed.

1800 willy / Levi finished MMW025 (purged), will return to take sample tomorrow
All members of crew off site.

Location Date 5/23/10

Project / Client Monsanto

0700 To ranch / shed, met WW / LM / TB, loaded equipment to sample wells (MWs) into truck, LM / WW to MMW007 purge. LF / TB to MBW152 sample.

0900 MBW152 still needs 0.8' of recovery. Per WW / LM, MMW025 recovering slowly.

1100 To MBW099, need to collect additional samples and measure depth. This well was purged dry (17.5') on 5/20 and sampled on 5/21 but had not fully recovered. MBW099's depth when arriving at the well today was 6.83' (initial DTW was 1.1' bfc) Although this is not 80% recovered, the water contributing to the higher water table was likely a result of water seeping into the well via a flooded

Location _____ Date 5/23/10

Project / Client Monsanto

con't MBW099

ground surface through the surface casing.

DTW = 6.83

Calibration		cal check
Time	0855	Time 0910
Temp	3.5	2.77
pH	7.10, 4.00	7.02
ORP	235	243.9
DO	79.0% @ 600.1	79.3 @ 6000
SC	1413	7582
Turb	1000/10/0.02	9.94/0.03

1230 To MMW025 to check WL, locked so no wl

1350 To MBW112, dry.

1440 To MBW152, WL = 11.75', needs to recover to 11.34' bgs to sample.

Location _____ Date 5/23/10

Project / Client Monsanto

1530 At ranch, packing coolers to ship in the morning. LM/WW taking ER's from decomned equipment

Cal check
time 1520
temp 11.92
pH 7.06
ORP 227.1
DO 73.8% @ 599.5
SC 7494
turb 10.03/0.01

1700 LM/WW/TB off site

1900 MBW135 re-labeled, original labels were worn off. LF off site

Location Henry Date 5/24/10
Project / Client Monsanto

0730 called Barry to check in, took coolers to Plant to ship, bought twine for MMW007 transducer, talked to Leah - need to verify that MST051 was dry

1000 calibrated YSI at mine shop, picked up bottles

	calibration	check
time	1055	1054
temp	5°C	5.43
pH	7.00/4.0	6.89
ORP	232	246.4
DO	78.8 @ 598.5	64.8 @ 598.9
SC	1413	7397
turb	1000/1000	9.98/1000

1100 To mine office, met w/ Barry.

1230 MBW152
immediately sampling after readings

1237 WL = 10.78' btoc

Location Henry Date 5/24/10
Project / Client Monsanto

1248 WL = 11.00

Final readings:

Time	1255
WL	11.51
rate	-
Cum.V.	-
Temp	4.38
pH	6.92
ORP	199.0
DO	8.60
SC	728
Turb	36

Sample ID: 1005GWMBW152-U/F
Time: 1300

1320 13.8' post sample depth
1325 14.7' - pumped dry
1415 MMW025 WL = 113.75' btoc
1420 MMW007 WL = 37.6' btoc
1708 WL = 36.75' btoc

Location Enoch Valley Date 5/24/10

Project / Client Monsanto

1700 Broken fitting on top piece for MMW007, attempted to sample this well but water spraying at wellhead. Will replace fitting (ferrell) and return to sample in the morning.

Stuck in the mud, very boggy area and difficult to access w/ trucks. Tyler's truck seems to be light enough and we will try early in the morning on 5/25 while ground is still frozen. Pulled out by Monsanto employees, Jason and Brent.

1900 LF/TB offsite.

Location Enoch Valley Date 5/25/10

Project / Client Monsanto

0700 To ranch, picked up bailer for possible use on MMW007/25

0730 Met with B. Koch at the mine office, cooler sent on Friday did not arrive at lab until Monday. This will likely be ok since Cd and Se are preserved. SO_4 and TDS will be thrown out.

0807 cal check for 5/24

Temp	2.2 C
pH	7.07
ORP	240.0 mV
DO	84.5% @ 549.5
SC	7894
Turb	10.07

Location Enoch Valley Date 5/25/10

Project / Client Monsanto

0820 calibration | cal check

Time	08:20	Time 08:45
Temp	7.10, 4.0	3.3
pH	7.10, 4.0	7.15
ORP	236.0	241.5
DO	78.8	78.0
SC	1413	7610
Turb	1000, 10, 0.02	10.09

MMW007

0905 WL = 36.10, began purge

Final readings:

Time	0910
WL	36.4' btoc
rate	0.06 L/min
Temp	6.79
pH	7.18
ORP	1468
DO	38.3
SC	257
Turb	11.50

Location Enoch Valley Date 5/25/10

Project / Client Monsanto

Sample ID: 1005GWMMW007-U/F

Time: 0915

collected MS/MSD as well

0930 Met on site w/ B. Koch for Task-in-progress inspection. Need tags for fire extinguisher but otherwise good.

1100 Left equipment at Mine Ofc. for Barry to sample MMW025 on 5/27.

1158 cal check

Temp	14.06
pH	7.15
ORP	228.9
DO	91.3 @ 596.6
SC	7644
Turb	10.14

Location Ranch Date 5/25/10

Project / Client Monsanto

1230 Packing coolers, moving ranch items from ranch to machine shop.

1400 Left radio, extra battery, peri. pump charger at Trail Ck. Lodge for Barry to pick up. Tyler will take cooler to FedEx at SLC airport

1800 Per Tyler, cooler's tracking# is 867331383493

Location Date

Project / Client

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MONSANTO

MAY 2010
CERCLA SW SAMPLING

"Rite in the Rain"®
ALL-WEATHER
JOURNAL
No. 391

AMEC GEOMATRIX

MAY 13, 2010
S. STALEY / T. BROWNING
CERCLA SW SAMPLING

FIELD METER CALIBRATION 0800

YSI 556 - MULTI METER

pH - 3 pT CALIBRATION
4.0 - 4.0 Reading
7.0 - 6.97 Reading
10.0 - 9.93 Reading

SC - 1413 µmhos @ 25°c
1434 @ 4.1°c

ORP - STD: 220 MV
230.0 @ 5.9 - STD FROM SHT 232 MV

DO - 593.6 mmhg - Baro pressure
76.1 %

OAKTON T-100 TURBIDITY MTR.

800/100/20/0.02 NTU STDS.

MET w/ LELAND MWH - WENT TO "RANCH" TO GET ORGANIZED
LEFT - STARTING @ BALLARD SITES.

LELAND COMPLETED FIELD BOOK INFORMATION & MWH FIELD SHTS.

SAMPLED: MST067 - DRY
MST 069
MST 089
MST 090
MST 092
MST 093
MST 094
MST 095

METER CALIBRATION 1846 HR.
5/13/2010
YSI 556: pH 7.0 STD - 7.17 SU
SC STD 1413 µmhos - 1292 @ 10.3°c

DO 86.9% @ 591 mmHg
ORP 220 MV STD - 230.2 @ 10.7°c

MAY 14 2010
S. STAUEY / T. BROWNING
CERCLA SW SAMPLING
L. FUHRIG - MWH

FIELD METER CALIBRATION 0730

YSI 556 - MULTI METER

pH - ~~3pt~~ 2pt CALIBRATION
4.0 - 3.93 Reading
7.0 - 7.03 Reading
~~10.0~~ —— only did 2pt

SC - 1413 µmhos @ 25°C
1356 @ 9.9°C

ORP - STD 220 MV - STD = 228 @ 13°C
229.5 MV @ 13°C

DO - 79.5% @ 603.8 mmHg

OAKTON T-100 TURBIDITY MTR

800/100/20/0.02 NTU STDS.

ALL SITE PHOTOS TAKEN
LOOKING UPSTRM FOR PHOTO #1
AND DOWNSTREAM FOR PHOTO #2

END OF DAY CALIBRATION 5/14/10
2130 HRS

YSI 556

pH 7.0 STD - 7.08 S.U.

SC STD 1413 µmhos -
READING 1389 @ 21°C

ORP - STD = 220 MV
MTR Reads 225 MV @ 20°C
STD SHT 223 MV @ 20°C

DO - 78.9% @ 601.5 mmHg

OAKTON T-100 TURBIDITY MTR

✓ 100 STD NTU - MTR RD. 102 NTU
✓ 20 STD NTU - MTR RD. 21 NTU

MAY 15, 2010
S. STALEY / T. BROWNING
CERCLA SW SAMPLING
L. FUHRIG - MWH

FIELD METER CALIBRATION
0842 HRS
FRESH pH/SC STDS

YSI 556 - MULTI METER

pH - 2 pt CALIBRATION
7.0 STD - 7.16 Reading
10.0 STD - 10.13 Reading

SC - 1413 µmhos @ 25°C
~~MTR RD 1229 @ 7.89°C~~ OUT OF RANGE
MTR RD 1372 @ 7.97°C OK ACCEPTED

ORP - STD 220 MV STD = 231 MV @ 8°C
234.1 MV @ 8°C

DO - 115.9% @ 605.5 mmHg - BEFORE
79.7% @ 605.5 mmHg - AFTER

OAKTON T-100 TURBIDITY MTR
800/100/20/0.02 NTU STDS.

TAILGATE SAFETY - (1) STAY OUT OF SOUTH RAS (2) CHANGING FLATS!

STARTED @ MST019 - BLACKFOOT RIVER

SAMPLED

MST019
MST0

END OF DAY YSI 556 MTR
CALIBRATION 5/15/2010 1840 HRS

pH 7.0 STD - ~~6.85~~ 7.03 ~~4.0 STD - 3.80 SM~~ SMB
~~SMB 10.0 STD - 9.80~~ SMB

SC STD 1413 µmhos @ 25°C
Reading 1594 @ 15.7°C

DO 60.2% @ 592.0 mmHg

ORP STD = 220 MV STD SHT 226 @ 15°C
MTR READS 223 MV

ODYSSEY T-100 TURBIDITY MTR
✓ 20 NTU = 19.76

MAY 16, 2010 - CERCLA SW SAMPLING
S. STACEY T. BROWNING

FIELD METER CALIBRATION 0750
YSI METER - 556 MULTI METER

pH - 2 PT. 7.0 s.u. - 6.97 s.u. reading
4.0 su. - 3.89 su. reading

ORP - 220 MV - STD - 229.9 @ 10.0°C
SHT - 230 MV @ 10°C

DO - 66.8% @ 600.5 mmHg: Before
79.0% @ 600.5 mmHg: After

SC - 1595 µmhos @ 8.48°C

STD 1413 @ 25°C

TAILGATE SAFETY MTG
① EVERYONE'S LOCATION FOR THE DAY
② SUNSCREEN
③ SLIPS / TRIPS / FALLS

MARSH McBIRNEY MTR HAS BEEN SET TO READ VELOCITY IN M/SEC - FOR ALL MMTS PRIOR TO TODAY - RESET THIS AM TO FT/S

SITES SAMPLED

MST-128
MST-131
MST-132
MST-269 - DRY

1300 HRS MAY 16, 2010

CERCLA SPRINGS/SEEPS

MDS026 - ENOCH VALLEY MINE
SEEP - S. DUMP
SAMPLE TIME: 1330
pH - 7.76 su.
SC - 1715 umhos/cm
Temp - 12.23°c
DO(mg/l) - 5.34
ORP - 67.2 mv
TURBIDITY - 5.38 NTU
GRAB W/PERRY PUMP
BOTTLE LIST
1-250 4°c - TDS
1-250 HNO_3 - Vanadium
1-250 HNO_3 - Cd - Se
1-250 FILTERED SO_4, Cl
1-250 FILTERED W/HNO_3 - Cd
1-250 FILTERED W/HNO_3 Ca, Mg

1c - 1.6 sec.
1 1/4c - 1.8 sec
1c - 1.7 sec.

MDS025 - ENOCH VALLEY MINE
W. DUMP SEEP
SAMPLE TIME: 1400
SAME AS MDS026 BOTTLES

pH - 6.80
SC - 1677 umhos/cm
Temp - 11.74°c
DO(mg/l) - 4.41
ORP - 21.8
TURBIDITY - 8.69 NTU
USE FLOW MMT FROM 5/15/2010 SUMMIT
GRAB W/PERRY PUMP

MST144 - W. POND CK. HOWTRS.
BL. W. POND
SAMPLE TIME: 1445
SAME AS MDS026 BOTTLES

GRAB W/PERRY PUMP

pH - 7.01
SC - 807
Temp - 9.05°c
DO (mg/l) 7.76
ORP - 2.20

TURBIDITY - 3.07 NTU

V	TIME
2/3c	1.6 sec
3/4c	1.9 sec.
3/4c	1.8 sec

MDS03A - HENRY MINE DUMP SEEP #3

~~SKD SITE IS WET ON SURFACE BUT NO H_2O TO COLLECT SAMPLE~~ WRONG LOCATION FOUND SITE

SAMPLE TIME: 1640
SAME AS MDS026 BOTTLES

pH- 7.66 S.U.
SC 898 umhos/cm
Temp - 15.09°c
DO(mg/l) 5.46
ORP - 20.8 MV
TURBIDITY 8.85 NTU

H_2O IS SLIGHT COLOR - TANNIN/TEA
STAGNANT H_2O W/ LOTS OF VERY SMALL MACROINVERTEBRATE JUST BL. THE SURFACE
NO APPARENT FLOW TO MEAS.

GRAB W/ PERRY PUMP

END OF DAY YSI 556 MTR
CALIBRATION 5/16/2016 @ 1820

DO mg/l - 6.02 @ 592.6 mmHg

pH - 7.0 STD - 7.14 Reading

SC - 1413 @ 25°c - 1406 @ 19.9°c

ORP 221.3 @ 19.9°c -
STD = 223 @ 20°c

TURBIDITY STD 20 NU - READS 19.79

MAY 17 2010
SPRING / SEEP SAMPLING
S. STACEY / T. BROWNING

FIELD METER CALIBRATION
1147 HRS

YSI 556

pH - 2PT 7.0 SU - 7.08 SU READING
4.0 SU - 4.05 SU READING

ORP ~~-200~~ 220 MV STD - 208.2 @ 18.35°C

DO - 70.7% @ 599.9 mmHg . BEFORE
78.6% @ 599.9 mmHg AFTER

SC - 1413 @ 25°C STD - 1435 @ 22.07°C

TURBIDITY - OAKTON T-100

800 NTU / 100 NTU / 20 NTU / 0.02 NTU STDS

MD5030 - BALLARD MINE, PIT #2
UPPER DUMP SEEP

SAMPLE TIME 1315
STAGNANT H_2O - NO FLOW

pH - 7.08
SC - 903 umhos/cm
Temp - 8.06°C
DO (mg/l) 7.45
ORP - 12.6 MV
TURBIDITY - 15.4 NTU

BOTTLE LIST
1-250 4°C - TDS
1-250 HNO_3 - Vanadium
1-250 - HNO_3 - Cd - Se
1-250 FILTERED SO_4 & Cl
1-250 FILTERED w/ HNO_3 - Cd
1-250 - FILTERED w/ HNO_3 Ca, Mg

GRAB w/ PERRY PUMP

MST096 - TRIB OF N. FK. WOOLEY VALLEY CK. BL. BALLARD MINE
DRY - NO SAMPLE TAKEN
1500 HRS

MSG-004-1 - BALLARD MINE HOLMGREN SPG
SAMPLE TIME: 1530

SPREADS OUT - CAN'T MEAS.
FLOW, BIG SPRING
SAME BOTTLES AS MDS030

pH - 7.92
SC - 591 µmhos/cm
Temp - 14.24°c
DO (mg/l) - 8.23
ORP - 25.0 MV
TURBIDITY - 9.35 NTU

GRAB W/ PERRY PUMP

MSG004-2 - DUPLICATE
SAMPLE TIME
1540

MSG-004-2
pH - 7.87
SC - 519
Temp - 14.21°c
DO (mg/l) - 8.35
ORP - 15.3 MV ~~500~~ - DIDN'T HIT RD. BUTTON
TURBIDITY - ~~2.14~~ NTU
10.96

MSG005 - BALLARD MINE, CATTLE SPRING
SAMPLE TIME: 1600

pH - 7.44 SU
SC - 566 µmhos/cm
Temp - 11.30°c
DO - 7.38 mg/l
ORP - 39.8 MV
TURBIDITY - 2.01 NTU

FLOW-TIME/VOL
1 3/4c - 2.3s.
2c, 2.4s
2 1/4c. 2.6s

COLLECTED FROM PIPE DISCHARGE @ STOCK TANK
BOTTLES SAME AS MSD030 EXCEPT FOR 3 OF 4 HNO_3 ARE 500 ML - Ran out of 250 ML

MSG007 - BALLARD MINE - S OF SE SPRING

NO SAMPLE COLLECTED.
SPONGY IN PLACES - V. SMALL POCKETS OF STANDING H_2O BUT NOT ENOUGH TO COLLECT SAMPLES.
1635 HRS
FOUND BROKEN STAKE @ SITE - NOT IDENTIFIABLE

MSG006 - BALLARD MINE - SOUTHEAST SPRING

SAMPLE TIME: 1700
SEVERAL SPRINGS FORM CHANNEL

pH - 7.12 S.U.
SC - 1204 umhos/cm
Temp - 12.48°C
DO - 5.93 mg/l
ORP - 4.8 MV
TURBIDITY - 3.99 NTU

COLLECTED W/ PERRY SAMPLER
ALL HNO_3 BOTTLES ARE 500 ML (4)

MSG006
FLOW - ESTIMATE W/ MARSHA McBIRNEY

W = 0.8 FT
D = 0.2 FT
V = 0.70 FT/SEC

MST069 - SHORT CK. BL. BALLARD MINE

SAMPLE TIME: 1745
BOTTLES SAME AS MSG006
COLLECTED W/ PERRY PUMP

pH - 7.74 SU
SC - 2406 umhos/cm
Temp - 13.33°C
DO - 7.00 mg/l
ORP - 35.4 MV
TURBIDITY - 21.9 NTU

FLOW - TIME/VOL

1/4 C.	6.2 SEC
1/4 C.	6.6 SEC
1/4 C.	6.3 SEC.

MST069 - WATER BLANK
SAMPLE TIME
1745 HRS
1005B-GW-01 - Sample ID
filled w/ Distilled H_2O
No filter

MAY 17 2010 - 1800 Hrs
END OF DAY CALIBRATION ✓

YSI 556 MTR

pH - 7.0 STD - MTR RDS 7.00 SU
4.0 STD. - MTR RDS 4.08 SU

DO - METER RDS 5.95 mg/l 601.2 mmHg

SC - METER RDS 1455 @ 21.5°C
STD = 1413 @ 25°C

ORP - METER RDS. 221.2 MV @ 21.8°C
STD RDS. 222 MV @ 20°C

OAKTON T-100 TURBIDITY MTR

20 NTU STD - MTR READS 20.1 NTU

1005ER-GW-01
EQUIPMENT RINSEATE
BLANK
SAMPLE TIME 1845

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9/15/10 **Arrival Time** 1330

Field Personnel
Leland Fuhrig **Signatures**

SITE DESCRIPTION

Station Name Enoch Valley, West Dump Seep **Station Number** MDS025

Latitude N 42 ° 52 ' 12.1 " **Longitude** W 111 ° 24 ' 14.41 "

Elevation 6697 ft **Datum** NAD 27 **Photo Number** LF camera 0915 10...

Site & Stream Description Hardly any water, muddy area with prevalent oxides

Surface Water Characteristics (color, odor, appearance): Slight odor, orange / brown in color. grassy / willows

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(peri). Up-stream / Across-stream

Sample ID: 1009GWMDS025-U/F **Sample Time:** 1335

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1405		
Water Temperature (°C)					16.19		
Specific Conductivity (µS/cm) @ 25° C					1435		
Conductivity (µS/cm)					1194		
TDS (g/L)					0.932		
Dissolved Oxygen (% sat.)					34.1		
Dissolved Oxygen (mg/L)					3.31		
pH					5.64		
ORP (mV)					91.9		
Turbidity (FTU)					190.8		
Air Temperature (°C)					25		

Not enough water at station location to submerge YSI probes and attain parameters, water placed in 1L bottle

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 15 / 10 **Time** 1415 **Station Number** MDS 025

Completed by: C. Fahrig **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4	Flow Measurement					
	5						
	6	Not Possible					
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 15 / 10 **Arrival Time** 1030

Field Personnel
Leland Fuhrig **Signatures**

SITE DESCRIPTION

Station Name Enoch Valley, South Dump seep **Station Number** MDS026

Latitude N 42 ° 51 ' 48.6 " **Longitude** W 111 ° 23 ' 36.7 "

Elevation 6640 ft **Datum** NAD 27 **Photo Number** LF camera 091510...

Site & Stream Description Narrow boggy area, no defined single channel, grassy. PVC pipe exists but is under heavy sediment, buried

Surface Water Characteristics (color, odor, appearance): clear mostly but slightly muddy from sediment. No odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1009GWMDS026-UF **Sample Time:** 1120

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	1100	1105			1140		
Water Temperature (°C)					9.11		
Specific Conductivity (µS/cm) @ 25° C	1413	7612			1672		
Conductivity (µS/cm)					1166		
TDS (g/L)					1.087		
Dissolved Oxygen (% sat.)	79.2 @ 601.3	79.6			47.5		
Dissolved Oxygen (mg/L)					5.43		
pH	4.01, 7.04	7.20			7.30		
ORP (mV)	225	215.3			71.9		
Turbidity (FTU)	1000 / 101 / 0.02	10.17			66.71		
Air Temperature (°C)					21		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 15 / 10 **Time** 1230 **Station Number** MAJ026

Completed by: L Fuhrig **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	60	0.5
2	60	0.55
3	60	0.55

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 14 / 10 **Arrival Time** 1345

Field Personnel

Leland Fuhrig
Emily Jackson

Signatures

SITE DESCRIPTION

Station Name Ballard Mine, Pit #2 Upper DS **Station Number** MDS030

Latitude N 42 ° 49 ' 41.5 " **Longitude** W 111 ° 29 ' 20.3 "

Elevation 6598 ft **Datum** NAD 27 **Photo Number** LF camera 09140...

Site & Stream Description rocky / grassy, drainage, very little water

Surface Water Characteristics (color, odor, appearance): No odor, somewhat muddy but mostly just when disturbed

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1009GWMDS030-1/2-US/F **Sample Time:** 1355

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	1500	1536	1548		1530	1543	
Water Temperature (°C)	20	24.21	23.31		9.36	9.58	
Specific Conductivity (µS/cm) @ 25° C	1413	7890	7812		864	866	
Conductivity (µS/cm)					605	611	
TDS (g/L)					0.561	0.563	
Dissolved Oxygen (% sat.)	76.8				58.1	52.5	
Dissolved Oxygen (mg/L)					6.69	6.40	
pH	4.01, 7.02, 10.01	7.16	7.13		6.61	6.62	
ORP (mV)	223,	280.0	299.9		125.0	183.3	
Turbidity (FTU)	1000/10/0.02	10.41	10.32		186	171	
Air Temperature (°C)					27	27	

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 14 / 10 **Time** 1550 **Station Number** MD5030

Completed by: L. Fishing **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
Flow Not	Measurable	

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 15 / 10 **Arrival Time** 1525

Field Personnel

Leland Fuhrig **Signatures** [signature]

SITE DESCRIPTION

Station Name Henry Mine, Dump Seep #3 **Station Number** MDS034

Latitude N 42 ° 53 ' 46.8 " **Longitude** W 111 ° 29 ' 10.5 "

Elevation 6367 ft **Datum** NAD 27 **Photo Number** LF camera 091510 ...

Site & Stream Description DRY

Surface Water Characteristics (color, odor, appearance): DRY

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 15 / 10 **Time** 1525 **Station Number** MDJ0341

Completed by: L. Fuhrig **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

DRY

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 14 / 10 **Arrival Time** 1150

Field Personnel

Leland Fuhrig **Signatures**

Emily Jackson

SITE DESCRIPTION

Station Name Ballard Mine, Holmgren Spring **Station Number** MSG004

Latitude N 42 ° 49 ' 16.9 " **Longitude** W 111 ° 28 ' 12.5 "

Elevation 6627 ft **Datum** NAD 27 **Photo Number** LF camera 09/14/10...

Site & Stream Description In wooded area, no defined channel but roughly 10'-15' wide boggy drainage, grassy

Surface Water Characteristics (color, odor, appearance): muddy, slight odor, floating debris

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1005SWMSG004-U/F **Sample Time:** 1210

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	1115				1305		
Water Temperature (°C)					10.50		
Specific Conductivity (µS/cm) @ 25° C	1413	1439			524		
Conductivity (µS/cm)							
TDS (g/L)					0.340		
Dissolved Oxygen (% sat.)	77.2	77.2			18.7		
Dissolved Oxygen (mg/L)					2.02		
pH	7.40	7.22 3.82			6.18		
ORP (mV)	220	219.2			66.4		
Turbidity (FTU)	1000/10/ 0.02				183.0		
Air Temperature (°C)					24		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9/14/10 **Time** 1310 **Station Number** MS6004

Completed by: L. Fuhrig **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Boggy Area - no measurable flow

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 15 / 10 **Arrival Time** 1310

Field Personnel

Leland Fuhrig **Signatures** [signature]

SITE DESCRIPTION

Station Name West Pond Ck. headwaters, below West Pond **Station Number** MJT 144

Latitude N 42 ° 52 ' 15.8 " **Longitude** W 111 ° 24 ' 21.5 "

Elevation 6580 ft **Datum** NAD 27 **Photo Number** LF camera - 091510...

Site & Stream Description Small stream channel below pond and above two small dams. DRY

Surface Water Characteristics (color, odor, appearance): DRY

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

DRY

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 14 / 10 **Time** 1650 **Station Number** MST069

Completed by: L. Fuhrig **Checked by:** E. Jackson

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	32.	1.25
2	42	1.2
3	41	1.5

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 15 / 10 **Time** 1310 **Station Number** MST 144

Completed by: L. Fuhrig **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

DRY

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 8 / 16 / 10 **Arrival Time** 1630

Field Personnel

L. Fuhrig **Signatures**

SITE DESCRIPTION

Station Name Blackfoot River below Ballard Creek **Station Number** MST019

Latitude N 42 ° 48 ' 51.5 " **Longitude** W 111 ° 30 ' 22.2 "

Elevation 6296 ft **Datum** NAD 27 **Photo Number** LF camera 09/15/10 ...

Site & Stream Description Blackfoot River - under haul road bridge

Surface Water Characteristics (color, odor, appearance): clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, ~~Horizontal-bottle~~, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: ~~1009SW~~ MST019 - U/F **Sample Time:** 1635

" - MS

" - MSD

Field Measurements

Parameter	Calibration	Calibration Check 1 (EOD)	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time		1700			1650		
Water Temperature (°C)		22.10			14.28		
Specific Conductivity (µS/cm) @ 25° C		7262			316		
Conductivity (µS/cm)					254		
TDS (g/L)					0.245		
Dissolved Oxygen (% sat.)					86.5		
Dissolved Oxygen (mg/L)					8.77		
pH		7.13			7.57		
ORP (mV)		214.6			191.3		
Turbidity (FTU)		9.90			4.78		
Air Temperature (°C)					23		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 16 / **Time** 1645 **Station Number** MST019

Completed by: L. Fuhrig **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
From USGS Website:		
	.56 CFS	

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 16 / 10 **Arrival Time** 1500

Field Personnel

Leland Fuhrig **Signatures** [signature]

Emily Jackson [signature]

SITE DESCRIPTION

Station Name Blackfoot River below State Land Ck. **Station Number** MST020

Latitude N 42° 48' 31.97" **Longitude** W 111° 30' 06.28"

Elevation 6300 ft **Datum** NAD 27 **Photo Number** LF camera 091610

Site & Stream Description Black-foot river south of bridge, gravelly bank on one side, willows on opposite

Surface Water Characteristics (color, odor, appearance): clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1009SWMST020-U/F **Sample Time:** 1510

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1510		
Water Temperature (°C)					14.15		
Specific Conductivity (µS/cm) @ 25° C					317 ~~0.317~~		
Conductivity (µS/cm)					251		
TDS (g/L)					0.202		
Dissolved Oxygen (% sat.)					84.0		
Dissolved Oxygen (mg/L)					8.63		
pH					7.46		
ORP (mV)					180.6		
Turbidity (FTU)					5.34		
Air Temperature (°C)					29°		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 09 / 16 / 10 **Time** 1510 **Station Number** MST020

Completed by: L. Fuhrig **Checked by:** E. Jackson

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 1.10 **ft** **L.E.W.** ~~1.10~~ 47.5 **ft** **Total Width** 46.4 **ft**

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 (0.6) 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 (0.6) 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
2.5	1	0.74	1.89	25.0	16	0.89	1.51
4.0	2	0.78	2.05	26.5	17	0.95	2.08
5.5	3	0.83	2.41	28.0	18	0.75	2.11
7.0	4	0.84	2.38	29.5	19	0.68	1.69
8.5	5	0.89	1.97	31.0	20	0.73	1.45
10.0	6	0.97	1.99	32.5	21	0.64	1.34
11.5	7	0.90	1.40	34.0	22	0.63	1.22
13.0	8	0.57	2.14	35.5	23	0.56	0.94
14.5	9	0.61	2.55	37.0	24	0.54	0.69
16.0	10	0.79	2.18	38.5	25	0.53	0.85
17.5	11	0.99	2.09	40.0	26	0.52	0.64
19.0	12	0.99	1.93	41.5	27	0.50	0.66
20.5	13	0.94	2.53	43.0	28	0.49	0.80
22.0	14	1.01	2.17	44.5	29	0.39	~~1.04~~ 0.42
23.5	15	0.82	1.94	46.0	30	0.28	0.40

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 16 / 10 **Arrival Time** 1140

Field Personnel

Leland Fuhrig **Signatures** Leland Fuhrig

Emily Jackson

SITE DESCRIPTION

Station Name Immediately below Henry Mine (1997 #24) **Station Number** MST044

Latitude N 42 ° 53 ' 50.60 " **Longitude** W 111 ° 29 ' 24.80 "

Elevation 6258 ft **Datum** NAD 27 **Photo Number** LF camera 091610...

Site & Stream Description 8-10' wide flow in channel, sediment - rocks, grasses moss on rocks

Surface Water Characteristics (color, odor, appearance): clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 10095WMST044 - U/F **Sample Time:** 1150

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1205		
Water Temperature (°C)					14.46		
Specific Conductivity (µS/cm) @ 25° C					803		
Conductivity (µS/cm)					641		
TDS (g/L)					0.522		
Dissolved Oxygen (% sat.)					87.9		
Dissolved Oxygen (mg/L)					8.95		
pH					8.29		
ORP (mV)					81.8		
Turbidity (FTU)					3.85		
Air Temperature (°C)					26°		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 16 / 10 **Time** 1150 **Station Number** MST044

Completed by: L. Fuhrig **Checked by:** E. Jackson

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 1.50 ft **L.E.W.** 7.00 ft **Total Width** 5.50 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
~~1.50~~ 1.90	1	0.45	Ø				
2.3 ~~1.90~~	2	0.53	0.06				
2.7	3	0.66	0.57				
3.1	4	0.63	0.11				
3.5	5	0.56	0.44				
3.9	6	0.60	0.61				
4.3	7	0.68	1.02				
4.7 ~~4.7~~	8	0.61	1.72				
5.1 ~~5.0~~ ~~4.9~~	9	0.59	2.24				
5.5 ~~5.1~~	10	0.81	0.20				
5.9 ~~5.5~~	11	0.81	0.39				
6.3 ~~5.9~~	12	0.82	0.33				
6.7	13	0.89	0.09				
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 16 / 10 **Arrival Time** 1010

Field Personnel

Leland Fuhrig **Signatures** Leland Fuhrig

Emily Jackson

SITE DESCRIPTION

Station Name Little Blackfoot River above Henry CK **Station Number** MST045

Latitude N 42 ° 54 ' 10.70 " **Longitude** W 111 ° 29 ' 30.10 "

Elevation (p300) ft **Datum** NAD 27 **Photo Number** LF camera 091610...

Site & Stream Description 8-12' wide flow in channel, meandering, sediment + rocks + grass. Some grass floating.

Surface Water Characteristics (color, odor, appearance): clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 10095WMST045 - 1/2/3 - U/F **Sample Time:** 1020 | 1030 | 1040

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	0830	1020	1040	1050	1025	1050	1105
Water Temperature (°C)	10	15.11	17.92	17.15	11.66	11.84	11.96
Specific Conductivity (µS/cm) @ 25° C	14113	7693 ~~14113~~	7632	7630	816	817	817
Conductivity (µS/cm)	—	—	—	—	608	612	614
TDS (g/L)	—	—	—	—	.530	0.531	0.531
Dissolved Oxygen (% sat.)	87.5	~~78~~ —	—	—	78.7	77.7	76.3
Dissolved Oxygen (mg/L)	—	—	—	—	8.53	8.39	8.22
pH	7.06 4.00	~~7.26~~ ~~3.69~~ 6.98	7.14	7.10	7.58	8.05	8.08
ORP (mV)	226	~~232~~ 232.1	227.2	230.4	111.11	113.4	123.1
Turbidity (FTU)	1000/101 0.02	9.94	10.24	9.97	3.11	3.05	2.72
Air Temperature (°C)	—	—	—	—	21.5	22	22

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 16 / 10 **Time** 1110 **Station Number** MST045

Completed by: L. Fuhrig **Checked by:** E. Jackson

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 1.5 ft **L.E.W.** 9.3 ft **Total Width** 7.8 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 (0.6) 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
2.0	1	0.275	Ø				
2.5	2	0.590	Ø				
3.0	3	0.670	0.43				
3.5	4	0.750	0.84				
4.0	5	0.720	0.30				
4.5	6	0.930	0.35				
5.0	7	1.00	0.73				
5.5	8	0.950	0.52				
6.0	9	0.750	0.31				
6.5	10	1.05	0.35				
7.0	11	0.95	0.38				
7.5	12	1.00	0.59				
8.0	13	0.73	0.80				
8.5	14	0.60	0.54				
9.0	15	0.73	0.26				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9/14/10 **Arrival Time** 1610

Field Personnel

Leland Fuhrig **Signatures**

Emily Jackson

SITE DESCRIPTION

Station Name Short Ck. below Ballard Mine **Station Number** MST069

Latitude N 42 ° 49 ' 11.6 " **Longitude** W 111 ° 29 ' 22.4 "

Elevation 6388 ft **Datum** NAD 27 **Photo Number** LF camera 09140...

Site & Stream Description Narrow (1-2' wide) grassy channel below waste pile

Surface Water Characteristics (color, odor, appearance): Muddy, mostly from sediment disturbance. No color/odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1009GWMST069-U/F **Sample Time:** 1620
1009SWMST069-U/F

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1645		
Water Temperature (°C)					12.67		
Specific Conductivity (µS/cm) @ 25° C					2334		
Conductivity (µS/cm)					1783		
TDS (g/L)					1.517		
Dissolved Oxygen (% sat.)					DO.9		
Dissolved Oxygen (mg/L)					8.50		
pH					7.44		
ORP (mV)					162.0		
Turbidity (FTU)					319.7		
Air Temperature (°C)					21		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2010 SW Sampling (1005813.020101)

Date 9 / 14 / 10 **Time** 1650 **Station Number** MST069

Completed by: L. Fuhrig **Checked by:** E. Jackson

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	32.	1.25
2	42	1.2
3	41	1.5

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

WELL SAMPLING FORM

Page: 1 of ____

Project No.: ____ Client: Monsanto Date: 9/17/10 Well ID: MMW010

Task: GW Sampling Field Crew: L. Fuhrig, T. Ostler

Measuring Point (MP): gray disk Water Level (WL): 11.15 ft below MP

Sampling Method (see applicable calculations below): purge + sample Device: Grundfos / bladder

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): ____ Starting PSI = (½ WL + 20): 25.5
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): ____ ft below MP Water Height (H): ____ ft below MP Casing Radius (r): ____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ____ gal Required Run Time: ____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1105	11.15	purged dry w/ Grundfos, waiting for recovery							
1113	22.6	—							
1118	20.0	—							
1135	13.0	—							
1151	11.5	—							
1203	11.20								
1208	11.7	-	1L	10.22	6.59	90.1	[illegible]	1683	58.48
1212	12.4		5L	9.59	6.22	109.8	2.76	1694	55.82

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1212	12.4	1	5	9.59	6.22	109.8	2.76	1694	55.82

SAMPLE ID: ____ **TIME:** ____

Final Low Flow Sampling Settings: PSI: 30 Charge: 5 sec Exhaust: 10 sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 9/17/00 Well ID: MMW013

Task: GW Sampling Field Crew: L. Fuhrig, T. Ostler

Measuring Point (MP): gray disk Water Level (WL): [redacted] 8.0 ft below MP

Sampling Method (see applicable calculations below): low flow Device: bladder

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 3.5 Starting PSI = (½ WL + 20): 24
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0830	[redacted]	cal Check	–	11.27	7.08	243.2		7650	10.19
0905	[redacted]		2.25L	7.90	6.87	246.0	6.45	757	3.99
0910	8.08	0.55	5L	7.45	6.80	182.0	6.54	762	3.68
0915	8.08	0.7	8.5	7.49	6.97	157.0	6.51	761	2.49
0920	8.08	0.7	12	7.52	7.08	146.0	6.47	761	1.92
0925	8.08	0.6	15	7.55	7.06	143.4	6.43	760	1.57
0930	8.08	0.55	17.75	7.56	7.07	141.1	6.41	760	1.91

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0930	8.08	0.55	17.75	7.56	7.07	141.1	6.41	760	1.91

SAMPLE ID: 0009GWMMW013-U/F **TIME:** 0935

Final Low Flow Sampling Settings: PSI: 25 Charge: 5 sec Exhaust: 10 sec

WELL SAMPLING FORM

Page: 1 of ____

Project No.: ____ Client: Monsanto Date: 9/17/10 Well ID: MMW029

Task: GW Sampling Field Crew: L. Fuhrig, T. Ostler

Measuring Point (MP): gray disk Water Level (WL): 24.68 ft below MP

Sampling Method (see applicable calculations below): low flow Device: bladder

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 5.4 Starting PSI = (½ WL + 20): 32
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): ____ ft below MP Water Height (H): ____ ft below MP Casing Radius (r): ____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ____ gal Required Run Time: ____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1330	24.68	cal check		24.69	7.05	223.3		7710	10.99
1340	24.73	-	0.25	12.55	7.20	135.3	5.55	1451	3.86
1345	24.76	0.3	1.75	10.66	6.63	148.2	5.43	1470	4.98
1350	24.76	0.2	2.75	10.02	6.60	143.1	5.43	1472	1.45
1355	24.76	0.25	4.0	10.02	6.67	137.5	5.43	1472	1.44
1400	24.77	0.2	5.0	9.95	6.67	134.4	5.44	1473	1.86
1405	24.77	0.2	6.0	9.94	6.71	129.2	5.47	1471	1.72
1420	EOD	cal check		23.36	7.08	215.8		7711	9.95

Continue stabilization readings on additional pages if necessary

began purge 1335

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1405	24.77	0.2	6.0	9.94	6.71	129.2	5.47	1471	1.72

SAMPLE ID: 1009GWMMW029-1/2-D/F **TIME:** 1410

Final Low Flow Sampling Settings: PSI: 30 Charge: 5 sec Exhaust: 17 sec

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

ALL-WEATHER

ENVIRONMENTAL FIELD BOOK

Name Leland Fuhrig

Address

Phone 520 904-1598

Project Fall SW/GW Sampling
Monsanto

This book is printed on "Rite in the Rain" All-Weather Writing Paper - A unique paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.

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PAGE	REFERENCE	DATE

Location Monsanto / Ballard Date 9/14/10

Project / Client Leland Fuhrig, Emily Jackson

Partly cloudy, 50/60°F

0800 Met in Soda Springs, picked up supplies in town and on to mine site.

0900 Met Barry at mine site, got supplies, did vehicle insp. AK drilling is here and will prep for well drilling today.

1030 to machine shed for the rest of supplies and YSI / Turb calibration

1115
YSI / Turb calibration
Turbidity: 1000/10/0.02
SC: 1413 / 1439
pH: 7.22 / 3.82 7.0/4.0

Location MSG004 Date 9/14/10

Project / Client

Arrived 1150

MSG004 Leland + Emily
Ballard Mine, Holmgren Spring
N 42° 49' 16.9"
W 111° 28' 12.5"
Elev 6627
Photos: LF Camera 091410...
In wooded area, no defined channel but roughly 10'-15' wide boggy drainage, grassy
Muddy, slight odor, floating debris

Sample collected w/ 1L bottle
1009GWMSG004 - U/F, 1210

Time 1305	DO mg/L 2.02
H_2O T 11.5	pH 6.18 *
SC 524	ORP 66.4 *
Cond -	Turb 183
TDS 0.340	Air T 24
DO% 18.7	

* Had problems with pH/ORP probe on initial readings, re-calibrated

Location Date

Project / Client

wide, boggy area, no flow recorded

MDS030 LF, EJ

Arrived 1345
Ballard Mine, Pit #2 Upper Dump Sp
N 42° 49' 41.5" W 111° 29' 20.3"
Elev 6598 ft.
Photos on LF camera 091410...
- Rocky/grassy drainage, very little water
- No odor, somewhat muddy but mostly just when disturbed
samples collected at 1355
↳ IDs: 1009GWMDS030 - 1/2 - U/F

* YSI we had been using was giving bad pH measurements, returned it to mine ofc for a new YSI

Location MDS030 Date 9/14/10

Project / Client

	Mcol	CK1	CK2	Sam1	sam2
Time	1500	1536	1548	1530	1543
H_2OT	20	24.21	23.31	9.36	9.58
SC	1413	7890	7812	864	866
Cond				605	611
TDS				0.561	0.563
DO%	76.8			58.1	56.5
DO[]				6.69	6.40
pH	4.01 7.04 10.04	7.16	7.13	6.61	6.62
ORP	223	280.0	299.9	125.0	183.3
Turb	1000 0.02	10.11	10.32	186	171
AirT				27	27

Flow not measurable

Location MST069 Date 9/14/10

Project / Client

Arrived 1610

MST069 Short Ck. below Ballard Mine

N 42° 49' 11.6"

W 111° 29' 22.4" Elev 6388

Photo # 9LF camera 9/14/10

- Narrow (1'-2' wide) channel, grassy below waste pile
- Muddy, mostly from sed. disturbance

No color/odor

Samples collected at 1620, both GW and SW collected at this station

IDs: 1009GWMST069-U/F

1009SWMST069-U/F

Time	1615		
H_2OT	12.67	[DO]	8.50
SC	2334	pH	7.44
Cond	1783	ORP	162.0
TDS	1.517	Turb	39.7
DO%	80.9	AirT	21

Location MST069 Date 9/14/10

Project / Client

MST069 1650

Flow:

Meas. #	Time(s)	Vol (L)
1	32	1.25
2	42	1.2
3	41	1.5

1700 To Machine shed, did equipment rinse and blanks

1745 OFFSITE, to Pocatello to pick up rental truck

Location Enoch Valley Date 9/15/10

Project / Client LF

clear, sunny, 60°-70°F

0730 Picking up supplies in town

0800 Velocity meter from ~~shipping~~ Plant

0830 Machine shop for supplies and bottle inventory

0930 Mine ofc for supplies, radio, vehicle inspection

1030 MD5026

Enoch Valley, South Dump Seep

N 42°51'48.6"

W 111°23'36.7" Elev 6640

- Narrow boggy area, no defined single channel, grassy. DVC pipe exists but is under heavy sediment, buried.
- clear but mostly mudd, when sediment is disturbed. No odor.

Location MD5026 Date 9/15/10

Project / Client

Sample collected @ 1120
↳ ID: 1009GWMD5026-U/F
Matrix spikes also collected, 1200
1009GW-MS-U/F
1009GW-MSD-U/P

	Cal	Check	Sample
Time	1100	1105	1140
H2OT			9.11
SC	1413	7642	1672
cond			1166
TDS			1,087
DO%	79.2 @ 101.8	79.6	47.5
[DO]			5.45
pH	4.01 7.04	7.00	7.30
ORP	225	215.3	21.9
Turb	1000/0 0.02	10.17	66.21
AirT			21

Location Date 9/15/10

Project / Client

Flow - 12:30

Meas	Time (s)	Vol (L)
1	60	0.5
2	60	0.55
3	60	0.55

1310 MST 1414
West Pond Ck. headwaters below West Dr
N 42° 52' 15.8"
W 111° 24' 21.5" Elev 6580
photo on LF camera, 091510 ...
→ DRY
No sample or flow

Location MDS 025 Date 9/15/10

Project / Client LF

1330 MDS025

Enoch Valley, West Dump Seep

N 42°52' 12.1"

W 111°24' 14.4"

Elev 6697

Photo LR camera 091510...

- Hardly any water, muddy area with prevalent oxides
- Slight odor, orange/brown in color, grassy/willows

Sampled at 1335

↳ ID: 1009GWMDS025 -U/F

Time	1405		
H_2OT	16.19		
SC	1435	pH	5.64
Cond	1194	ORP	96.9
TDS	0.932	Turb	190.8
DO%	34.1	Air T	25
[DO]	3.31		

Location Date 9/15/10

Project / Client

No Flow meas. collected - barely enough standing H_2O to even collect sample

MDS034 1525

Henry Mine, Dump Seep #3

N 42°53' 46.8" W 111°29' 10.5"

Elev 6367

coords are off - need to fix

DRY

No sample or flow

1600 To MST014 to try velocity meter but meter is not what ordered. MST019 does not require manual v measurement but short on bottles (4 extra sets req'd - MS/MSD/EQ(B)), back to shed for cooler packing. Verified with Levi McKay that Grundfos works

Location _____ Date 9/15/10

Project / Client _____

2000 Coolers packed with samples from 9/14, 9/15, made copies of COCs.

OFFSITE

Location Henry / Ballard Date 9/16/10

Project / Client

Emily, Leland

0730 To plant, shipped 3 coolers

0800 Met Emily Jackson at Ballard building area

0830 Shed - need HNO_3 bottles and filters, will get at mine ofc.

0900 Picked up supplies at Mine ofc, met w/ Barry. He needs us to meet him at 1 PM to go into the mine and sample w/ him

1010 MST045

Little Blackfoot River above Henry Ck

N 42° 54' 10.70"

W 111° 29' 30.10" Elev 6300

- 8'-12' wide flow in channel, meandering sediment + rocks + grass, some floating

- clear, no odor

Location MST045 Date 9/16/10

Project / Client

→ 1005 MST045 - 1/2/3/- U/F

Samples collected at 1020/1030/1040

	cal	ck1	CK2	CK3
Time	0830	1020	1040	1050
H_2O T	10	15.11	17.92	17.15
SC	1413	7643	7632	7630
Cond	–	–	–	–
TDS	–	–	–	–
DO%	87.5	–	–	–
[DO]	–	–	–	–
pH	7.06 4.00	6.98	7.14	7.10
ORP	220	232.1	227.2	230.4
Turb	1000/101 0.02	9.94	10.24	9.97
Air T	–	–	–	–

TC=178

Flow: 1110 REW 1.5 LEW 9.3

Dist	Subs #	Depth	Velocity
2.0	1	0.225	0
2.5	2	0.59	0
3.0	3	0.67	0.43
3.5	4	0.75	0.84
4.0	5	0.72	0.30
4.5	6	0.93	0.75

Location Date

Project / Client

Sam 1	Sam 2	Sam 3
1025	1050	1105
11.66	11.84	11.96
816	817	817
608	612	614
0.530	0.531	0.531
78.7	77.7	76.3
8.53	8.39	8.22
7.58	8.05	8.08
111.11	113.4	123.1
3.11	3.05	2.72
21.5	22	22

5.0	7	1.00	0.73
5.5	8	0.95	0.52
6.0	9	0.75	0.31
6.5	10	1.05	0.35
7.0	11	0.95	0.58
7.5	12	1.00	0.59
8.0	13	0.73	0.80
8.5	14	0.60	0.54
9.0	15	0.73	0.26

Location MST044 Date 9/16/10

Project / Client

MST044 1140 LF, EJ
↳ Immediately below Henry Mine
N 42°53'50.60"
W 111° 29' 24.85" Elev 6258
- 8'-10' wide flow in channel, sediment - rocks - grasses, moss on rocks
- clear, no odor
sample collected at 1150
↳ 1009SWMST044-U/F

Time	1205
H_2OT	14.46
SC	803
Cond	641
TDS	0.522
DO%	87.9
[DO]	8.95
pH	8.29
ORP	81.8
Turb	3.85
AirT	26

Location MST044 Date 9/16

Project / Client Time: 1150

REW 1.50 LEW 7.00 T=5.50'

Dist	Subs#	Depth	Vel
1.9	1	0.45	0
2.3	2	0.53	0.06
2.7	3	0.66	0.57
3.1	4	0.63	0.11
3.5	5	0.56	0.44
3.9	6	0.60	0.61
4.3	7	0.68	1.02
4.7	8	0.61	1.72
5.1	9	0.59	2.24
5.5	10	0.81	0.70
5.9	11	0.81	0.39
6.3	12	0.82	0.33
6.7	13	0.89	0.09

Location MST020 Date 9/16

Project / Client LF/EJ

1500 [MST020]
Blackfoot River below stadelandck
N 42°48'31.97"
W 111°30' 06.28" Elev 6300
- Blackfoot River E. of bridge
- clear, no odor
Sample at 1510
↳ 1009SWMST020 - J/F

Time	1510
H_2OT	14.15
SC	317
cond	257
TDS	0.206
DO%	84.0
[DO]	8.63
pH	7.46
ORP	130.0
Turb	0.34
AirT	29

Location MST020 Date 9/16

Project / Client REW 1.10 LEW 47.5 T=464

Dist	Subs#	Depth	Vel
2.5	1	0.79	1.89
4.0	2	0.78	2.05
5.5	3	0.83	2.41
7.0	4	0.84	2.38
8.5	5	0.89	1.97
10.0	6	0.97	1.99
11.5	7	0.90	1.40
13.0	8	0.57	2.14
14.5	9	0.61	2.55
16.0	10	0.79	2.18
17.5	11	0.99	2.09
19.0	12	0.99	1.93
20.5	13	0.94	2.53
22.0	14	0.91	2.17
23.5	15	0.82	1.94
25.0	16	0.89	1.51
26.5	17	0.95	2.08
28.0	18	0.75	2.11
29.5	19	0.68	1.69
31.0	20	0.73	1.45
32.5	21	0.64	1.34

Location MST020 Date 9/16

Project / Client

Dist	Subst#	Depth	Vel.
34.0	22	0.63	1.22
35.5	23	0.56	0.94
37.0	24	0.54	0.69
38.5	25	0.53	0.89
40.0	26	0.52	0.64
41.5	27	0.50	0.66
43.0	28	0.49	0.80
44.5	29	0.39	0.42
46.0	30	0.28	0.40

MST019 1630

Blackfoot River below Ballard Ck.

N 42 48 51.5"

W 111°30' 22.2" Elev 6296

- Blackfoot River under hard rd bridge
- clear, no odor

Sample at 1635, Remmerer

10095WMST019-U/F

" -MS

" -MSD

Location MST019 Date 9/16

Project / Client

		EOD check
Time	1650	1700
H_2OT	14.69	22.10
SC	316	7662
Cond	254	-
TDS	0.205	-
DO%	86.5	-
[DO]	8.72	-
pH	7.57	7.13
ORP	191.3	214.6
Turb	4.78	9.90
AirT	23	-

To Mine ofc for Well sampling supplies, will get sounder from Ak

Collected Bl.+ Eq. rinse

10098-SW-01-U/F

10098ER-SW-02-U/F

— OFFSITE 1830 —

Location Enoch / Henry / Ballard Date 9/17/10

Project / Client Monsanto

0600 In town - picked up ice, ziplocs, dropped off vel. meter at plant for shipping

0640 to Machine shed, picked up GW sampling equipment

0700 Met Travis, Emily at Mine ofc. got sounder from Barry's ofc, generators / compressor from core shed, put peristaltic back, fueled equipment,

calibration check: 0830

Temp	11.27 C
pH	7.08
ORP	243.2 mV
SC	7650 µS/cm
Turb	10.19

Location Enoch Date 9/17/10

Project / Client

MMW013 / 0830

L. Fuhrig, T. Ostler
WL = 8.0'
low flow (Gladder,
min purge: 3.5
starting DS1: 24 PSI

began purge @ 0900
stabilization at 0930

Final readings:

Time	0930
WL	8.08'
rate	0.85
Cum. V	17.75
Temp	7.56
pH	7.07
ORP	141.1
DO	6.41
SC	7660
Turb	1.91

Location MMW013 Date 9/17/10

Project / Client

~~Sampling~~

Sample collected at 0935

1009GWmmW013 - U/F

psi: 25 Charge: 5 Exhaust: 10

To shed for Grundfos and tubing,

MMW010 WL = 11.15' - gray disk

pulled out bladder pump, stored in clean fresh bag. put Grundfos in well, would not work initially but 2nd try, worked.

Purged dry at 1105

waited 1 hour for recovery.

11.20'

Collected sample after two rounds of readings

Final readings:

Time	1212	Cond	5L
WL	12.11	Temp	9.59
rate	1	pH	6.22

Location MMW010 Date 9/17

Project / Client

ORP	109.8
DO	2.76
SC	1694
Turb	55.82

ID: 1009GWMMW010 - U/F

Time: 1215

Settings PSI: 30

Charge: 5

exhaust: 10

1330 calibration check

Time	1330
WL	24.68
Temp	24.69
pH	7.05
ORP	223.3
SC	7710
Turb	10.09

Location MMW029 Date 9/17/10

Project / Client

T. Ostler, L. Fahrig

1300-1320 returned Grundfos pump and tubing to machine shed. Drove to MMW029 via Ballard haul road, opened gate and after driving through and closing gate the lock had a pin fall out of it and would no longer open.

MMW029

WL = 24.68'

MP: gray disk / low flow / bladder

min. purge: 5.4 L

starting PSI: 32

1335 began purge

1405 parameters stable, collecting sample (duplicate)

Time 1405	pH 6.71
WL 24.77'	ORP 129.2
rate 0.2 L/min	DO 5.47
cumV 6.0 L	SC 1471
Temp 9.94 C	Turb 1.72

Location Date 9/17

Project / Client

ID: 1009GWMMW029-1/2-D/F

Time: 1410

Settings: PSI 30

charge 5

exhaust 17

1420 end-of-day calibration check

Temp	23.36
pH	7.08
ORP	215.8
DO	
SC	7711
Turb	9.95

organized machine shed and equip, prepared samples for shipment for the rest of the day. Emily will ship mon. morning

OFFSITE 1830

A-4 2012 Spring and Fall Groundwater and Surface Water Sampling

TABLE A-7
2012 SPRING GROUNDWATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Elevation MP (ft-AMSL)	Static Water Level (ft-bmp)	Elevation Static Water (Ft-AMSL)	Purge Rate (L/min)	Cumulative Purge Vol. (L)	Water Temp (deg. C)	pH	ORP (mV)	D.O. (mg/L)	Spec Cond (uS/cm) @ 25 deg. C	Turbidity (NTU)	Device	Comments	Date	Time
WG	MBW006	6319.31	3.81	6315.5	0.12	4.6	7.93	7.45	50.1	4.6	0.822	1.9	Peristaltic	Low Flow	5/15/2012	11:57
WG	MBW009	6310.69	1.72	6308.97	0.2	9.25	8.4	6.99	209.5	2.29	1	4.69	Peristaltic	Low Flow	5/15/2012	14:53
WG	MBW011	6339.8	1.12	6338.68	0.3	14	6.72	6.81	238.5	1.2	0.658	5.98	Peristaltic	Low Flow	5/15/2012	17:40
WG	MBW027	6313.33	5.4	6307.93	0.08	2.3	7.06	7.16	146.4	7.85	1028	1.53	Peristaltic	N/A	5/13/2012	14:48
WG	MBW028	6339.99	5.4	6334.59	0.27	15.75	7.12	6.59	141.1	0.21	1263	1.73	Peristaltic	Standard Purge	5/13/2012	16:55
WG	MBW032	6499.13	11.24	6487.89	0.4	8.8	5.18	7.12	211.1	6.6	1.885	1.42	Peristaltic	Low Flow	5/14/2012	17:34
WG	MBW048	6421.72	0.8	6420.92	0.55	18	5.91	7.17	225.2	0.3	0.161	3.41	Peristaltic	Standard Purge	5/14/2012	16:30
WG	MBW085	6639.57	3	6636.57	0.16	7.25	5.32	6.85	314	8.88	127	4.8	Peristaltic	Standard Purge	5/11/2012	9:13
WG	MBW087	6587.3	1.8	6585.5	0.15	6	5.64	6.73	224.1	1.36	432	2.42	Peristaltic	Low Flow	5/11/2012	15:45
WG	MBW099	6599.25	0.74	6598.51	0.35	11.8	6	6.57	177.1	7.99	199	8.35	Peristaltic	Standard Purge	5/11/2012	12:16
WG	MBW107	6486.78	Dry	Dry	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
WG	MBW112	6404	Dry	Dry	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
WG	MBW130	6416.29	1.37	6414.92	N/A	N/A	7.06	7.07	358.7	2.19	0.179	62.4	Peristaltic	Purge/Sample	5/14/2012	10:25
WG	MBW131	6468.52	3.51	6465.01	0.12	2.52	6.86	7.18	210.4	6.01	0.115	3.55	Peristaltic	Low Flow	5/15/2012	9:54
WG	MBW135	6290.56	1.4	6289.16	0.5	11.25	6.99	7.22	163.9	1.04	334	7.87	Peristaltic	Standard Purge	5/12/2012	14:13
WG	MBW152	6280	8.61	6271.39	N/A	N/A	10.02	7.49	184.5	5.03	0.704	19.58	Peristaltic	Purge/Sample	5/14/2012	18:05
WG	MMW006	6485.46	255.22	6230.24	0.26	20.75	9.86	7.49	306.1	4.3	412	0.21	Bladder Pump	Low Flow	5/10/2012	12:06
WG	MMW007	6619.89	34.31	6585.58	0.96	158.3	7.34	7.01	264.6	0.73	240	1.77	Bladder Pump	Standard Purge	5/11/2012	9:07
WG	MMW009	6789.2	207.14	6582.06	0.5	72	9.43	7.3	15.8	0.07	552	4.2	Bladder Pump	Low Flow	5/8/2012	14:13
WG	MMW010	6462.62	2.01	6460.61	0.1	8.25	10.25	6.41	222.5	0.97	1448	4.74	Bladder Pump	Low Flow	5/14/2012	11:22
WG	MMW011	6268.31	77.15	6191.16	0.12	8.1	9.35	7.35	218.6	8.26	582	1.19	Bladder Pump	Low Flow	5/13/2012	10:45
WG	MMW012	6488.72	Dry	Dry	Dry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
WG	MMW013	6634.46	4.7	6629.76	0.37	11.5	7.29	7.03	272.5	9.22	225	0.61	Bladder Pump	Low Flow	5/12/2012	10:45
WG	MMW015A	6364.37	20.81	6343.56	0.1	13.7	11.27	6.84	100.7	4.1	645	4.81	Peristaltic	Low Flow	5/15/2012	15:01
WG	MMW017	6313.86	24.63	6289.23	0.1	4.55	12.88	6.88	142.1	5.06	1304	0.33	Bladder Pump	Low Flow	5/13/2012	15:48
WG	MMW018	6459.52	10	6449.52	0.18	3.9	8.53	7.25	123.5	6.83	151	1.38	Bladder Pump	Low Flow	5/15/2012	9:53
WG	MMW020	6525.71	271.46	6254.25	0.83	29	9.34	7.07	283.6	8.22	595	0.96	Bladder Pump	Low Flow	5/10/2012	14:12
WG	MMW021	6436.3	202.97	6233.33	0.275	16	9.47	7.1	325.2	4.29	540	0.5	Bladder Pump	Low Flow	5/10/2012	9:58
WG	MMW022	6635.85	202.67	6433.18	0.2	21.2	8.85	7.22	85	4.16	297	2.85	Bladder Pump	Low Flow	5/15/2012	10:02
WG	MMW023	6230.92	105.88	6125.04	0.48	26.5	9.89	7.13	-31.5	0.07	989	0.43	Bladder Pump	Low Flow	5/13/2012	12:45
WG	MMW024	6704.05	58.88	6645.17	0.87	18.75	7.75	7.11	258.1	3.19	279	0.27	Bladder Pump	Low Flow	5/12/2012	11:35
WG	MMW025	6612.87	28.82	6584.05	0.9	262.75	8.48	7.66	79.4	1.15	109	1.83	Bladder Pump	Standard Purge	5/11/2012	16:16
WG	MMW026	6599.21	277.71	6321.5	0.6	22	10.73	7.49	7.3	0.06	369	0.19	Bladder Pump	Low Flow	5/9/2012	16:30
WG	MMW027	6491.07	104.1	6386.97	0.65	11.5	7.95	7.18	73.9	3.72	1082	0.4	Bladder Pump	Low Flow	5/8/2012	17:38
WG	MMW028	6316.91	65.7	6251.21	0.8	19	8.24	7.41	201.8	7.82	529	0.67	Bladder Pump	Low Flow	5/13/2012	11:44
WG	MMW029	6498.67	20.13	6478.54	0.22	5.3	8.19	7.2	138.1	6.29	554	0.74	Bladder Pump	Low Flow	5/12/2012	9:13
WG	MMW030	6355.25	23.1	6332.15	1.2	357.5	9.56	7.58	101	0.57	150	0.97	Bladder Pump	Standard Purge	5/12/2012	12:14
WG	MMW031	6346.42	87.69	6258.73	0.64	14.5	9.69	7.52	173.1	7.97	202	0.08	Bladder Pump	Low Flow	5/14/2012	13:13
WG	MMW032	6446.39	19.46	6426.93	1.22	106.6	6.84	7.35	74	7.71	126	3.07	Bladder Pump	Standard Purge	5/15/2012	10:58
WG	MMW033	6489.84	11.55	6478.29	1	142	6.79	7.59	86.4	0.09	374	4.26	Bladder Pump	Standard Purge	5/14/2012	17:26
WG	MMW034	6640.31	10.96	6629.35	0.4	11.5	7.52	7.22	278.1	8.74	204	0.63	Bladder Pump	Low Flow	5/12/2012	10:09
WG	MMW035	6500.34	105.11	6395.23	0.3	13.5	8.69	6.87	193.4	2.21	1306	0.11	Bladder Pump	Low Flow	5/9/2012	13:33
WG	MMW036	6425.18	112.13	6313.05	0.5	18	8.29	7.58	61.2	7.56	385	0.6	Bladder Pump	Low Flow	5/8/2012	16:41
WG	MMW037	6419.39	112.5	6306.89	0.46	19.3	9.01	7.37	207.7	7.46	357	3.54	Bladder Pump	Low Flow	5/9/2012	11:39
WG	MPW019	6720.76	N/A	N/A	N/A	26	10.6	7.68	187.9	1.6	0.388	4.86	Peristaltic	Grab Sample	5/16/2012	9:50
WG	MW16A	6346.71	5.15	6341.56	0.08	3	15.63	7.62	208	0.63	1.446	4.83	Peristaltic	Low Flow	5/15/2012	13:34

GW	Groundwater	L/min	liters per minute
deg. C	degrees Celsius	mg/l	milligrams per liter
ft-AMSL	feet above mean sea level	mV	millivolts
ft-bmp	feet below measuring point	NTU	Nephelometric Turbidity Units
L	liters	uS/cm	microSiemens per centimeter

TABLE A-8
2012 SPRING SURFACE WATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Static Water Level (Feet)	Water Temp (deg. C)	pH	Spec Cond (uS/cm) @ 25 deg. C	Cond (uS/cm)	D.O. (% sat.)	D.O. (mg/l)	ORP (mV)	TDS (g/L)	Turbidity (NTU)	Air Temp (deg. c)	Discharge (cfs)	Comments	Date	Time
WS	MST019	N/A	11.84	7.65	0.51	0.382	75.1	8.1	229.6	N/A	18.89	19.25	179	River	5/13/2012	12:20
WS	MST020	N/A	11.25	8.1	0.517	0.381	64.4	7.02	145.5	N/A	18.56	11.5	161	River	5/13/2012	8:50
WS	MST025	N/A	9.54	7.1	2.019	1.422	37.5	4.25	90.1	N/A	17.66	20	0.0011	Seep	5/12/2012	13:20
WS	MDS026	N/A	11.05	7.31	1.623	1.19	56	6.13	227.5	N/A	24.27	19.5	0.0035	Seep	5/11/2012	17:15
WS	MDS030	N/A	9.18	7.13	0.838	0.585	54.2	6.2	225.1	N/A	6.19	19	0.0026	Seep	5/11/2012	14:32
WS	MDS034	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	5/9/2012	13:35
WS	MSG004	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	5/11/2012	13:45
WS	MSG005	N/A	7.18	7.38	0.588	0.388	63.7	7.65	338	N/A	1.28	18	0.005	Spring	5/11/2012	13:20
WS	MSG006	N/A	8.87	7.63	1.342	0.929	65.3	7.53	57.2	N/A	4.6	19	0.0177	Spring	5/10/2012	15:30
WS	MSG007	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	5/10/2012	17:00
WS	MST044	N/A	16.5	8.23	0.562	0.473	98.1	9.53	58.5	N/A	0	25	8.38	Stream	5/9/2012	13:10
WS	MST045	N/A	15.79	7.15	0.572	0.471	50.2	4.97	134.6	N/A	N/A	23	7.11	River	5/9/2012	10:52
WS	MST048	N/A	8.26	8.1	0.365	0.248	73.1	8.59	334	N/A	11.57	14	0.66	River	5/10/2012	10:50
WS	MST050	N/A	13.84	8.12	0.305	0.24	86.2	8.9	192.3	N/A	9.19	16	0.13	Creek	5/10/2012	13:00
WS	MST051	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry(Creek)	5/9/2012	14:20
WS	MST057	N/A	18.6	8.04	0.346	0.304	73	6.83	-2.7	N/A	N/A	25	0.00086	Creek	5/9/2012	16:26
WS	MST063	N/A	15.18	7.81	0.549	0.446	60.9	6.1	109	N/A	N/A	25	0.0053	Creek	5/9/2012	14:40
WS	MST066	N/A	12.31	7.69	0.656	0.497	74.2	7.92	234.1	N/A	6.85	22	0.22	Creek	5/12/2012	16:50
WS	MST067	N/A	9.93	7.4	1.553	1.106	56	6.28	226.9	N/A	8.45	17.5	0.0039	Creek	5/11/2012	15:25
WS	MST069	N/A	15.43	7.87	1.88	1.534	69.2	6.84	172	N/A	N/A	25	0.0764	Creek	5/8/2012	16:46
WS	MST089	N/A	12.82	7.53	0.37	0.284	62.9	6.65	126.7	N/A	3.04	18.5	0.02	Creek	5/11/2012	11:33
WS	MST090	N/A	14.37	7.75	0.359	0.289	73.3	7.42	176.7	N/A	1.35	15.5	0.06	Creek	5/11/2012	12:43
WS	MST092	N/A	8.06	7.54	0.4	0.271	61	7.2	39.2	N/A	13.63	16	0.0086	Creek	5/11/2012	10:50
WS	MST093	N/A	16.21	7.35	0.275	0.229	53.3	5.23	180.5	N/A	2.59	15	0.0025	Creek	5/10/2012	14:20
WS	MST094	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	5/11/2012	10:05
WS	MST095	NA	17.3	7.43	0.45	0.384	56	5.36	193	N/A	0.99	18.5	0.009	Stream	5/10/2012	14:56
WS	MST096	N/A	14.3	7.56	0.582	0.463	63.8	6.52	127.2	N/A	24.5	17.5	0.035	Creek	5/10/2012	17:20
WS	MST128	N/A	7.51	8.03	0.592	0.394	78.9	9.44	170.4	N/A	19.67	18	3.65	Creek	5/12/2012	10:50
WS	MST131	N/A	10.19	6.71	0.611	0.438	39.5	4.44	174.9	N/A	6.62	18	0.0009	Creek	5/12/2012	10:40
WS	MST132	N/A	9.01	7.96	0.589	0.409	76.4	8.8	188.8	N/A	19.8	19	2.61	Creek	5/12/2012	11:50
WS	MST133	N/A	14.61	7.58	0.303	0.243	72.3	7.35	170	N/A	14.17	16.5	0.08	Creek	5/11/2012	18:00
WS	MST136	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	5/12/2012	15:32
WS	MST143	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	5/12/2012	9:27
WS	MST144	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	5/12/2012	15:04
WS	MST226	N/A	6.45	7.2	0.331	0.214	33.7	4.14	291.6	N/A	1.1	16	0.0082	Creek	5/10/2012	12:20
WS	MST269	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	5/11/2012	16:51
WS	MST274	N/A	4.41	8.05	0.644	0.391	77.3	10.01	308.4	N/A	1.33	10.5	0.068	Creek	5/12/2012	8:44
WS	MST275	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5/12/2012	14:34

cfs	cubic feet per second	NTU	Nephelometric Turbidity Units
deg. C	degrees Celsius	N/A	Parameter not required / not collected
g/L	grams per liter	SW	Surface Water
mg/l	milligrams per liter	uS/cm	microSiemens per centimeter
mV	millivolts	% sat.	percent saturation

TABLE A-9
2012 FALL GROUNDWATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Static Water Level (ft-bmp)	Purge Rate (L/min)	Cumulative Purge Vol. (L)	Water Temp (deg. C)	pH	ORP (mV)	D.O. (mg/L)	Spec Cond (uS/cm) @ 25 deg. C	Turbidity (NTU)	Device	Comments	Date	Time
GW	MAW001	N/A	N/A	N/A	13.3	7.52	413	6.86	491.1	0.79	Grab Sample (Spigot)	Residential Well	9/18/2012	11:15
GW	MAW002	NA	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Residential Well, Not sampled ,no power to the pump.	9/19/2012	16:18
GW	MAW003	N/A	N/A	N/A	13.1	7.62	340.4	6.81	417.8	0	Spigot/Grab Sample	Sampled from the spigot on the west side of the house by the back fence.	9/18/2012	12:00
GW	MAW004	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Spoke with Sid Thompson about sampling the well. He said that the outlet piping is buried and a sample could not be collected at this time.	9/19/2012	17:15
GW	MAW005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Windmill Well	Dry	9/18/2012	9:35
GW	MAW006	N/A	N/A	N/A	10.2	7.56	170.5	6.91	330.5	9.83	Spigot/Grab Sample	Sampled from the spigot east of well at Godfrey shop. Residential Well.	9/19/2012	9:40
GW	MAW007	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No Sample collected form this well due to the wiring in the control box rotten and could not be repaired at the time of the sample.	9/18/2012	15:50
GW	MDW001	N/A	N/A	N/A	10.3	7.41	342.3	7.57	466	0.14	Spigot/Grab Sample	Sampled from the spigot on the NW corner of the shed. Residential Well.	9/18/2012	12:20
GW	MDW002	N/A	N/A	N/A	9.9	7.07	244.8	4.49	403.8	1.39	Spigot/Grab Sample	Sample collected from a spigot at the power pole adjacent to the barn.	9/18/2012	14:45
GW	MDW003	N/A	N/A	N/A	11.6	7.17	443.4	6.61	387	1.28	Spigot/Grab Sample	Sample was collected form a free flowing spigot near the fence and house.	9/18/2012	10:30
GW	MDW004	N/A	N/A	N/A	10.1	7.48	171.2	6.79	539.9	1.93	Spigot/Grab Sample	Ssample collected from a spigot in the well house.	9/19/2012	8:45
WG	MDW005	N/A	N/A	N/A	15.1	7.03	266.3	4.88	1230	0.96	Spigot/Grab Sample	Sample collected from a spigot in the well house behind the café.	9/18/2012	15:20
WG	MDW006	N/A	N/A	N/A	13.3	7.38	238	4.46	578.4	0.17	Spigot/Grab Sample	Sample collected from a spigot on the west side of the house.	9/18/2012	16:30

GW	Groundwater	mg/l	milligrams per liter
deg. C	degrees Celsius	mV	millivolts
ft-bmp	feet below measuring point	N/A	Parameter not required / not collected
L	liters	NTU	Nephelometric Turbidity Units
L/min	liters per minute	uS/cm	microSiemens per centimeter

TABLE A-10
2012 FALL SURFACE WATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Static Water Level (Feet)	Water Temp (deg. C)	pH	Spec Cond (uS/cm) @ 25 deg. C	Cond (uS/cm)	D.O. (% sat.)	D.O. (mg/L)	ORP (mV)	TDS (g/L)	Turbidity (NTU)	Air Temp (deg. c)	Discharge (cfs)	Comments	Date	Time
WS	MDS030	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry (Seep)	9/17/2012	16:50
WS	MDS034	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry (Seep)	9/17/2012	13:40
WS	MSG004	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry (Spring)	9/17/2012	18:20
WS	MST044	N/A	17	8.85	0.79	0.67	102.7	9.88	67.3	N/A	3.92	24	3.12	Stream	9/17/2012	13:50
WS	MST045	N/A	19.2	8.9	0.79	0.71	104.3	9.66	89.1	N/A	7.78	25	4.47	River	9/17/2012	15:57
WS	MST069	N/A	11.6	7.71	1.96	1.47	62.8	6.78	65.3	N/A	124	22	0.00766	Creek	9/17/2012	17:30
WS	MST144	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Dry	9/17/2012	12:59

cfs	cubic feet per second	NTU	Nephelometric Turbidity Units
deg. C	degrees Celsius	N/A	Parameter not required / not collected
g/L	grams per liter	SW	Surface Water
mg/l	milligrams per liter	uS/cm	microSiemens per centimeter
mV	millivolts	% sat.	percent saturation

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: monsanto Date: 5/15/12 Well ID: MBW006

Task: 2012 Spring SW/GW Field Crew: E. Yeager B. Bragdon

Measuring Point (MP): TOC Water Level (WL): 3.81 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: peristaltic, tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 12.5 x 0.03 0.45L Starting PSI = (½ WL + 20): ~~21.95~~ 21.905
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 11.91 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1118	3.81	0.2	0.2						
1127	3.80	0.12	1.0	9.91	*	205.0	5.73	0.882	29.05
1132	3.80	0.12	1.60	8.75	*	312.2	4.89	0.836	16.39
1137	3.80	0.12	2.20	8.41	*	300.6	4.18	0.830	12.12
1142	3.80	0.12	2.80	8.27	*	95.2	4.37	0.825	5.08
1147	3.80	0.12	3.40	8.23	*	52.1	4.41	0.827	2.90
1152	3.80	0.12	4.00	7.89	*	51.1	4.61	0.822	2.02
1157	3.80	0.12	4.60	7.93	*	50.1	4.60	0.822	1.90

Continue stabilization readings on additional pages if necessary

* pH probe broken on monsanto ugl ** final pH taken from sample with GW probe

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH **	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1157	3.80	0.12	4.60	7.93	7.45	50.1	4.60	0.822	1.90

SAMPLE ID: 1205GWMBW006 (U,F) **TIME:** 1157

Final Low Flow Sampling Settings: PSI: 21.90 Charge: _____ sec Exhaust: _____ sec

lat 42°49'0.1.650"N
long 111°29'28.885"W } WGS84, 50m off of Table 3

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: monsanto Date: 5/15/12 Well ID: MBW009

Task: Spring 2012 SW/GW Field Crew: B. Bragdon E. Yeager

Measuring Point (MP): TOC Water Level (WL): 1.72 ft below MP

Sampling Method (see applicable calculations below): 3-volume purge Device: peristaltic, tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 10.1 ft below MP Water Height (H): 8.38 ft below MP Casing Radius (r): 1.5" D ft =0.0625ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 2.3 = 8.7L gal Required Run Time: ~~28~~ 43.5 min/hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1406	1.72	0.175	0		*				
1411	4.45	0.175	0.875	9.70	*	322.5	0.84	0.992	10.63
1416	5.19	0.175	1.75	9.58	*	296.4	0.52	1.000	13.83
1418	5.66	0.25	1.75	bumped up pumping rate					
1423	5.63	0.25	3.0	8.30	*	294.6	0.73	0.977	8.77
1428	7.04	0.25	4.25	8.21	*	262.1	0.54	0.968	18.49
1433	7.35	0.20	5.25	8.39	*	251.3	0.85	0.985	16.18
1438	7.35	0.20	6.25	8.55	*	239.4	1.38	0.996	6.78
1443	7.53	0.20	7.25	8.36	*	229.5	1.71	0.995	6.12
1448	7.55	0.20	8.25	8.20	*	216.7	2.16	0.992	8.64
1453	7.55	0.20	9.25	8.40	*	209.5	2.29	1.000	4.69
							↳drawing air		

Continue stabilization readings on additional pages if necessary

*pH probe broken on monsanto YSI ** final pH from sample taken with GW probe

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1453	7.55	0.20	9.25	8.40	** 6.99	209.5	2.29	1.000	4.69

SAMPLE ID: 1205GWMBW009 (F,U) **TIME:** 1453

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

lat 42°49'12.033"N
long 111°29'49.700"W > WG584, 3cm off of Table 3

WELL SAMPLING FORM

Project No.: _____ Client: monsanto Date: 5/15/12 Well ID: MBW011

Task: 2012 Spring SW/GW Field Crew: E. yeager B. Bragdon

Measuring Point (MP): TOC Water Level (WL): 1.12 ft below MP

Sampling Method (see applicable calculations below): Low Flow to 3-volume (see note on pg. 2) Device: perastaltic, tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 13.5 0.81L Starting PSI = (½ WL + 20): 20.56
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 14.81 ft below MP Water Height (H): 13.69 ft below MP Casing Radius (r): 0.0625 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 3.7gal = 14.0L gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
~~1522~~	~~1.12~~	~~0.15~~	~~Ø~~						
1540	1.20	0.10	Ø						
1543	1.64	0.025	0.30						
1547	1.81	0.025	0.4	14.26	*	218.5	2.12	0.773	22.07
1552	2.13	0.025	0.525	12.82	*	232.0	1.79	0.745	26.67
1557	2.32	0.025	0.650	11.72	*	350.8	1.50	0.719	26.28
1602	2.41	0.025	0.775	11.92	*	292.6	1.17	0.721	24.81
1607	2.44	0.025	0.900	11.13	*	289.8	1.27	0.711	26.97
~~1612~~		~~0.025~~	~~1.025~~		~~*~~				
1615	3.49	0.20	1.7	changed to 3-volume, increased purge rate					
1620	4.45	0.20	2.7	7.99	*	194.0	1.49	0.666	17.59
1625	5.01	0.20	3.7	7.84	*	337.0	1.38	0.663	17.87

Low Flow effort

3-volume purge begin

Continue stabilization readings on additional pages if necessary

* pH probe broken on monsanto YSI ** Final pH taken on sample with GW probe

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH **	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1704	8.90	0.30	14.0	6.72	10.81	238.5	1.20	0.658	5.98

SAMPLE ID: 1205GWMBW011 (U,F) **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

lat 42°49'21.958"N
long 111°29'41.253"W } WGS84, 70m off of Table 3

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: monsanto Date: 5/15/12 Well ID: MBW011

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
a) ~~1626~~	~~5.01~~	~~0.30~~ 0.25	~~4.0~~ 3.95	increase purge rate					
1631	6.15	0.30	5.0	increase purge rate					
1636 ~~1637~~	7.09	0.30	6.5	7.04	*	218.9	1.35	0.652	10.37
1641	7.65	0.30	8.0	6.81	*	321.3	1.21	0.654	7.51
1646	8.15	0.30	9.5	6.82	*	284.7	1.19	0.659	6.04
1651	8.55	0.30	11.0	7.08	*	245.1	1.20	0.666	5.78
1656	8.75	0.30	12.5	6.89	*	235.3	1.21	0.662	8.75
1701	8.90	0.30	14.0	6.72	*	238.5	1.20	0.658	5.98

could not do low flow, but once WL reached water table it could be purged. switched to 3-volume purge. At 0.30L/min well consistentally drew down 0.5ft/5min or 0.1ft/min.

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 1008924 Client: Monsanto Date: 5-13-12 Well ID: ~~MMW-027~~ MBW-027 RY

Task: GW Sampling Field Crew: R. Young | B. Downey

Measuring Point (MP): Top of Caring (T.O.C.) Water Level (WL): ~~5.17~~ 5.40 RY ft below MP

Sampling Method (see applicable calculations below): _____ Device: Parcotaltic Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 0.9 L Starting PSI = (½ WL + 20): NA
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): — ft below MP Water Height (H): — ft below MP Casing Radius (r): — ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: — gal Required Run Time: — min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1428	5.69	—	0.5	8.09	7.27	144.3	16.44	1042	2.17
1433	5.68	0.03	0.65	7.22	7.20	148.1	8.82	1031	~~5.68~~ RY 5.60
1438	5.68	0.17	1.50	7.15	7.13	148.9	7.90	1031	1.11
1443	5.69	0.08	1.90	7.03	7.15	147.8	7.85	1030	5.17
1448	5.69	0.08	2.30	7.06	7.16	146.4	7.85	1028	1.53
Continue stabilization readings on additional pages if necessary									

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1448	5.69	0.08	2.30	7.06	7.16	146.4	7.85	1028	1.53

SAMPLE ID: 1205GWMBW027 (U,F) **TIME:** 1448

Final Low Flow Sampling Settings: PSI: NA Charge: NA sec Exhaust: NA sec

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 1008924 Client: Monsanto Date: 5-13-12 Well ID: MBW-028

Task: GW Sampling Field Crew: R. Young | B. Downey

Measuring Point (MP): Top of Casing (TOC) Water Level (WL): 5.40 ft below MP

Sampling Method (see applicable calculations below): Standard Purge Device: Peristaltic Pump

Low Flow Sampling (NA)

Minimum Purge = 2* (feet * vol tubing + vol pump): ~~1.2 L~~ 1.11 L (NA) Starting PSI = (½ WL + 20): 22 PSI (NA)
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 19.78 ft below MP Water Height (H): 5.40' ft below MP Casing Radius (r): 0.052 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 2.36 gal | 8.93 L gal Required Run Time: – min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1622	7.98	–	1.25	7.91	6.50	147.4	0.64	1311	32.6
1625	13.33	~~0.60~~ 1.00	4.25	6.57	6.64	150.9	0.64	1241	37.7
1630	15.43	0.63	7.40	6.88	6.72	149.1	1.41	1194	28.2
1635	14.00	0.37	9.25	7.08	6.71	146.7	1.11	1224	16.8
1640	13.28	0.30	10.75	7.04	6.70	147.4	0.74	1245	7.97
1645	13.20	0.37	12.60	7.07	6.69	146.2	0.41	1258	4.20
1650	13.21	0.36	14.40	7.11	6.69	143.5	0.29	1255	2.49
1655	13.22	0.27	15.75	7.12	6.59	141.1	0.21	1263	1.73

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1655	13.22	0.27	15.75	7.12	6.59	141.1	0.21	1263	1.73

SAMPLE ID: 1205GWMBW028 (U,F) **TIME:** 1655

Final Low Flow Sampling Settings: PSI: NA Charge: NA sec Exhaust: NA sec

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: monsanto Date: 5/14/12 Well ID: MBW032

Task: Spring 2012 SW/GW Field Crew: E. Yeager B. Bragdon

Measuring Point (MP): TOC, black mark Water Level (WL): 11.24 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: peristaltic, tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): ~~[illegible]~~ 0.81L Starting PSI = (½ WL + 20): 25.62
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]
13.5' tubing x 2 x 0.03 = ~~[illegible]~~ 0.81L

3-Volume Purge Sampling

Total Depth (TD): 14.19 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1714	11.24	0.4	0.8						
1719	11.34	0.4	2.8	5.80	*	205.3	6.55	1.925	7.84
1724	11.35	0.4	4.8	5.43	*	212.2	6.27	1.905	1.24
1729	11.37	0.4	6.8	5.30	*	213.4	6.46	1.894	0.416
1734	11.37	0.4	8.8	5.18	*	211.1	6.60	1.885	1.42

Continue stabilization readings on additional pages if necessary

* pH probe broken on monsanto ysi ** find pH from sample, used GW meter. ~~[illegible]~~

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1734	11.37	0.4	8.8	5.18	Final 7.12 **	211.1	6.60	1.885	1.42

SAMPLE ID: 1205GWMBW032 (U,F) **TIME:** 1734

Final Low Flow Sampling Settings: PSI: 25.685 Charge: _____ sec Exhaust: _____ sec

WGS84 lat 42°49'33.827" N
long 111°28'11.087" W
> matched table 3 locs.

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: monsanto Date: 5/14/12 Well ID: MBW048

Task: 2012 Spring SW/GW Field Crew: E. Yeager B. Bragdon

Measuring Point (MP): TOC, black mark Water Level (WL): ~~[illegible]~~ 0.8 ft below MP

Sampling Method (see applicable calculations below): 3-Volume Purge Device: perastaltic, tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 8.69 ft below MP Water Height (H): 0.8 ft below MP Casing Radius (r): 0.75" = 0.0625ft ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 8.97L gal Required Run Time: ~~[illegible]~~ 16.3 min/hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

2.37 Gal = 8.97L

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1548	0.8								
1555	2.51	0.55	3	6.51	*	364.7	0.81	0.141	22.59
1601	2.53	0.55	6	5.76	*	290.4	0.19	0.149	6.76
1607	2.53	0.55	9	5.84	*	240.8	0.11	0.155	23.1
1613	2.53	0.55	12	5.79	*	233.3	0.16	0.157	19.1
1619	2.51	0.55	15	5.77	*	224.0	0.09	0.159	12.6
1625	2.51	0.55	18	5.91	*	225.2	0.30	0.161	3.41
1630	sample well								

Continue stabilization readings on additional pages if necessary

* pH probe broken on monsanto YSI ** final pH from sample used GW meter

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1630	2.51	0.55	18	5.91	** final 7.17	225.2	0.30	0.161	3.41

SAMPLE ID: 1205GWMBW048(F,U) **TIME:** 1630

Final Low Flow Sampling Settings: PSI: 21.255 Charge: _____ sec Exhaust: _____ sec

lat 42°50' 03.594" N
long 111°27' 56.166" W WGS84

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-11-12 Well ID: MBW-085

Task: GW Sampling Field Crew: R. Young / B. Downey

Measuring Point (MP): Top of Casing Water Level (WL): 3.0' ft below MP

Sampling Method (see applicable calculations below): Standard Purge Device: Bladder Pump

Low Flow Sampling (NA)

Minimum Purge = 2* (feet * vol tubing + vol pump): – Starting PSI = (½ WL + 20): –
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 12.0 ft below MP Water Height (H): 3.0 ft below MP Casing Radius (r): 0.1667 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 17.62 gal | 66.7 L gal Required Run Time: – min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
	Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
	1433	4.48	–	0.5	6.02	6.84	218.3	0.67	334	2.78
5/11/12	1438	6.62	0.25	1.75	5.30	6.71	226.4	8.35	323	3.19
	1443	8.30	0.55	4.50	4.52	6.68	229.0	8.76	326	69.5
DRY	1445	8.50	0.50	5.50	4.65	6.70	231.7	9.25	319	139.0
	0905	3.07	–	6.0	5.08	6.77	317.7	8.38	140	10.1
5/12/12	0913	5.69	0.16	7.25	5.32	6.85	314.0	8.88	127	4.80

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0913	5.69	0.16	7.25	5.32	6.85	314.0	8.88	127	4.80

SAMPLE ID: 1205GWMBW085(U,F) **TIME:** 0910

Final Low Flow Sampling Settings: PSI: NA Charge: NA sec Exhaust: NA sec

WELL SAMPLING FORM

Project No.: 10069924 Client: Monsanto Date: 5-11-12 Well ID: MBW-087

Task: GW Sampling Field Crew: R.Young | B.Downey

Measuring Point (MP): Top of Casing (T.O.C) Water Level (WL): ~~1.76~~ 1.80 RY ft below MP

Sampling Method (see applicable calculations below): Low-flow Device: Parastaltic + tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 0.531 L Starting PSI = (½ WL + 20): ~~20.85~~ 20.90 RY
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): – ft below MP Water Height (H): – ft below MP Casing Radius (r): – ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: – gal Required Run Time: – min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1505	2.02	–	0.5	6.89	6.75	229.3	6.71	428	89.9
1510	2.05	0.2	1.5	5.93	6.71	230.7	1.95	429	24.5
1515	2.05	0.15	2.25	5.92	6.70	230.6	1.70	429	15.0
1520	2.05	0.15	3.0	5.74	6.70	229.8	2.10	431	10.8
1525	2.05	0.11	3.55	5.67	6.72	228.6	2.22	431	6.81
1530	2.05	0.09	4.00	5.68	6.72	226.3	1.59	431	4.35
1535	2.06	0.11	4.55	5.62	6.72	225.0	1.34	432	3.45
1540	2.06	0.14	5.25	5.62	6.73	223.2	1.43	431	2.92
1545	2.06	0.15	6.00	5.64	6.73	224.1	1.36	432	2.42

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1545	2.06	0.15	6.00	5.64	6.73	224.1	1.36	432	2.42

SAMPLE ID: 1205GWMBW087 (U,F) **TIME:** 1545

Final Low Flow Sampling Settings: PSI: NA Charge: NA sec Exhaust: NA sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-11-12 Well ID: MBLO-099

Task: GW Sampling Field Crew: R. Young / B. Downey

Measuring Point (MP): T.O.C. (North) Water Level (WL): 0.94' ft below MP

Sampling Method (see applicable calculations below): 3-volume purge Device: Peristaltic Pump

Low Flow Sampling (NA)

Minimum Purge = 2* (feet * vol tubing + vol pump): – Starting PSI = (½ WL + 20): –
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 17.32 ft below MP Water Height (H): 0.94 ft below MP Casing Radius (r): 0.065 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 4.88 gal | 18.472 gal Required Run Time: – min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
	Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
	1006	0.94	0.36	1.8	6.67	5.37	351.6	3.92	237	10.2
	1011	7.4	0.40	4.0	5.84	6.08	329.4	5.00	216	13.7
5-11-12	1016	12.13	0.42	6.25	5.85	6.33	309.9	9.12	224	20.3
DRY	1021	15.25	0.40	8.25	6.93	6.56	308.8	8.59	209	18.8
	1208	8.65	–	9.00	7.37	6.90	161.9	9.34	225	5.69
5-14-12	1213	12.82	0.35	10.75	6.16	6.59	172.8	8.83	181	9.96
DRY	1216	15.72	0.35	11.80	6.00	6.57	177.1	7.99	199	8.35

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1216	15.72	0.35	11.80	6.00	6.57	177.1	7.99	199	8.35

SAMPLE ID: 1205GWMBLO99 (U,F) **TIME:** 1205

Final Low Flow Sampling Settings: PSI: NA Charge: NA sec Exhaust: NA sec

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: Monsanto Date: 5/14/12 Well ID: MBW130

Task: 2012 SW/GW Sampling Field Crew: E. Yeager B. Bragdon

Measuring Point (MP): TOC Water Level (WL): 1.37 ft below MP

Sampling Method (see applicable calculations below): purge/sample Device: peristaltic, tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

0.45L/min

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1356		0.45/min	0L	7.81	*	186.5	3.84	0.169	11.18
1401			2.25	7.24	*	544.0	4.66	0.129	45.77
1406			4.50	7.14	*	438.8	4.69	0.130	52.52
~~1411~~ 1409			5.85 ~~6.75~~	7.50	*	399.9	4.57	0.131	20.19
	~~purged dry~~								ay
1414			8.10 ~~9.00~~	8.94	*	203.6	4.47	0.148	15.34
1419			10.35 ~~11.25~~	7.70	*	270.1	4.56	0.148	443.8
1420	purged dry				*				
5/15 1023	2.91	n/A	n/A	7.06	*	358.7	2.19	0.179	62.40

Continue stabilization readings on additional pages if necessary

*pH probe broken on Monsanto YSI ** final pH taken from sample with GW probe

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH **	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1025	2.91	purge/sample		7.06	7.07	358.7	2.19	0.179	62.40

SAMPLE ID: 1205GWMBW130 **TIME:** 1025

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

lat: 42° 49' 39.987" N
long: 111° 27' 12.869 W WGS84

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: monsanto Date: 5/~~14~~15/12 Well ID: MBW131

Task: Spring 2012 SW/GW Field Crew: E. Yeager B. Bragdon

Measuring Point (MP): TOC Water Level (WL): 3.51 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: peristaltic, tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 0.42L (7.0 0.03) Starting PSI = (½ WL + 20): ~~20.5~~ 21.755

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] WL dropped from 3.51 to 4.1 while pumping 0.3L/min. Was able to stabilize WL at 4.12 for sampling interval.

3-Volume Purge Sampling

Total Depth (TD): 7.86 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr

H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0904	4.1	~~0.5~~ 2	0.6	0.8L total		removed to get WL steady at 4.1 ~~ft~~ bgs			
0920	3.71	1	0.2						
0923	4.14	3	0.6	1.4L total					
start 0929	4.11	~~1.12~~ .12	~~2.16~~ 0	7.10	*	321.8	8.17	0.116	15.57
0934	4.12	~~1.12~~ .12	~~3.16~~ .12	6.96	*	~~23~~ 281.7	5.76	0.115	11.72
0939	4.12	0.12	0.72	6.84	*	238.5	5.11	0.116	10.88
0944	4.12	0.12	1.32	6.89	*	224.7	5.29	0.115	5.47
0949	4.12	0.12	1.92	6.94	*	211.1	6.47	0.115	4.44
0954	4.12	0.12	2.52	6.86	*	210.4	6.01	0.115	3.55

Continue stabilization readings on additional pages if necessary

*pH probe broken on monsanto YSI ** final pH taken from sample using GW probe

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH **	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0954 ~~0945~~	4.12	0.12	2.52	6.86	7.18	210.4	6.01	0.115	3.55

SAMPLE ID: 1205GWMBW131 (F,U) **TIME:** 0954

Final Low Flow Sampling Settings: PSI: 22.06 Charge: _____ sec Exhaust: _____ sec

lat 42° 50' 23.984" N
long 111° 28' 35.632" W > WGS84

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-12-12 Well ID: MBW-135

Task: GW Monitoring/Sampling Field Crew: R.Young / B.Downey

Measuring Point (MP): Top of Casing Water Level (WL): 1.40 ft below MP

Sampling Method (see applicable calculations below): Standard Purge Device: Parastaltic Pump

Low Flow Sampling (NA)

Minimum Purge = 2* (feet * vol tubing + vol pump): — Starting PSI = (½ WL + 20): —
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 19.55 ft below MP Water Height (H): 1.40 ft below MP Casing Radius (r): 0.052 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 3.46 gal / 13.1 L gal Required Run Time: — min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
	Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
5-12-12	1442	3.50	—	0.5	7.13	7.50	210.9	1.03	138	7.04
	1447	13.57	1.00	5.5	6.80	7.36	202.5	0.66	128	12.5
DRY	1450	18.0	0.92	8.25	7.03	7.41	107.1	4.63	65	81.5
	1408	4.11	—	8.75	7.46	7.53	149.8	1.58	335	10.6
5-14-12	1413	9:04	0.50	11.25	6.99	7.22	163.9	1.04	334	7.87

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1413	9.04	0.50	11.25	6.99	7.22	163.9	1.04	334	7.87

SAMPLE ID: 1205GWMBW~~0~~RY135 (U,F) **TIME:** 1413

Final Low Flow Sampling Settings: PSI: NA Charge: NA sec Exhaust: NA sec

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: monsanto Date: 5/14/2012 Well ID: ~~[illegible]~~ MBW152

Task: 2012 SW/GW spring Field Crew: B. Bragdon, E. Yeager

Measuring Point (MP): TOC Water Level (WL): ~~14.0~~ 8.61 ft below MP

Sampling Method (see applicable calculations below): ~~Low~~ flow purge/sample Device: peristaltic, tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 14.81 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
~~1202~~			~~1.5L~~	~~10.28~~	~~ok~~	~~232~~	~~6.30~~	~~0.705~~	~~8.32~~
1202		2L/min	1.5	10.28		232	6.30	0.705	8.32
1212	pumped dry		~~4.0~~ 5.5	8.34	*	158.7	4.78	0.1685	158.8
1805	11.59	n/A	n/A	10.02	*	184.5	5.03	0.704	19.58

5/14 ~~5/15~~ 5/15

Continue stabilization readings on additional pages if necessary

* pH probe broken on monsanto YSI ** final pH taken on sample with GW probe

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH **	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1805	11.59	n/A	n/A	10.02	7.49	184.5	5.03	0.704	19.58

SAMPLE ID: 1205GWMBW152(F,U) **TIME:** 1805

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

lat. 42°54'13.238"N
long 111°20'26.108"W
> WGS84, ~~[illegible]~~ off of table 3
75.5m

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: Monsanto Date: 5-10-12 Well ID: MMW-006

Task: G.W. Sampling Field Crew: B. Downey / L. Fahrig

Measuring Point (MP): Gray disk Water Level (WL): 255.22 ft below MP

Sampling Method (see applicable calculations below): Low flow Device: bladder/Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 20.62 Starting PSI = (½ WL + 20): 146
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1048	Pump	on							
1054	255.39	0.42	2.5	9.45	7.41	~~400~~ 307.1	5.98	408	0.58
1104	255.40	0.25	5.0	9.47	7.49	308.2	5.10	415	1.08
1114	255.38	0.275	7.75	9.64	7.48	309.4	4.49	412	0.30
1124	255.39	0.275	10.50	10.01	7.49	309.0	4.28	413	0.35
1134	255.34	0.20	12.50	10.05	7.47	308.3	4.31	410	0.18
1144	255.37	0.25	15.00	9.74	7.48	308.6	4.48	416	0.22
1154	255.35	0.275	17.75	10.00	7.49	305.7	4.38	415	0.47
1159	255.39	0.23	18.9	9.94	7.50	306.7	4.44	414	0.20
1206	255.38	0.26	20.75	9.86	7.49	306.1	4.30	412	0.21

Continue stabilization readings on additional pages if necessary

changed tanks

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1206	255.38	0.26	20.75	9.86	7.49	306.1	4.30	412	0.21

SAMPLE ID: 1205GW MMW006-U/F **TIME:** 1210

Final Low Flow Sampling Settings: PSI: 180 Charge: 8 sec Exhaust: 19 sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-11-12 Well ID: MMW-007

Task: GW Sampling Field Crew: R. Young | B. Downey

Measuring Point (MP): Gray Disc Water Level (WL): 34.31 ft below MP

Sampling Method (see applicable calculations below): ~~Low Flow~~ Standard Purge RY Device: Bladder Pump

Low Flow Sampling (NA)

Minimum Purge = 2* (feet * vol tubing + vol pump): 6.22 L (NA) Starting PSI = (½ WL + 20): 37 PSI (NA)
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 93.7 ft below MP Water Height (H): 34.31 ft below MP Casing Radius (r): 0.1667 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 116.3 gal | 440.2 L gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
	Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
*	1220	34.31	--	—	8.69	7.18	239.7	7.36	219	4.19
	1230	34.90	0.075	0.75	9.64	7.11	254.0	3.25	219	1.18
	1240	42.28	RY ~~0.875~~ 1.675	17.50	7.07	6.85	255.6	0.02	195	1.36
	1250	49.95	RY ~~1.55~~ 2.25	40.0	7.04	6.89	255.3	1.93	186	0.83
	1300	58.10	RY ~~1.55~~ 2.23	61.30	7.02	6.88	239.7	3.61	182	1.12
5-11-12	1310	65.08	2.03	81.60	7.03	6.95	219.7	4.07	182	1.00
	1320	70.62	1.64	98.0	7.08	6.94	197.2	4.18	183	0.46
	1330	74.65	1.53	113.3	7.06	6.94	170.9	4.12	184	0.74
	1340	77.33	2.17	135.0	7.08	6.91	137.4	4.00	189	1.89
	1350	80.01	1.50	150.0	7.16	6.89	87.9	2.62	202	2.89
	1355	80.7	0.96	154.8	7.18	6.88	90.7	2.14	202	2.81
DRY	0857	38.85	—	158.3	7.33	6.72	268.4	0.91	243	2.46
5-13-12	Continue stabilization readings on additional pages if necessary ... yes									

FINAL READINGS

	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
5-13-12	0907	40.86	0.96	158.3	7.34	7.01	264.6	0.73	240	1.77

SAMPLE ID: 1205GWMMW007(U,F) - (MS,MSD) **TIME:** 0900

Final Low Flow Sampling Settings: PSI: 50 Charge: 6 sec Exhaust: 11 sec

* Started w/ low flow but not able to support sustainable flow... Standard purge begun @ 1230

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: 1008924 Client: Monsanto Date: 5-13-12 Well ID: MMW-007

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0907	40.86	–	158.3	7.34	7.01	264.6	0.73	240	1.77
END									

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5/8/12 Well ID: MMW009

Task: GW Sampling Field Crew: L. Fehrig, B. Downey

Measuring Point (MP): TOC Water Level (WL): 207.14 ft below MP

Sampling Method (see applicable calculations below): low-flow Device: Nitrogen / bladder

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 34.12 Starting PSI = (½ WL + 20): 123.57
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1126	207.14								
1132	207.28			10.01	7.92	82.5	11.01	474	
1139	207.2			9.42	7.23	98.1	0.59	546	0.46
1146	207.2		5	9.63	7.23	-87.0	0.49	549	0.81
1152	207.25			10.05	7.23	-94.4	0.42	552	1.45
1203	207.20		9	10.84	7.25	-89.4	0.36	552	3.23
1207		0.25	10						
1212	207.30		12	9.30	7.25	-91.7	0.17	549	3.79
1218	207.28		15	9.26	7.24	-85.3	0.13	552	9.99
1224	207.25		18	9.32	7.23	-32.6	0.14	554	9.89
1229	207.27		20	9.40	7.25	-25.7	0.15	553	18.7
1339	207.24	0.5	25	9.35	7.26	-26.5	0.10	552	28.6

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1413	207.24	0.5	72	9.43	7.30	15.8	0.07	552	4.2

SAMPLE ID: 1205GWMMW009-U/F **TIME:** 1425

Final Low Flow Sampling Settings: PSI: 130 Charge: 9 sec Exhaust: 17 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: _____ Client: Monsanto Date: 5-8-12 Well ID: MW009

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal ~~or L/min~~)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1246	207.21		28.5	9.51	7.25	7.9	0.09	552	21.6
1252	207.23	0.5	31.5	9.38	7.26	6.8	0.09	551	12.5
1259	207.22		35	9.47	7.25	7.9	0.11	551	9.7
1305	207.25	0.5	38	9.47	7.26	7.0	0.07	550	6.6
1311	207.22		41.5	9.49	7.26	12.2	0.08	550	14.3
1318	207.23		45.0	9.48	7.26	12.5	0.07	550	31.6
1328	207.21	0.5	50.0	9.50	7.26	14.1	0.10	549	19.6
1334	207.22		53.5	9.50	7.27	15.9	0.08	548	11.1
1342			58	9.48	7.27	16.4	0.06	549	6.2
1353	207.24		63	9.63	7.26	12.9	0.12	553	16.4
1400	207.22		66.5	9.46	7.22	22.7	0.06	553	14.1
1408	207.24		68	9.38	7.28	16.6	0.04	553	5.9
1413	"		72	9.43	7.30	15.8	0.07	552	4.2

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-14-12 Well ID: MMW-010

Task: GW Sampling Field Crew: D. Young + B. Downey

Measuring Point (MP): Gray Disc Water Level (WL): 2.01 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2.74' Starting PSI = (½ WL + 20): 21PSI
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): – ft below MP Water Height (H): – ft below MP Casing Radius (r): – ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: – gal Required Run Time: – min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1037	2.25	–	0.75	9.15	6.52	241.9	1.32	1382	23.4
1042	2.18	0.2	1.75	10.31	6.35	240.5	1.21	1441	15.4
1047	2.15	0.19	2.70	10.31	6.34	237.8	1.34	1456	12.3
1052	2.14	0.16	3.50	10.39	6.35	234.0	1.12	1457	10.8
1057	2.14	0.09	3.95	10.42	6.36	231.3	1.15	1456	11.0
1102	2.15	0.21	5.00	10.54	6.37	229.7	1.11	1456	8.95
1107	2.15	0.20	6.00	10.23	6.39	227.2	1.10	1455	6.75
1112	2.15	0.20	7.00	10.47	6.40	225.1	1.02	1449	5.85
1117	2.15	0.15	7.75	10.51	6.41	223.5	0.99	1450	5.61
1122	2.15	0.10	8.25	10.25	6.41	222.5	0.97	1448	4.74

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1122	2.15	0.10	8.25	10.25	6.41	222.5	0.97	1448	4.74

SAMPLE ID: 1205GWMMW010(U,F) **TIME:** 1122

Final Low Flow Sampling Settings: PSI: 25 Charge: 3 sec Exhaust: 25 sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-13-12 Well ID: MMW-011

Task: GW Sampling Field Crew: R. Young / B. Downey

Measuring Point (MP): Gray Disc Water Level (WL): 77.15 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 7.72 Starting PSI = (½ WL + 20): 55
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): — ft below MP Water Height (H): — ft below MP Casing Radius (r): — ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: — gal Required Run Time: — min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0955	77.21	—	0.55	8.71	7.91	230.5	10.32	645	6.47
1000	77.30	0.14	1.25	8.70	7.42	231.6	11.28	642	4.08
1005	77.30	0.23	2.40	8.75	7.31	229.7	9.54	607	4.02
1010	77.30	0.10	2.90	8.73	7.31	227.6	8.92	596	4.51
1015	77.31	0.16	3.70	8.78	7.31	225.0	8.74	592	3.19
1020	77.30	0.11	4.25	8.81	7.32	224.2	8.42	586	1.93
1025	77.30	0.15	5.50	9.08	7.33	221.5	8.71	586	2.37
1030	77.31	0.08	5.90	9.12	7.33	221.3	8.74	584	1.40
1035	77.30	0.16	6.70	9.27	7.34	219.9	8.45	584	0.95
1040	77.30	0.16	7.50	9.30	7.34	219.8	8.34	583	1.30
1045	77.31	0.12	8.10	9.35	7.35	218.6	8.26	582	1.19
1050									

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1045	77.31	0.12	8.10	9.35	7.35	218.6	8.26	582	1.19

SAMPLE ID: 1205GWMMW011(U,F) **TIME:** 1045

Final Low Flow Sampling Settings: PSI: 50 Charge: 8 sec Exhaust: 10 sec

*Air bubbles present in the purge line.

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto. Date: 5-12-12 Well ID: MMW-013

Task: GW Sampling Field Crew: R. Young | B. Downey

Measuring Point (MP): T.O.C. Water Level (WL): 4.70 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2.86 Starting PSI = (½ WL + 20): 22.35 psi
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling NA

Total Depth (TD): — ft below MP Water Height (H): — ft below MP Casing Radius (r): — ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: — gal Required Run Time: — min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1025	4.78	-	0.6	7.96	7.17	275.9	10.22	245	2.78
1030	4.79	0.55	3.25	7.27	7.07	273.8	9.53	229	0.41
1035	4.80	0.71	6.80	7.26	7.04	273.4	9.42	227	0.63
1040	4.80	0.57	9.65	7.29	7.04	272.3	9.34	226	0.64
1045	4.80	0.37	11.50	7.29	7.03	272.5	9.22	225	0.61

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1045	4.80	0.37	11.50	7.29	7.03	272.5	9.22	225	0.61

SAMPLE ID: 1205GWMMW013 (U,F) **TIME:** 1045

Final Low Flow Sampling Settings: PSI: 20 Charge: 8 sec Exhaust: 10 sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-15-12 Well ID: MMW-015A

Task: GW Sampling Field Crew: R. Young / B. Downey

Measuring Point (MP): Top of Casing Water Level (WL): 20.81 ft below MP

Sampling Method (see applicable calculations below): Low-flow Device: Parastaltic + Tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2.70L Starting PSI = (½ WL + 20): NA
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): – ft below MP Water Height (H): – ft below MP Casing Radius (r): – ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: – gal Required Run Time: – min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1341	20.96	–	1.50	9.98	6.76	94.2	6.38	630	3.52
1346	21.07	0.34	3.20	9.89	6.92	103.7	5.38	628	3.38
1351	21.11	0.21	4.25	9.92	6.89	104.7	5.05	634	6.60
1356	21.02	0.17	5.10	10.30	6.86	104.9	4.66	649	11.80
1401	21.05	0.23	6.25	10.13	6.85	105.2	4.44	654	15.70
1406	20.96	0.13	6.90	10.61	6.84	105.4	4.19	647	15.0
1411	20.85	DY ~~0.26~~ 0.18	7.80	11.49	6.82	106.0	4.08	648	12.8
1416	20.84	0.09	8.25	11.84	6.81	104.9	4.14	651	12.9
1421	20.84	0.14	8.95	11.39	6.82	104.4	4.38	653	10.6
1426	20.84	0.03	9.10	11.41	6.82	103.6	4.27	651	9.85
1431	20.84	0.18	10.0	11.42	6.81	104.3	4.20	651	8.47
1436	20.84	0.24	11.20	11.53	6.81	105.0	4.20	652	7.34

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1501	20.84	0.10	13.70	11.27	6.84	100.7	4.10	645	4.81

SAMPLE ID: 1205GWMMW015A(U,F) **TIME:** 1505

Final Low Flow Sampling Settings: PSI: NA Charge: NA sec Exhaust: NA sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: 1008924 Client: Monsanto Date: 5-15-12 Well ID: MMW-015A

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1441	20.84	0.09	11.65	11.16	6.81	104.7	4.17	645	6.33
1446	20.84	0.11	12.20	11.24	6.82	103.8	4.10	645	5.88
1451	20.84	0.10	12.70	11.07	6.82	103.2	4.09	645	5.54
1456	20.84	0.10	13.20	11.34	6.82	102.7	4.08	644	5.08
1501	20.84	0.10	13.70	11.27	6.84	100.7	4.10	645	4.81

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-13-12 Well ID: MMW-017

Task: GW Sampling Field Crew: R. Young / B. Downey

Measuring Point (MP): Gray Disc Water Level (WL): 24.63 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 4.36 Starting PSI = (½ WL + 20): 33 PSI
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): — ft below MP Water Height (H): — ft below MP Casing Radius (r): — ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: — gal Required Run Time: — min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1508	24.87	—	0.6	10.73	6.92	151.4	8.63	1287	3.53
1513	24.93	0.14	1.3	11.63	6.87	148.4	5.72	1286	1.22
1518	24.93	0.10	1.8	12.40	6.87	146.1	5.52	1301	0.70
1523	24.93	0.08	2.2	12.89	6.87	145.5	5.21	1302	0.79
1528	24.93	0.10	2.7	13.49	6.87	144.1	5.22	1307	0.70
1533	24.93	0.09	3.15	13.22	6.87	143.1	5.33	1312	0.67
1538	24.93	0.10	3.65	12.73	6.86	144.2	5.29	1309	0.62
1543	24.93	0.08	4.05	12.55	6.87	144.6	5.28	1309	0.72
1548	24.93	0.10	4.55	12.88	6.88	142.1	5.06	1304	0.33

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1548	24.93	0.10	4.55	12.88	6.88	142.1	5.06	1304	0.33

SAMPLE ID: 1205GWMMW017 (U,F) **TIME:** 1548

Final Low Flow Sampling Settings: PSI: 30 Charge: 5 sec Exhaust: 30 sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto. Date: 5-15-12 Well ID: MMW-018

Task: GW Sampling Field Crew: R. Young | B. Downey

Measuring Point (MP): Gray disc Water Level (WL): 10.0 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2.8 L Starting PSI = (½ WL + 20): 25 psi
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): – ft below MP Water Height (H): – ft below MP Casing Radius (r): – ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: – gal Required Run Time: – min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0933	10.22	–	0.50	8.95	7.35	147.0	7.26	157	3.10
0938	10.29	0.20	1.50	8.67	7.30	133.7	6.88	152	1.20
0943	10.24	0.21	2.60	9.10	7.26	128.2	6.67	151	1.21
0948	10.20	0.08	3.00	9.39	7.27	124.7	6.71	151	1.11
0953	10.28	0.18	3.90	8.53	7.25	123.5	6.83	151	1.38

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0953	10.28	0.18	3.90	8.53	7.25	123.5	6.83	151	1.38

SAMPLE ID: 1205GWMMW018(U,F)-(MS,MSD) **TIME:** 0955

Final Low Flow Sampling Settings: PSI: 25 Charge: 4 sec Exhaust: 27 sec

WELL SAMPLING FORM

Page: _____ of _____

Project No.: _____ Client: Monsanto Date: 5-10-12 Well ID: MMW-20

Task: G.W. Sampling Field Crew: B. Downey / L. Fahrig

Measuring Point (MP): Gray disk Water Level (WL): 271.46 ft below MP

Sampling Method (see applicable calculations below): Low flow Device: bladder / Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 25.18 Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1322	Pump	on	12						
1333	271.55		2	9.41	7.06	282.2	7.60	654	2.01
1343	271.55		5	9.21	7.12	284.5	7.63	622	2.84 — changed tanks
1349	271.54	0.83	10.5	9.30	7.04	283.5	8.57	597	1.72
1356	271.47	0.64	15.0	9.32	7.05	282.1	8.55	595	1.28
1402	271.55	0.83	20.0	9.34	7.06	282.5	8.37	595	1.10
1407	271.55	0.85	24.25	9.31	7.07	281.8	8.21	596	0.80
1412	271.56	0.83	29.	9.34	7.07	283.6	8.22	595	0.96

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1412	271.56	0.83	29.0	9.34	7.07	283.6	8.22	595	0.96

SAMPLE ID: 1205GWMMW020-U/F **TIME:** 1416

Final Low Flow Sampling Settings: PSI: 200 Charge: 12 sec Exhaust: 24 sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5-10-12 Well ID: MMW-021

Task: G.W. Sampling Field Crew: B. Downey / L Fabrig

Measuring Point (MP): Gray Disk Water Level (WL): 202.97 ft below MP

Sampling Method (see applicable calculations below): Low flow Device: bladder / Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 15.52 Starting PSI = (½ WL + 20): 121
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0858	Pump	on							
0906	203.10		2.5	9.88	6.40	295.0	6.15	547	0.52
0914	203.11		4	9.55	6.77	330.5	5.35	545	0.20
0919	203.08	0.35	5.75	9.58	6.87	329.9	4.98	544	0.17
0929	203.12	0.25	8.25	9.51	6.97	331.9	4.72	543	0.13
0939	203.14	0.25	10.75	9.46	7.02	330.6	4.50	542	0.18
0944	203.14	0.30	12.25	9.53	7.05	328.9	4.49	541	0.35
0949	203.15	0.275	13.75	9.52	7.07	327.5	4.39	541	0.40
0954	203.14	0.275	15	9.50	7.08	326.4	4.32	541	0.19
0958	203.14	0.275	16	9.47	7.10	325.2	4.29	540	0.5

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0958	203.14	0.275	16	9.47	7.10	325.2	4.29	540	0.5

SAMPLE ID: 1205 GW MMW 021-U/F **TIME:** 1000

Final Low Flow Sampling Settings: PSI: 135 Charge: 10 sec Exhaust: 16 sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-16-12 Well ID: MMW-022

Task: GW Sampling Field Crew: R. Young / B. Downey

Measuring Point (MP): Gray Disc Water Level (WL): 202.67 ft below MP

Sampling Method (see applicable calculations below): Low-Flow Device: Bladder Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 20.38 L Starting PSI = (½ WL + 20): 121 PSI
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): — ft below MP Water Height (H): — ft below MP Casing Radius (r): — ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: — gal Required Run Time: — min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0907	202.71	–	0.80	9.05	7.69	104.2	8.78	266	36.5
0917	202.94	~~0.69~~ 0.35 RY	4.25	8.67	7.25	55.6	3.71	289	13.4
0927	202.94	0.40	8.25	8.76	7.26	84.6	4.30	297	7.33
0937	202.92	0.41	12.30	8.81	7.24	85.9	4.40	297	9.25
0947	202.94	0.32	15.50	8.82	7.24	84.9	4.20	298	4.06
0957	202.92	0.38	19.25	8.88	7.21	85.4	4.30	298	3.72
RY ~~09~~ 1002	202.92	0.20	21.20	8.85	7.22	85.0	4.16	297	2.85

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1002	202.92	0.20	21.20	8.85	7.22	85.0	4.16	297	2.85

SAMPLE ID: 1205 GW MMW022 (U,F) **TIME:** 1005

Final Low Flow Sampling Settings: PSI: 175 Charge: 6 sec Exhaust: 28 sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-13-12 Well ID: MMW-023

Task: GW Sampling Field Crew: R. Young + B. Downey

Measuring Point (MP): Gray Disc Water Level (WL): 105.88 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 22.12 L Starting PSI = (½ WL + 20): 73 PSI
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): — ft below MP Water Height (H): — ft below MP Casing Radius (r): — ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: — gal Required Run Time: — min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1215	106.05	–	1.50	9.63	7.24	18.2	0.52	977	3.31
1220	106.02	1.20	6.70	9.53	7.15	-9.0	0.0	969	0.89
1225	106.02	1.00	11.70	9.57	7.12	-0.8	0.0	969	1.11
1230	106.02	0.92	16.30	9.62	7.12	-14.2	0.02	986	0.86
1235	106.02	0.82	20.50	9.64	7.12	-24.6	0.05	993	0.61
1240	105.98	0.72	24.10	9.96	7.12	-29.6	0.04	991	0.72
1245	105.98	0.48	26.50	9.89	7.13	-31.5	0.07	989	0.43

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1245	105.98	0.48	26.50	9.89	7.13	-31.5	0.07	989	0.43

SAMPLE ID: 1205 GWMMW023 (U,F) **TIME:** 1245

Final Low Flow Sampling Settings: PSI: 105 Charge: 7 sec Exhaust: 10 sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-12-12 Well ID: MMW-024

Task: GW Sampling Field Crew: R. Young / B. Downey

Measuring Point (MP): Top of gray disc Water Level (WL): 58.88 ft below MP

Sampling Method (see applicable calculations below): Low flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 12.7 L Starting PSI = (½ WL + 20): 50 PSI
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): – ft below MP Water Height (H): – ft below MP Casing Radius (r): – ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: – gal Required Run Time: – min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1115	59.05	–	0.5	8.29	7.43	257.2	3.09	253	1.65
1120	59.08	0.85	4.75	7.74	7.12	264.2	3.03	276	0.55
1125	59.02	0.95	9.50	7.70	7.10	262.0	3.09	278	0.19
1130	59.09	0.98	14.40	7.66	7.11	260.0	3.07	279	0.38
1135	59.06	0.87	18.75	7.75	7.11	258.1	3.19	279	0.27

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1135	59.06	0.87	18.75	7.75	7.11	258.1	3.19	279	0.27

SAMPLE ID: 1205GWMMW024 (U,F) **TIME:** 1135

Final Low Flow Sampling Settings: PSI: 110 Charge: 10 sec Exhaust: 9 sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-11-12 Well ID: MMW-025

Task: GW Sampling Field Crew: R. Young / B. Downey

Measuring Point (MP): Gray Disc Water Level (WL): 28.82 ft below MP

Sampling Method (see applicable calculations below): Standard Purge Device: Bladder Pump

Low Flow Sampling (NA)

Minimum Purge = 2* (feet * vol tubing + vol pump): NA Starting PSI = (½ WL + 20): NA
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 200' ft below MP Water Height (H): 28.82 ft below MP Casing Radius (r): 0.16667 ft

Three Purge Volumes = ~~3*[Pi * r² * H * 7.48]~~ ** See below By 1,268.8 L gal Required Run Time: - min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1117	28.82	-	-	8.79	7.74	258.9	3.94	246	4.41
1127	29.08	0.125	1.25	10.34	7.64	259.8	2.34	261	10.50
1137	29.10	0.075	2.00	10.24	7.61	259.6	1.75	249	70.2
1147	29.25	0.06	2.60	10.33	7.66	257.0	1.72	248	88.5
1157	35.40	1.04	13.0	7.81	7.58	258.8	1.77	244	15.8
* 1620	44.03	-	33.0	7.94	7.57	212.2	0.38	244	3.48
1633	52.15	1.54	53.0	7.92	7.64	217.8	1.71	244	2.49
1645	59.65	1.67	73.0	7.91	7.60	217.7	1.80	244	2.63
1657	68.41	1.67	93.0	7.94	7.55	218.9	1.79	243	2.03
1709	74.77	1.67	113.0	7.81	7.55	219.5	1.87	244	2.52
1721	84.5	1.67	133.0	7.78	7.62	221.0	1.80	244	2.50
1733	90.62	1.67	153.0	7.80	7.68	220.0	1.97	244	2.11

Continue stabilization readings on additional pages if necessary

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1616	53.42	0.90	262.75	8.48	7.66	79.4	1.15	109	1.83

SAMPLE ID: 1205GWMMW025(U,F) **TIME:** 1618

Final Low Flow Sampling Settings: PSI: 125 Charge: 15 sec Exhaust: 12 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: 1008924 Client: Monsanto Date: 5-11-12 Well ID: MMW-025

	STABILIZATION READINGS									
	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
	Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
5-11-12	1745	97.05	1.67	173.0	7.80	7.71	~~218.0~~ 218.0	1.82	244	1.97
	1757	105.90	1.67	193.0	7.78	7.73	219.4	1.81	244	1.56
	1809	112.44	1.67	213.0	7.80	7.68	219.9	1.98	244	1.43
	1820	119.0	1.82	233.0	7.78	7.70	218.8	1.85	244	1.31
* DRY	1831	124.8	1.82	253.0	7.85	7.66	219.2	1.97	244	1.39
	1606	48.68	-	254.0	9.40	8.03	78.3	5.71	122	6.61
	1611	50.23	0.85	258.25	8.51	7.67	79.5	1.57	109	3.62
5-15-12	1616	53.42	0.90	262.75	8.48	7.66	79.4	1.15	109	1.83

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: Monsanto Date: 5-9-12 Well ID: MMW-026

Task: G.W. Sampling Field Crew: B. Dawney / L. Fuhrig

Measuring Point (MP): Gray disk Water Level (WL): 277.71' ft below MP

Sampling Method (see applicable calculations below): Low flow Device: bladder / Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 21.7 Starting PSI = (½ WL + 20): 158
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)	
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5	
1525	277.77	Began purge								
1540	277.77		0.5	11.60	7.54	0.2	0.0	374	0.51	
1550	277.78	0.26	3.75	10.96	7.47	18.1	0.0	371	0.55	
1600	277.79	0.36	7.5	10.57	7.44	11.2	0.04	370	0.31	
1610	277.80	0.45	12	10.83	7.48	10.4	0.07	370	0.32	
1620	277.5	0.4	16	10.55	7.49	7.0	0.09	369	5.19	changed tanks
1625	277.81	0.60	19.0	10.70	7.48	5.8	0.08	368	0.20	
1630	277.80	0.60	22.0	10.73	7.49	7.3	0.06	369	0.19	

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1630	277.80	0.60	22.0	10.73	7.49	7.3	0.06	369	0.19

SAMPLE ID: 1205 GW MMW026-U/F **TIME:** 1635

Final Low Flow Sampling Settings: PSI: 200 Charge: 12 sec Exhaust: 17 sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5-8-12 Well ID: MMW-027

Task: G.W. Sampling Field Crew: L. Fahrig / B. Downey

Measuring Point (MP): Gray Disk Water Level (WL): 104.10' ft below MP

Sampling Method (see applicable calculations below): Low-Flow Device: bladder / Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 7.9 Starting PSI = (½ WL + 20): 72
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1719	Pump on								
1720	104.19'		~~0.80~~ 0.5	9.60	7.70	67.8	9.50	815	1.1
1723	104.19'		2.0	7.96	7.18	72.5	4.11	1078	0.7
1728	"	0.60	5.0	7.92	7.17	73.7	3.91	1084	0.4
1733	104.21		8.0	7.88	7.17	73.8	3.80	1084	0.5
1738	104.22	0.65	11.5	7.95	7.18	73.9	3.72	1082	0.4

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1738	104.22	0.65	11.5	7.95	7.18	73.9	3.72	1082	0.4

SAMPLE ID: 1205GWMMW027-U/F **TIME:** 1755

Final Low Flow Sampling Settings: PSI: 85 Charge: 6 sec Exhaust: 10 sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-13-12 Well ID: MMW-028

Task: GW Sampling Field Crew: R Young | B. Downey

Measuring Point (MP): Gray Disc Water Level (WL): 65.70 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 6.4L Starting PSI = (½ WL + 20): 53
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): – ft below MP Water Height (H): – ft below MP Casing Radius (r): – ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: – gal Required Run Time: – min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1119	65.73	–	0.6	9.04	7.63	197.2	9.26	545	2.81
1124	65.74	0.73	4.25	8.19	7.40	205.3	8.46	530	0.79
1129	65.75	0.85	8.50	8.22	7.37	205.9	8.19	529	0.50
1134	65.74	0.60	11.50	8.19	7.38	205.2	7.97	528	0.44
1139	65.76	0.70	15.0	8.20	7.39	203.4	7.89	530	1.01
1144	65.72	0.80	19.0	8.24	7.41	201.8	7.82	529	0.67

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1144	65.72	0.80	19.0	8.24	7.41	201.8	7.82	529	0.67

SAMPLE ID: ~~1205GWMMW028 (U,F)~~ RY, 1205GWMMW028-(1,2)-(U,F) **TIME:** 1144

Final Low Flow Sampling Settings: PSI: 55 Charge: 8 sec Exhaust: 10 sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: _____ Well ID: MMW-029

Task: GW Sampling Field Crew: R.Young / B.Rainey

Measuring Point (MP): Gray Disc Water Level (WL): 20.13' ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 4.30 L Starting PSI = (½ WL + 20): 30 PSI
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): – ft below MP Water Height (H): – ft below MP Casing Radius (r): – ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: – gal Required Run Time: – min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0848	20.24	–	0.7	8.13	7.34	175.6	7.62	555	2.78
0853	20.23	0.08	1.10	8.42	7.23	156.3	6.62	553	1.10
0858	20.27	0.23	2.25	8.25	7.20	145.0	6.29	553	0.88
0903	20.28	0.13	2.90	8.22	7.20	141.6	6.49	553	1.13
0908	20.32	0.26	4.20	8.09	7.20	139.4	6.41	553	0.92
0913	20.32	0.22	5.30	8.19	7.20	138.1	6.29	554	0.74

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0913	20.32	0.22	5.30	8.19	7.20	138.1	6.29	554	0.74

SAMPLE ID: 1205GWMMW029 (U,F) **TIME:** 0913

Final Low Flow Sampling Settings: PSI: 30 Charge: 6 sec Exhaust: 27 sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-12-12 Well ID: MMW-030

Task: GW Sampling Field Crew: R Young | B Downey

Measuring Point (MP): Gray Disc Water Level (WL): 23.10' ft below MP

Sampling Method (see applicable calculations below): Standard Purge Device: Bladder Pump

Low Flow Sampling (NA)

Minimum Purge = 2* (feet * vol tubing + vol pump): 10.3 L Starting PSI = (½ WL + 20): —
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 155 ft below MP Water Height (H): 23.10 ft below MP Casing Radius (r): 0.16667 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 258.30 gal | 977.7 L ~~gal~~ Required Run Time: — min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
* 1221	23.33	—	0.4	12.87	7.87	236.3	5.71	140	2.85
1230	25.68	0.51	5.0	9.17	7.62	236.4	0.10	133	1.73
1237	31.29	2.14	20.0	9.26	7.60	225.4	0.12	133	1.19
1247	39.32	2.00	40.0	9.21	7.62	226.2	0.14	133	0.58
1258	47.14	1.82	60.0	9.23	7.61	226.4	0.28	133	0.54
1308	54.33	2.00	80.00	9.22	7.53	223.8	0.22	133	0.41
1323	64.32	2.00	110.00	9.20	7.50	219.9	0.23	133	0.36
1333	71.00	2.00	130.00	9.19	7.50	221.2	0.40	133	0.36
1343	77.30	2.00	150.00	9.16	7.51	219.5	0.40	133	0.42
1353	84.10	2.00	170.00	9.14	7.52	216.7	0.30	133	0.58
1404	90.95	1.82	190.00	9.11	7.54	214.5	0.41	133	0.43
1415	97.38	1.82	210.00	9.17	7.54	214.7	0.37	133	0.39

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1214	42.40	1.20	357.5	9.56	7.58	101.0	0.57	150	0.97

SAMPLE ID: 1205GWMMW030 (U,F) **TIME:** 1216

Final Low Flow Sampling Settings: PSI: 125 Charge: 7 sec Exhaust: 10 sec

* Attempted low-flow, drawdown issues encountered, switched to standard purge method

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: 1008924 Client: Monsanto Date: 5-12-12 Well ID: MMW-~~024~~ 030

	STABILIZATION READINGS									
	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
	Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
	1427	103.90	1.67	230.0	9.12	7.56	212.6	0.32	133	0.87
	1438	110.15	1.82	250.0	9.04	7.56	211.8	0.35	133	0.53
5-12-12	1450	115.75	1.67	270.0	9.19	7.58	210.3	0.38	133	0.91
	1508	121.0	1.11	290.0	9.21	7.59	209.8	0.37	132	0.65
	1520	126.73	1.67	310.0	9.23	7.59	208.7	0.37	132	0.72
	1532	132.25	1.67	330.0	9.21	7.59	206.8	0.37	132	0.73
DRY	1546	138.0	1.43	350.0	9.27	7.58	207.1	0.43	132	0.91
	1209	40.17	–	351.5	9.60	7.69	101.7	3.35	153	0.99
5-15-12	1214	42.40	1.20	357.5	9.56	7.58	101.0	0.57	150	0.97

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-14-12 Well ID: MMW-031

Task: GW Sampling Field Crew: R. Young, B. Downey

Measuring Point (MP): Gray Disc Water Level (WL): 87.69' ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 12.7 L Starting PSI = (½ WL + 20): 64 PSI
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): — ft below MP Water Height (H): — ft below MP Casing Radius (r): — ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: — gal Required Run Time: — min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1248	87.78	–	0.5	11.06	7.99	171.4	12.15	208	5.14
1253	87.84	0.25	1.75	9.61	7.45	174.8	8.60	204	1.87
1258	87.88	0.70	5.25	9.65	7.38	175.1	8.20	203	1.00
1303	87.88	0.55	8.00	9.70	7.45	174.4	8.01	202	0.50
1308	87.90	0.66	11.30	9.75	7.49	173.7	8.08	202	0.38
1313	87.89	0.64	14.50	9.69	7.52	173.1	7.97	202	0.08

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1313	87.89	0.64	14.50	9.69	7.52	173.1	7.97	202	0.08

SAMPLE ID: 1205GWMMW031 (U,F) **TIME:** 1313

Final Low Flow Sampling Settings: PSI: 100 Charge: 13 sec Exhaust: 12 sec

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto. Date: 5-15-12 Well ID: MMW-032

Task: GW Sampling Field Crew: R. Young / B. Downey

Measuring Point (MP): Gray Disc Water Level (WL): 19.46' ft below MP

Sampling Method (see applicable calculations below): Standard Purge Device: Bladder Pump

Low Flow Sampling (NA)

Minimum Purge = 2* (feet * vol tubing + vol pump): 4.8 L (NA) Starting PSI = (½ WL + 20): 30 PSI (NA)
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 65.0 ft below MP Water Height (H): 19.46 ft below MP Casing Radius (r): 0.1667 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 45.54 90.37 gal / 342.1 L gal Required Run Time: – min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
	Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
	1052	19.67	–	0.50	12.68	7.59	104.9	6.71	141	3.99
*	1057	19.76	0.04	0.70	13.83	7.45	107.5	5.15	142	2.45
5-15-12	1102	21.76	0.96	5.50	6.65	7.32	109.6	6.38	142	1.82
	1107	27.73	2.90	20.00	6.58	7.28	109.8	6.45	141	0.99
1114	~~1112~~ RY	35.18	2.86	40.00	6.48	7.30	109.0	6.74	141	0.96
1121	~~1117~~ RY	42.18	2.86	60.00	6.45	7.30	108.8	6.90	141	0.69
1129	~~1122~~ RY	49.41	2.22	80.00	6.45	7.32	105.5	6.72	141	1.05
1137	~~1127~~ RY	56.59	2.22	100.00	6.46	7.34	106.2	6.72	141	0.95
1140	~~1132~~ RY	—	—	—	DRY	—	—	—	—	—
	1053	30.00	–	100.50	7.14	7.59	67.8	8.46	128	9.31
5-16-12	1058	32.31	1.22	106.60	6.84	~~7.66~~ RY	74.0	7.71	126	3.07
						7.35				

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1058	32.31	1.22	106.60	6.84	7.35	74.0	7.71	126	3.07

SAMPLE ID: 12056WMMW032(U,F) **TIME:** 1105

Final Low Flow Sampling Settings: PSI: 50 Charge: 13 sec Exhaust: 12 sec

* Not able to maintain head/WL at low-flow, will switch to standard purge @ 1058

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-14-12 Well ID: MMW-033

Task: GW Sampling Field Crew: R. Young | B. Downey

Measuring Point (MP): Gray Disc Water Level (WL): 11.55 ft below MP

Sampling Method (see applicable calculations below): Standard Purge Device: Bladder Pump

Low Flow Sampling (NA)

Minimum Purge = 2* (feet * vol tubing + vol pump): 9.7 L (NA) Starting PSI = (½ WL + 20): 26 PSI (NA)
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 150 ft below MP Water Height (H): 11.55 ft below MP Casing Radius (r): 0.1667 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 271.13 gal | 1,026.2 L gal Required Run Time: -- min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1455	11.83	–	0.50	10.74	7.86	158.6	6.46	443	2.09
1500	11.85	0.08	0.90	13.18	7.48	85.6	2.08	429	2.34
1510	11.85	~~0.12~~ 0.06	1.50	16.78	7.71	38.8	0.88	430	9.51
1520	11.85	~~0.10~~ 0.05	2.00	16.25	7.86	33.5	0.52	423	11.70
1530	11.85	~~0.10~~ 0.05	2.50	16.04	7.97	49.2	0.26	409	10.50
* 1540	11.98	0.05	3.0	16.34	8.01	65.1	0.24	404	11.60
Standard Purge 1600	14.08	–	4.50	6.60	7.76	80.4	0.11	396	4.51
1605	18.01	3.10	20.00	6.61	7.70	77.7	0.0	396	2.47
1616	22.88	1.81	40.00	6.56	7.68	77.2	0.03	394	5.46
1626	27.05	2.00	60.00	6.50	7.61	78.2	0.06	388	5.37
1636	31.01	2.00	80.00	6.49	7.61	79.8	0.06	385	5.32
1646	33.98	2.00	100.00	6.50	7.62	80.5	0.07	382	

Continue stabilization readings on additional pages if necessary

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1726	34.65	1.00	142.0	6.79	7.59	86.4	0.09	374	4.26

SAMPLE ID: 1205GWMMW033(U,F) **TIME:** 1726

Final Low Flow Sampling Settings: PSI: 125 Charge: 8 sec Exhaust: 17 sec

* Stopped to attempt WL recharge to maintain low-flow

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: 1008924 Client: Monsanto Date: 5-14-12 Well ID: MMW-033

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1651	34.54	2.00	110.00	6.63	7.60	82.2	0.09	380	4.88
1656	34.61	0.80	114.0	6.72	7.59	83.4	0.11	379	4.83
1701	34.61	0.75	117.75	6.71	7.59	84.4	0.12	377	3.60
1706	34.61	1.05	123.0	6.75	7.60	84.1	0.10	376	3.79
1711	34.85	0.86	127.3	6.66	7.59	85.9	0.10	375	3.67
1716	34.89	0.89	131.75	6.72	7.61	85.8	0.12	376	4.50
1721	34.66	1.05	137.0	6.76	7.61	85.4	0.12	376	4.39
1726	34.65	1.00	142.0	6.79	7.59	86.4	0.09	374	4.26

WELL SAMPLING FORM

Project No.: 1008924 Client: Monsanto Date: 5-12-12 Well ID: MMW-034

Task: GW Sampling Field Crew: R. Young / B. Downey

Measuring Point (MP): Gray Disc Water Level (WL): 10.96' ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 10.0 L Starting PSI = (½ WL + 20): 26 PSI
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling (NA)

Total Depth (TD): — ft below MP Water Height (H): — ft below MP Casing Radius (r): — ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: — gal Required Run Time: — min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0939	11.04	—	0.6	8.24	7.44	284.3	7.29	202	1.37
0944	11.09	0.2	1.6	7.61	7.28	285.3	7.89	204	2.03
0949	11.17	0.36	3.4	7.50	7.21	285.9	8.91	204	3.04
0954	11.20	0.42	5.5	7.51	7.20	284.3	9.18	204	1.46
0959	11.20	0.4	7.5	7.54	7.20	281.6	8.93	204	0.81
1004	11.21	0.4	9.5	7.56	7.21	279.6	8.80	204	0.56
1009	11.21	0.4	11.5	7.52	7.22	278.1	8.74	204	0.63

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1009	11.21	0.4	11.5	7.52	7.22	278.1	8.74	204	0.63

SAMPLE ID: 1205GWMMW034-(1,2)-(U,F) **TIME:** 1009

Final Low Flow Sampling Settings: PSI: 50 Charge: 8 sec Exhaust: 9 sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5-9-12 Well ID: MMW-035

Task: G.W. Sampling Field Crew: B. Downey / L. Fuhrig

Measuring Point (MP): Gray disk Water Level (WL): 105.11 ft below MP

Sampling Method (see applicable calculations below): Low flow Device: bladder/Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 12.32 Starting PSI = (½ WL + 20): 73
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1247	Pump on								
1253	105.18'		1.0	9.46	7.03	156.0	3.15	1151	0.59
1258	105.16'	0.30	2.5	8.82	6.89	166.8	2.12	1264	0.54
1303	105.16	0.25	3.75	8.70	6.86	183.1	2.27	1310	1.15
1308	105.15	0.30	5.25	8.74	6.87	188.3	2.24	1315	0.40
1313	105.15	0.35	7.0	8.61	6.87	191.2	2.23	1313	0.17
1318	105.15	0.30	8.5	8.69	6.88	192.0	2.22	1312	0.34
1323	105.16	0.40	10.5	8.79	6.89	192.5	2.23	1310	0.32
1328	105.17	0.30	12.0	8.91	6.88	193.3	2.20	1307	0.37
1333	105.16	0.30	13.5	8.69	6.87	193.4	2.21	1306	0.11

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1333	105.16	0.30	13.5	8.69	6.87	193.4	2.21	1306	0.11

SAMPLE ID: 1205 GW MMW035-W/F **TIME:** 1344

Final Low Flow Sampling Settings: PSI: 80 Charge: 8 sec Exhaust: 12 sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5-8-12 Well ID: MMW-036

Task: G.W. Sampling Field Crew: L. Fuhrig / B. Downey

Measuring Point (MP): Gray disk Water Level (WL): 112.13' ft below MP

Sampling Method (see applicable calculations below): low flow Device: bladder / Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 8.8 Starting PSI = (½ WL + 20): 76
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1554	Pump on								
1556	112.18'		1.5	9.75	8.00	45.7	11.01	402	1.3
1601	112.16'	0.40	3.0	8.85	7.41	54.5	7.62	390	0.8
1604	112.18'		5.0	8.89	7.43	57.1	7.59	390	0.6
1612	112.16'	0.45	8.0	9.20	7.46	60.2	7.33	390	0.3
~~1622~~	~~112.15'~~		~~10.0~~	~~1.80~~	* had to switch tanks				
1630	Pump ~~off~~ back on								
1632	112.20'		10.0	8.49	7.58	60.3	7.71	388	0.9
			~~13.0~~						
1637	112.18'	0.50	15.0	8.28	7.56	61.5	7.52	387	0.3
1641	112.17'	0.50	18.0	8.29	7.58	61.2	7.56	385	0.6

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1641	112.17'	0.50	18.0	8.29	7.58	61.2	7.56	385	0.6

SAMPLE ID: 1205 GW MMW 036-U/F **TIME:** 1655

Final Low Flow Sampling Settings: PSI: 85 Charge: 6 sec Exhaust: 10 sec

WELL SAMPLING FORM

Project No.: _____ Client: Monsanto Date: 5-9-12 Well ID: MMW-037

Task: G.W. Sampling Field Crew: B. Downey / L. Fuhrig

Measuring Point (MP): Gray disk Water Level (WL): 112.50' ft below MP

Sampling Method (see applicable calculations below): Low-flow Device: bladder / Nitrogen

Low Flow Sampling

Assumed 301' of tubing

Minimum Purge = 2* (feet * vol tubing + vol pump): 19.06 Starting PSI = (½ WL + 20): 76

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr

H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1024	Pump on	*1039 had to change tanks.							
* had to increase press. to 150 PSI to get pump working.							→ had bubble in purge line		
1100	112.60		2.5	9.08	7.10	190.2	13.60	363	6.0
1106	112.62	0.42	5.0	8.92	7.20	202.9	9.20	368	7.58
1112	112.63	~~0.42~~ 0.50	8.0	8.83	7.27	209.6	8.00	365	6.6
1121	112.68	0.44	~~10.0~~ 12.0	8.86	7.32	209.4	7.47	363	5.49
1129	112.64	0.38	15.0	8.89	7.34	208.6	7.55	359	4.39
1134	112.69		17.0	8.94	7.35	208.6	7.40	358	4.26
1139	112.68	0.46	~~2.0~~ 19.3	9.01	7.37	207.7	7.46	357	3.54

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1139	12.68	0.46	19.3	9.01	7.37	207.7	7.46	357	3.54

SAMPLE ID: 1205 GW MMW037-1/2-U/F **TIME:** 1145

Final Low Flow Sampling Settings: PSI: 150 Charge: 10 sec Exhaust: 17 sec

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: Monsanto. Date: 5/16/12 Well ID: MPW019

Task: Spring 2012 SW/GW Field Crew: E.Yeager B.Bragdon

Measuring Point (MP): n/A Water Level (WL): n/A ft below MP

Sampling Method (see applicable calculations below): grab sample from spicket on well treatment tank area in shop Device: Peristaltic, tubing, Bucket

photos #41, 42, 43

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

sample collected before treatment tanks but after well head

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0930	n/A	n/A	6	9.97	*	256.9	1.78	0.381	4.10
0935	n/A	n/A	~~15~~ 11	9.66	*	~~140~~ 254.0	~~1.32~~ 1.32	0.385	2.07
0940	n/A	n/A	16	10.61	*	195.1	1.34	0.391	3.14
0945	n/A	n/A	21	10.75	*	193.1	1.41	0.390	3.09
0950	n/A	n/A	26	10.60	*	187.9	1.60	0.388	4.86

Continue stabilization readings on additional pages if necessary

*pH probe broken on monsanto YSI ** final pH taken from sample using GW probe

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH **	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0950	n/A	n/A	26	10.60	~~7.68~~	187.9	1.60	0.388	4.86

SAMPLE ID: 1205GWMPW019 **TIME:** 0950

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

lat 42°52'38.322"N
long 111°25'16.169"W } WGS84, 30m off of table 3

WELL SAMPLING FORM

Page: 1 of 1

Project No.: _____ Client: monsanto Date: 5/15/12 Well ID: MW-16A (cut lock)

Task: spring 2012 SW/GW Field Crew: E. Yeager B. Bragdon

Measuring Point (MP): TOC black mark Water Level (WL): 5.15 ft below MP

Sampling Method (see applicable calculations below): LowFlow Device: peristaltic, tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 1.8L (30 0.03) Starting PSI = (½ WL + 20): ~~40~~ ~~30~~ 22.575
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 37.81 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1248	5.15	begin purge							
1304	5.20	0.08	0.725						
1309	5.41	0.08	1.0	17.36	*	204.8	2.36	1.504	15.56
1314	5.48	0.08	1.4	15.87	*	231.7	1.55	1.458	6.67
1319	5.51	0.08	1.8	15.71	*	229.5	1.07	1.452	4.20
1324	5.52	0.08	2.2	15.65	*	222.1	0.68	1.454	4.44
1329	5.55	0.08	2.6	15.52	*	211.4	0.63	1.450	4.39
1334	5.58	0.08	3.0	15.63	*	208.0	0.63	1.446	4.83

Continue stabilization readings on additional pages if necessary

*pH probe broken on monsanto YSI ** final pH taken from sample used GW probe

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH **	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1334	5.58	0.08	3.0	15.63	7.62	208.0	0.63	1.446	4.83

SAMPLE ID: 1205GWMW-16A-(U,F) **TIME:** 1334

Final Low Flow Sampling Settings: PSI: 23 Charge: _____ sec Exhaust: _____ sec

lat 42°49'07.535"n
long 111°29'23.656"W > WGS84, 166m off of Table 3

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/13/12 **Arrival Time** 1050

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon

SITE DESCRIPTION

Station Name Blackfoot River Below Ballard Creek **Station Number** MST019

Latitude N 42 ° 48 ' 49 " **Longitude** W 111 ° 30 ' 21 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 40

Site & Stream Description 45.5' Wide, apx. 1.0'-3.0' deep, rocky bottom (boulders not gravel)

Surface Water Characteristics (color, odor, appearance): sediment laden, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Kemmerer). Up-stream / Across-stream

Sample ID: 1205SWMST019 **Sample Time:** ~~1130~~ 1220

Sample collected at 1/3, 1/2, 2/3 stream width then composited

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					~~1130~~ 1220		
Water Temperature (°C)					11.84		
Specific Conductivity (µS/cm) @ 25° C					0.510		
Conductivity (µS/cm)					0.382		
TDS (g/L)							
Dissolved Oxygen (% sat.)					75.1		
Dissolved Oxygen (mg/L)					8.10		
pH					7.65		
ORP (mV)					175.6 pH mV 229.6 ORP		
Turbidity (FTU)					18.89		
Air Temperature (°C)					19.25		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 13 / 12 **Time** 1200 **Station Number** MST019

Completed by: E. Yeager, B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** 47 ft **Total Width** 48 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

	Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			
		Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)	
(0.6)	47	1	1.10	+0.22					
	45	2	1.30	+0.76					
	43	3	1.60	+1.69					
	41	4	1.70	+2.09					
	39	5	1.85	+1.74					
(0.2)	37	6	2.00	+2.36	37			+1.81	(0.8)
	35	7	2.00	+2.23	35			+1.73	
	33	8	2.00	+2.36	33			+1.90	
(0.6	31	9	1.75	+2.25	—				
(0.2)	29	10	2.15	+2.41	29			+1.87	
	27	11	2.10	+2.52	27			+2.45	
	25	12	2.3	+2.65	25			+1.91	
	23	13	2.45	+2.35	23			+1.84	
	21	14	2.70	+2.45	21			+2.18	
	19	15	2.80	+2.34	19			+1.77	

USGS Stream Gauging Station
Readings from left to right
facing upstream

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 13 / 12 **Time** 1200 **Station Number** MST019

Completed by: E. Yeager B. Brugdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 2.5 ft **L.E.W.** 47 ft **Total Width** 48 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

	Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			
		Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)	
(0.2)	17	1	2.90	+2.24	17			+2.01	(0.8)
	15	2	3.00	+1.98	15			+1.67	
	13	3	3.00	+1.85	13			+1.66	
	11	4	2.80	+1.66	11			+1.06	
	9	5	2.50	+1.63	9			+1.37	
	7	6	2.20	+1.55	7			+1.29	
(0.6)	5	7	1.9	+1.30	—			—	
	3	8	1.5	+0.54	—			—	
	1	9	—	—	—			—	
		10							
		11							
		12							
		13							
		14							
		15							

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 13 / 12 **Arrival Time** 0841

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name Blackfoot River below State Land Creek **Station Number** MST020

Latitude N 42 ° 48 ' 31 " **Longitude** W 111 ° 30 ' 06 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** ~~37~~ 39

Site & Stream Description Stream 42' wide, 0.0'-3.3' deep, solid gravely bottom in channel away from edges

Surface Water Characteristics (color, odor, appearance): Sediment laden water, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Kemmerer). Up-stream / Across-stream

Sample ID: 1205SWMST020 **Sample Time:** 0850

Sample composite of 1/3, 1/2, 2/3 stream width interval grabs

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					0850 ~~HY~~		
Water Temperature (°C)					11.25		
Specific Conductivity (µS/cm) @ 25° C					0.517		
Conductivity (µS/cm)					0.381		
TDS (g/L)							
Dissolved Oxygen (% sat.)					64.4		
Dissolved Oxygen (mg/L)					7.02		
pH					8.10		
ORP (mV)					173.7 pH mV 145.5 ORP		
Turbidity (FTU)					18.56		
Air Temperature (°C)					11.5		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 13 / 12 **Time** _____ **Station Number** MST020

Completed by: E Yeager B. Braydon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 6.0 **ft** **L.E.W.** 48 **ft** **Total Width** 48 **ft**

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
48	1	0.6	+0.16				
46	2	1.5	+0.46			WCB	
44	3	2.8	(.2)+1.10	44		(.8) ~~+0.83~~	+0.83
42	4	3.0	(.2)+1.51	42		(.8)	+1.37
40	5	3.2	+1.81	40			+1.66
38	6	3.25	+1.97	38			+1.77
36	7	3.1	+2.04	36			+1.86
34	8	3.0	+2.00	34			+1.66
32	9	3.2	+2.15	32			+1.83
30	10	3.3	+2.13	30			+1.70
28	11	3.2	+1.99	28			+1.72
26	12	3.2	+1.66	26			+1.59
24	13	3.2	+1.41	24			+1.31
22	14	3.1	+1.46	22			+1.29
20	15	3.3	+1.60	20			+1.62

Reading left to right facing up stream

Page 2

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 13 / 12 **Time** _____ **Station Number** MST020

Completed by: _____ **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
18	1	3.25	+1.63	18			+1.42
16	2	2.85	+1.37	16			+1.99
14	3	2.40	+1.02	14			+0.36
12	4	2.1	+0.95	12			+0.36
10	5	1.3	(0.6) +0.34	10	—	—	—
8	6	0.8	(0.6) -0.08				
6	7	—	—				
4	8	—	—				
2	9	—	—				
0	10	—	—				
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 12 / 12 **Arrival Time** 1316

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name West Dump Seep **Station Number** MDS025

Latitude N 42 ° 52 ' 13 " **Longitude** W 111 ° 24 ' 11 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description 10' wide marshy area, orange and green bacterial growth in water, flow limited to narrow 12" wide channels

Surface Water Characteristics (color, odor, appearance): sulfer odor, organic odor, water tinted yellow

SAMPLE COLLECTION

Collection Method: (1L bottle) Horizontal-bottle, Swing-sampler, Other( ), (Up-stream) Across-stream

Sample ID: 1205SWMDS025 **Sample Time:** 1320

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1320		
Water Temperature (°C)					9.54		
Specific Conductivity (µS/cm) @ 25° C					2.019		
Conductivity (µS/cm)					1.422		
TDS (g/L)							
Dissolved Oxygen (% sat.)					37.5		
Dissolved Oxygen (mg/L)					4.25		
pH					7.10		
ORP (mV)					233.4 pHmV 90.1 ORP		
Turbidity (FTU)					17.66		
Air Temperature (°C)					20.0		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Time** 1325 **Station Number** MDS025

Completed by: E. Yeager B. Bradylon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	20	0.6L
2	20	0.625L
3	20	0.6L

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 11 / 2012 **Arrival Time** 1710

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name South Dump Seep **Station Number** MDS026

Latitude N 42 ° 51 ~~.59~~ . 54 ~~.63~~ " **Longitude** W 111 ° 23 ~~.24~~ ' ~~.41~~ 36 "

Elevation ft **Datum** NAD 27 **Photo Number** 25

Site & Stream Description 18" wide, 1"-3" deep, chanel full of vegetation

Surface Water Characteristics (color, odor, appearance): clear water, some floating sediment, no odor.

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1205SW MDS026 **Sample Time:** 1715

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1715		
Water Temperature (°C)					11.05		
Specific Conductivity (µS/cm) @ 25° C					1.623		
Conductivity (µS/cm)					1.190		
TDS (g/L)							
Dissolved Oxygen (% sat.)					56.0		
Dissolved Oxygen (mg/L)					6.13		
pH					7.31		
ORP (mV)					221.0 pHmV 227.5 ORP		
Turbidity (FTU)					24.27		
Air Temperature (°C)					19.5		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 11 / 2012 **Time** 1715 **Station Number** MDS026

Completed by: E. Yeager B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	~~[illegible]~~ 10	~~[illegible]~~ 1L
2	~~[illegible]~~ 10	1L
3	10	1L

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 11 / 2012 **Arrival Time** 1426

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name Pit #2 Upper Dump Seep **Station Number** MDS030

Latitude N 42 ° 49 ' 44 " **Longitude** W 111 ° 29 ' 20 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 22

Site & Stream Description ~~mash~~ marshy area with visable flow through marsh.

Surface Water Characteristics (color, odor, appearance): ~~reddish~~ water clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1205SWMDS030 **Sample Time:** 1432

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1432		
Water Temperature (°C)					9.18		
Specific Conductivity (µS/cm) @ 25° C					0.838		
Conductivity (µS/cm)					0.585		
TDS (g/L)							
Dissolved Oxygen (% sat.)					54.2		
Dissolved Oxygen (mg/L)					6.20		
pH					7.13		
ORP (mV)					202.4 pHmV 225.1 ORP		
Turbidity (FTU)					6.19		
Air Temperature (°C)					19		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 11 / 2012 **Time** 1430 **Station Number** MD5030

Completed by: E. Yeager B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	10	0.70L
2	10	0.70L
3	10	0.80L

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/9/2012 **Arrival Time** 1335

Field Personnel

E. Yeager **Signatures** EY

B. Bragdon BB

SITE DESCRIPTION

Station Name ~~[illegible]~~ Henry Mine, Dump Seep #3 **Station Number** ~~[illegible]~~ MDS 034

Latitude N 111 ° 29 ' 23 " **Longitude** W 42 ° 53 ' 46 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 4

Site & Stream Description _____

Dry

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

Dry

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling MDS

Date 5 / 9 / 2012 **Time** 1335 **Station Number** [illegible]034

Completed by: E Yeager & B Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

DNS

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/11/2012 **Arrival Time** 1345

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name Holmgren Spring **Station Number** MSG004

Latitude N 42 ° 49 ' 16 " **Longitude** W 111 ° 28 ' 16 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 21

Site & Stream Description _____

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/11/2012 **Time** 1345 **Station Number** MSG004

Completed by: E. Yeager B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

DRY

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/11/2012 **Arrival Time** 1317

Field Personnel

E. Yeager **Signatures** EY

B. Bragdon BB

SITE DESCRIPTION

Station Name Cattle Spring **Station Number** MSG005

Latitude N 42 ° 49 ' 19 " **Longitude** W 111 ° 28 ' 01 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 20

Site & Stream Description sample collected from 1.5" diameter pipe that spring flows from

Surface Water Characteristics (color, odor, appearance): water is clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(X). Up-stream / Across-stream

1.5" Diameter pipe that spring flows from

Sample ID: 1205SWMSG005 **Sample Time:** 1320

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1320		
Water Temperature (°C)					7.18		
Specific Conductivity (µS/cm) @ 25° C					0.588		
Conductivity (µS/cm)					0.388		
TDS (g/L)							
Dissolved Oxygen (% sat.)					63.7		
Dissolved Oxygen (mg/L)					7.65		
pH					7.38		
ORP (mV)					297.5 pH mV 338.0 ORP		
Turbidity (FTU)					1.28		
Air Temperature (°C)					18		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/11/2012 **Time** 1323 **Station Number** MSG005

Completed by: E. Yeager B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	7	1L
2	7	1L
3	7	1L

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 10 / 2012 **Arrival Time** 1512

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name Southeast Spring **Station Number** MSG006

Latitude N 42 ° 49 ' 41 " **Longitude** W 111 ° 27 ' 51 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 13

Site & Stream Description apx 7.0" across, ~~leg~~ 5"-8" deep

Surface Water Characteristics (color, odor, appearance): Clear water, good flow into creek, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ) Up-stream / Across-stream

Sample ID: 120505WMSG006 **Sample Time:** 1530

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1530		
Water Temperature (°C)					8.87		
Specific Conductivity (µS/cm) @ 25° C					1.342		
Conductivity (µS/cm)					0.929		
TDS (g/L)							
Dissolved Oxygen (% sat.)					65.3		
Dissolved Oxygen (mg/L)					7.53		
pH					7.63		
ORP (mV)					241.4 pHmV 57.2 ORP		
Turbidity (FTU)					4.0		
Air Temperature (°C)					19.0		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/10/2012 **Time** 1541 **Station Number** MSG006

Completed by: E. Yeager, B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	5	2.5
2	5	2.5
3	5	2.5

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/10 / 2012 **Arrival Time** 1700

Field Personnel

E. Yeager **Signatures** ey

B. Braogdon BB

SITE DESCRIPTION

Station Name South of Southeast spring **Station Number** MS9007

Latitude N 42° 49 ' 39 " **Longitude** W 111° 27 ' 42 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 14

Site & Stream Description _____

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

Dry

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/10/2010 **Time** 1700 **Station Number** MSG007

Completed by: E. Yeager B. Broaglon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

DRY

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/13/12 **Time** 1703 **Station Number** MST044

Completed by: E. Weaver B. Braydon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 0.1 ft **L.E.W.** _____ ft **Total Width** 9.5 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0.1	1	0.1	—				
0.8	2	0.6	+0.04				
1.5	3	0.7	+0.61				
2.2	4	0.6	+0.74				
2.9	5	0.5	+1.21				
3.6	6	0.8	+1.25				
4.3	7	0.9	+1.39				
5.0	8	1.1	+2.10				
5.7	9	1.0	+1.38				
6.4	10	1.1	+1.72				
7.1	11	1.0	+1.40				
7.8	12	1.0	+1.10				
8.5	13	0.6	+0.23				
9.2	14	—	—				
	15						

Readings taken from right to left facing upstream

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 9 / 2012 **Arrival Time** 1215

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name Immediately below Henry mine **Station Number** MST044

Latitude N 42 ° 53 ' 50 " **Longitude** W 111 ° 29 ' 24 "

Elevation ft **Datum** NAD 27 **Photo Number** #3

Site & Stream Description Stream flowing South, 1' wide, flat sides with grass, cobble and boulders in stream bed.

Surface Water Characteristics (color, odor, appearance): clear, fast moving, no floating material

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 12055WMST044 **Sample Time:** 1310

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time	1310				1310		
Water Temperature (°C)					16.5		
Specific Conductivity (µS/cm) @ 25° C					0.562		
Conductivity (µS/cm)					0.473		
TDS (g/L)							
Dissolved Oxygen (% sat.)					98.1		
Dissolved Oxygen (mg/L)					9.53		
pH					8.23		
ORP (mV)					58.5		
Turbidity (FTU)					0.0		
Air Temperature (°C)					25		

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 9 / 12 **Arrival Time** 1048

Field Personnel

Emily Yeager **Signatures** EY

Bill Bragdon BB

SITE DESCRIPTION

Station Name MST045 Little Blackfoot River above Henry Creek **Station Number** MST045

Latitude N 42 ° 54 ' 10 " **Longitude** W 111 ° 29 ' 30 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** #2

Site & Stream Description Stream 11' wide, flat on sides with grass, Cow foot prints along bank, soft on bank side, solid in middle.

Surface Water Characteristics (color, odor, appearance): Light brown tint, some moss and floating grass, snail shells in water.

SAMPLE COLLECTION

Collection Method: (1L bottle) Horizontal-bottle, Swing-sampler, Other( ). (Up-stream) / Across-stream

Sample ID: ~~MST045~~ 1205SWMST045 **Sample Time:** 1052

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1052	1100	
Water Temperature (°C)					15.79	16.12	
Specific Conductivity (µS/cm) @ 25° C					0.572	0.574	
Conductivity (µS/cm)					0.471	0.476	
TDS (g/L)					~~0.3~~		
Dissolved Oxygen (% sat.)					50.2	57.5	
Dissolved Oxygen (mg/L)					4.97	5.45	
pH					7.15	7.15	
ORP (mV)					~~134.6~~ 177.5 ORP 134.6 pHmV	→ 138 pHmV 169.0 ORP	
Turbidity (FTU)					n/A *	*	
Air Temperature (°C)					23	23	

no turbidity taken, meter unavailable. Verified ok with client Rachel Roskelley.

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 13 / 12 **Time** 1735 **Station Number** MST045

Completed by: E. Yeager, B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 14.7 **ft** **L.E.W.** ~~14.7~~ 4.7 **ft** **Total Width** 35.3 **ft**

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
4.7	1	0.75	+0.20				
5.4	2	1.25	+0.28				
6.1	3	1.0	+0.51				
6.8	4	0.9	+0.37				
7.5	5	1.2	+0.50				
8.2	6	1.4	+0.65				
8.9	7	1.3	+0.89				
9.6	8	1.2	+0.89				
10.3	9	1.3	+0.98				
11.0	10	1.4	+0.99				
11.7	11	1.3	+1.09				
12.4	12	1.2	+0.87				
13.1	13	0.8	+0.58				
13.8	14	0.6	+0.20				
14.5	15	—	—				

Readings from left to right facing upstream

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 10 / 2012 **Arrival Time** 1040

Field Personnel

E. Yeager **Signatures** ey

B. Braaglon BB

SITE DESCRIPTION

Station Name Little Blackfoot River **Station Number** MST048

Latitude N 42 ° 55 ' 12 " **Longitude** W 111 ° 26 ' 26 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 8

Site & Stream Description 3 ft total width, 0.2"-0.5" deep

Surface Water Characteristics (color, odor, appearance): clear, free flowing, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 120SSWMST048 **Sample Time:** 1050

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1050		
Water Temperature (°C)					8.26		
Specific Conductivity (µS/cm) @ 25° C					0.365		
Conductivity (µS/cm)					0.248		
TDS (g/L)							
Dissolved Oxygen (% sat.)					73.1		
Dissolved Oxygen (mg/L)					8.59		
pH					8.1		
ORP (mV)					309.1 pHmV 334.0 ORP		
Turbidity (FTU)					11.57*		
Air Temperature (°C)					14		

* using scientific inc monsanto owned meter

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/13/12 **Time** 1807 **Station Number** MST048

Completed by: E. Yeager B. Brayton **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 1.6 **ft** **L.E.W.** 4.4 **ft** **Total Width** 6.2 **ft**

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
1.7	1	0.4	+0.17				
2.1	2	0.5	+0.52				
2.5	3	0.45	+0.55				
2.9	4	0.40	+1.05				
3.3	5	0.30	+0.85				
3.7	6	0.30	+0.81				
4.1	7	0.2	+0.66				
4.5	8	—	—				
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Reading from right to left facing upstream

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 10 /2010 **Arrival Time** 1250

Field Personnel

E. Yeager **Signatures** EY

B. Bragdon BB

SITE DESCRIPTION

Station Name Long Valley Creek below Ballard Min **Station Number** MST 050

Latitude N 42 ° 50 ' 54 " **Longitude** W 111 ° 29 ' 49 "

Elevation ft **Datum** NAD 27 **Photo Number** 10

Site & Stream Description 3.8' ~~ate~~ wide, apx. 0.1'-0.25' deep

Surface Water Characteristics (color, odor, appearance): ~~clear~~, free flowing, no odor, water has slight yellow tint

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1205SWMST050 **Sample Time:** 1300

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1300		
Water Temperature (°C)					13.84		
Specific Conductivity (µS/cm) @ 25° C					0.305		
Conductivity (µS/cm)					0.240		
TDS (g/L)							
Dissolved Oxygen (% sat.)					86.2		
Dissolved Oxygen (mg/L)					8.90		
pH					8.12		
ORP (mV)					142.3 pHmV 192.3 ORP		
Turbidity (FTU)					9.19		
Air Temperature (°C)					16		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/13/12 **Time** 1635 **Station Number** MST050

Completed by: E. Yeager, B. Bragdon **Checked by:**

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 3.0 ft L.E.W. 6.5 ft Total Width 8.3 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
3.0	1	0.10	—				
3.4	2	0.3	+0.14				
3.8	3	0.35	+0.01				
4.2	4	0.35	+0.06				
4.6	5	0.35	+0.04				
5.0	6	0.40	+0.23				
5.4	7	0.20	+0.37				
5.8	8	0.25	+0.36				
6.2	9	0.20	-0.03				
	10						
	11						
	12						
	13						
	14						
	15						

Readings from right to left facing upstream

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/9/2012 **Arrival Time** 1420

Field Personnel

E Yeager **Signatures** ey

B Bragdon BB

SITE DESCRIPTION

Station Name East Fork Long Valley Creek below Henry Mine **Station Number** MST051

Latitude N 42 ° 52 ' 18 " **Longitude** W 111 ° 28 ' 58 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 5

Site & Stream Description Dry

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, ~~Horizontal-bottle~~, Swing-sampler, Other( ), ~~Up-stream~~ / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

Dry

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 9 / 2012 **Time** 1420 **Station Number** MST051

Completed by: E. Yeager B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/9/2012 **Arrival Time** 1100

Field Personnel

E. Yeager **Signatures** ey

B. Braydon BB

SITE DESCRIPTION

Station Name ~~West Fork~~ Lone Pine Creek above Lone Pine Creek **Station Number** MST057

Latitude N 42 ° 51 ' 59 " **Longitude** W 111 ° 26 ' 21 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 7

Site & Stream Description stream apx 2.0' wide, 2"-6" deep

Surface Water Characteristics (color, odor, appearance): clear water, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 120509WMST057 **Sample Time:** 1626

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1626		
Water Temperature (°C)					18.60		
Specific Conductivity (µS/cm) @ 25° C					0.346		
Conductivity (µS/cm)					0.304		
TDS (g/L)							
Dissolved Oxygen (% sat.)					73.0		
Dissolved Oxygen (mg/L)					6.83		
pH					8.04		
ORP (mV)					142.6 pH mV -2.7 ORP		
Turbidity (FTU)					* NA		
Air Temperature (°C)					25		

* no turbidity meter available for use, cleared no turbidity sample collection with client Rachel Roskelley

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 9 / 2012 **Time** 1620 **Station Number** MST057

Completed by: E.Yeager B.Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	30	0.80L
2	30	0.80L
3	30	0.60L

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/9/2012 **Arrival Time** 1440

Field Personnel

E Yeager **Signatures** ey

B Bragdon BB

SITE DESCRIPTION

Station Name Stripmine creek below Henry mine **Station Number** MST063

Latitude N 42 ° 52 ' 01 " **Longitude** W 111 ° 26 ' 21 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 6

Site & Stream Description stream width 14", 2-6" deep

Surface Water Characteristics (color, odor, appearance): clear water, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 120SSWMST063 **Sample Time:** _____

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1504	1507	1510
Water Temperature (°C)					15.18	15.19	15.20
Specific Conductivity (µS/cm) @ 25° C					0.549	0.550	0.550
Conductivity (µS/cm)					0.446	0.447	0.447
TDS (g/L)							
Dissolved Oxygen (% sat.)					60.9	60.6 ~~60.0~~	60.4
Dissolved Oxygen (mg/L)					6.10	6.07	6.06
pH					7.81	7.79	
ORP (mV)					257.0 pHmV 109 ORP	209.1 pHmV ~~204~~ 127 ORP	204 pHmV 21.3 ORP
Turbidity (FTU)					NA *	NA *	* NA
Air Temperature (°C)					25		

* Turbidity meter unavailable for use, cleared no no turbidity measurement with client Rachel Roskelley.

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/9/2012 **Time** 1500 **Station Number** MST063

Completed by: E. Yeager B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	9	1L
2	7	1L
3	5	1L

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Arrival Time** ~~[illegible]~~ 1646

Field Personnel

E. Yeager **Signatures** EY

B. Bragdon BB

SITE DESCRIPTION

Station Name Ballard Creek above Blackfoot River **Station Number** MST0606

Latitude N 42 ° 48 ' 56 " **Longitude** W 111 ° 30 ' 07 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 36

Site & Stream Description stream 2' wide, 0.1"-0.35" deep, clear of any debris, full of gravel

Surface Water Characteristics (color, odor, appearance): clear water, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 120512WMST0606 **Sample Time:** 1650

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1650		
Water Temperature (°C)					12.31		
Specific Conductivity (µS/cm) @ 25° C					0.656		
Conductivity (µS/cm)					0.497		
TDS (g/L)					~~[illegible]~~		
Dissolved Oxygen (% sat.)					74.2		
Dissolved Oxygen (mg/L)					7.92		
pH					7.69		
ORP (mV)					289.6 pHmV 234.1 ORP		
Turbidity (FTU)					6.85		
Air Temperature (°C)					22		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Time** 1655 **Station Number** MST0660

Completed by: E. Yeager, B. Bragdon **Checked by:**

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 7.8 ft L.E.W. 10.3 ft Total Width ~~2.0~~ WCB 17.9 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0.3	1	<0.1	—				
0.6	2	0.25	-0.04				
0.9	3	0.35	+0.22				
1.2	4	0.35	+1.12				
1.5	5	0.20	+1.31				
1.8	6	<0.1	—				
2.0	7	<0.1	—				
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Reading ~~left~~ right to left facing up stream

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 11 / 12 **Arrival Time** 1504

Field Personnel

E. Yeager **Signatures** EY

B. Bragdon BB

SITE DESCRIPTION

Station Name Ballard Creek Headwaters **Station Number** MST067

Latitude N 42 ° 49 ' 23 " **Longitude** W 111 ° 29 ' 34 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 23

Site & Stream Description stream apx 18" across, 12" deep, channel completely full of plant growth

Surface Water Characteristics (color, odor, appearance): clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 12055WMST067 **Sample Time:** 1525

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1525		
Water Temperature (°C)					9.93		
Specific Conductivity (µS/cm) @ 25° C					1.553		
Conductivity (µS/cm)					1.106		
TDS (g/L)							
Dissolved Oxygen (% sat.)					56.0		
Dissolved Oxygen (mg/L)					6.28		
pH					7.40		
ORP (mV)					187.3 pHmV 226.9 ORP		
Turbidity (FTU)					8.45		
Air Temperature (°C)					17.5		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/11/2012 **Time** 1524 **Station Number** MST067

Completed by: E. Yeager, B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	15	1.5L
2	15	1.5L
3	15	2.0L

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 08/may/2012 **Arrival Time** 1635

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name Short creek below ballard mine **Station Number** MST069

Latitude N 42 ° 49 ' 11 " **Longitude** W 111 ° 29 ' 22 "

Elevation 6305 ft **Datum** ~~NAD 27~~ WGS84 **Photo Number** 1

Site & Stream Description stream channel open, no site disturbance, stake in place along with PVC channel pipe

Surface Water Characteristics (color, odor, appearance): clear water, visable flow, organic smell

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: ~~may069~~ 1205SWMST069 **Sample Time:** 1640

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1646		
Water Temperature (°C)					~~16.32~~ 15.43		
Specific Conductivity (µS/cm) @ 25° C					1,880		
Conductivity (µS/cm)					~~22.37~~ 1.534		
TDS (g/L)							
Dissolved Oxygen (% sat.)					69.2		
Dissolved Oxygen (mg/L)					6.84		
pH					7.87		
ORP (mV)					~~240.2~~ 186.3 pHmV 172.0 ORP		
Turbidity (FTU)					*NA		
Air Temperature (°C)					25 ~~81.4°F~~		

* turbidity meter unavailable for use, verified ok to not collect with Client Rachel Rosselley

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 08 / may / 2012 **Time** 1646 **Station Number** MST0609

Completed by: E. Yeager B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	40	1L
2	40	0.75L
3	46	1L

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 11 / 2012 **Arrival Time** 1127

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name Wooley Valley Creek, below North Fork Wolley Valley Creek **Station Number** MST089

Latitude N 42 ° 49 ' 28 " **Longitude** W 111 ° 26 ' 19 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 18

Site & Stream Description Stream 5.2' wide, 0.3"-0.7" deep, alot of grass growing in flow chanel

Surface Water Characteristics (color, odor, appearance): Clear water, no odor.

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 12055WMST089 **Sample Time:** 1133

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1133	1135 ~~1133~~	1137
Water Temperature (°C)					12.82	12.86	12.87
Specific Conductivity (µS/cm) @ 25° C					0.370	0.370	0.370
Conductivity (µS/cm)					0.284	0.285	0.285
TDS (g/L)							
Dissolved Oxygen (% sat.)					62.9	63.5	63.2
Dissolved Oxygen (mg/L)					6.65	6.70	6.66
pH					7.53	7.53	7.53
ORP (mV)					174.1 pH mV 126.7 ORP	173.1 121.6	172.3 118.6
Turbidity (FTU)					3.04	3.04	3.04
Air Temperature (°C)					18.5	18.5	18.5

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/13/12 **Time** 1353 **Station Number** MST089

Completed by: E. Uecker, B. Bradyton **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 2.9 **ft** **L.E.W.** _____ **ft** **Total Width** 10.3 **ft**

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
2.9	1	0.15	+0.01				
3.6	2	0.30	-0.22				
4.3	3	0.45	-0.07				
5.0	4	0.45	+0.13				
5.7	5	0.45	-0.02				
6.4	6	0.4	+0.20				
7.1	7	—	—				
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Readings taken from right to left facing upstream

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 11 / 2012 **Arrival Time** 1229

Field Personnel

E. Yeager **Signatures** EY

B. Braydon BB

SITE DESCRIPTION

Station Name Wooley Valley Creek above North Fork Wooley Valley Creek **Station Number** MST 090

Latitude N 42 ° 49 ' 28 " **Longitude** W 111 ° 26 ' 49 "

Elevation ft **Datum** NAD 27 **Photo Number** 19

Site & Stream Description Stream 1.6' wide, 0.1"-0.3" deep, clear flowing chanel

Surface Water Characteristics (color, odor, appearance): clear water, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 120511WMST090 **Sample Time:** 1243

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1243		
Water Temperature (°C)					14.73		
Specific Conductivity (µS/cm) @ 25° C					0.359		
Conductivity (µS/cm)					0.289		
TDS (g/L)							
Dissolved Oxygen (% sat.)					73.3		
Dissolved Oxygen (mg/L)					7.42		
pH					7.75		
ORP (mV)					164.5 pH mV 176.7 ORP		
Turbidity (FTU)					1.35		
Air Temperature (°C)					15.5		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/13/12 **Time** 1326 **Station Number** MST090

Completed by: E. Yeager B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 2.9 ft L.E.W. 4.4 ft Total Width 6.6' ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
2.9	1	0.20	-0.01				
3.2	2	0.30	+0.15				
3.5	3	0.25	+0.29				
3.8	4	0.25	+0.33				
4.1	5	0.15	—				
4.4	6	—	—				
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Readings right to ~~left~~ left facing upstream

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/11/2012 **Arrival Time** 1041

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name North Fork Wooley Valley Creek above Wolley Valley Creek **Station Number** MST092

Latitude N 42 ° 49 ' 40 " **Longitude** W 111 ° 27 ' 04 "

Elevation ft **Datum** NAD 27 **Photo Number** 17

Site & Stream Description Flow area apx 12"-18" wide, apx. 6"-8" deep, deep flat area looks like no flow.

Surface Water Characteristics (color, odor, appearance): clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 12055WMST092 **Sample Time:** 1051

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1050		
Water Temperature (°C)					8.06		
Specific Conductivity (µS/cm) @ 25° C					0.400		
Conductivity (µS/cm)					0.271		
TDS (g/L)							
Dissolved Oxygen (% sat.)					61.0		
Dissolved Oxygen (mg/L)					7.20		
pH					7.54		
ORP (mV)					168.4 pHmV 37.2 ORP		
Turbidity (FTU)					13.63		
Air Temperature (°C)					16.0		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/11/2012 **Time** 1045 **Station Number** MJT092

Completed by: E. Yeager, B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	9	2.5L
2	10	2.5L
3	12	2.5L

Flow by Meter

R.E.W._____ft **L.E.W.**_____ft **Total Width**_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 10 / 2012 **Arrival Time** 1355

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name North Fork Wooley Valley Creek above Ballard Mine **Station Number** MST093

Latitude N 42 ° 50 ' 28 " **Longitude** W 111 ° 28 ' 34 "

Elevation ft **Datum** NAD 27 **Photo Number** 11

Site & Stream Description marshy conditions with pooling water before pond inlet. Sample taken at best flow area.

Surface Water Characteristics (color, odor, appearance): clear water, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1205SWMST093 **Sample Time:** 1420

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1420		
Water Temperature (°C)					16.21		
Specific Conductivity (µS/cm) @ 25° C					0.275		
Conductivity (µS/cm)					0.229		
TDS (g/L)							
Dissolved Oxygen (% sat.)					53.3		
Dissolved Oxygen (mg/L)					5.23		
pH					7.35		
ORP (mV)					155.9 pHmV 180.5 ORP		
Turbidity (FTU)					2.59		
Air Temperature (°C)					15		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 10 / 2012 **Time** ~~PM~~ 1423 **Station Number** MST093

Completed by: E. Yeager, B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	28	1.5L
2	30	2.5L
3	30	2.25L

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/11/2012 **Arrival Time** 1005

Field Personnel

E. Yeager **Signatures** ey

B. Braaden BB

SITE DESCRIPTION

Station Name Spring Fed Trib #1 of N. Fork Wooley Valley Cr., below Ballard Mine **Station Number** MST 094

Latitude N 42 ° 49 ' 50 " **Longitude** W 111 ° 28 ' 10 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 16

Site & Stream Description _____

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

DRY

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/11/2012 **Time** 1005 **Station Number** MST094

Completed by: E. Yeager, B. Bringdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

DRY

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/10/2012 **Arrival Time** 1445

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name Spring fed trib # 2 of N. Fork Wolley Valley cr. Below Ballard Mine **Station Number** MST095

Latitude N 42 ° 49 ' 39 " **Longitude** W 111 ° 28 ' 05 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 12

Site & Stream Description Stream width 12", apx 6.0" deep, marsh like conditions with water flowing in low area

Surface Water Characteristics (color, odor, appearance): clear water, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 12055WMST095 **Sample Time:** 1456

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1456		
Water Temperature (°C)					17.30		
Specific Conductivity (µS/cm) @ 25° C					0.450		
Conductivity (µS/cm)					0.384		
TDS (g/L)							
Dissolved Oxygen (% sat.)					56.0		
Dissolved Oxygen (mg/L)					5.36		
pH					7.43		
ORP (mV)					157.4 pH mV 193.0 ORP		
Turbidity (FTU)					0.99		
Air Temperature (°C)					18.5		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 10 / 2012 **Time** 1501 **Station Number** MST095

Completed by: E. Yeager B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	4	1L
2	4	1L
3	4	1L

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/10/2012 **Arrival Time** 1710

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name Tributary of North Fork Wooley Valley Creek, below Ballard Mine **Station Number** MST 096

Latitude N 42 ° 49 ' 30 " **Longitude** W 111 ° 27 ' 45 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 15

Site & Stream Description wet, marshy area apx 8' wide, main water flow apx. 1ft wide and 3"-4" deep

Surface Water Characteristics (color, odor, appearance): clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1205SWMST096 **Sample Time:** 1720

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1720		
Water Temperature (°C)					14.30		
Specific Conductivity (µS/cm) @ 25° C					0.582		
Conductivity (µS/cm)					0.463		
TDS (g/L)							
Dissolved Oxygen (% sat.)					63.8		
Dissolved Oxygen (mg/L)					6.52		
pH					7.56		
ORP (mV)					161.7 pHmV 127.2 ORP		
Turbidity (FTU)					24.5		
Air Temperature (°C)					17.5		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/10/2012 **Time** 1718 **Station Number** MST096

Completed by: E. Yeager, B. Braiglon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	2	1L
2	2	1L
3	0.5	1L

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Arrival Time** 1035

Field Personnel

E. Yeager **Signatures** EY

B. Bragdon BB

SITE DESCRIPTION

Station Name Angus Creek above Rasmussen Creek **Station Number** MST128

Latitude N 42 ° 51 ' 08 " **Longitude** W 111 ° 22 ' 32 "

Elevation ft **Datum** NAD 27 **Photo Number** 30

Site & Stream Description ~~Angus~~ Stream 6.0' wide, apx 1.3' deep

Surface Water Characteristics (color, odor, appearance): cloudy, suspended sediment, can't see chanel bottom, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1205SWMST128 **Sample Time:** 1050

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1050		
Water Temperature (°C)					7.51		
Specific Conductivity (µS/cm) @ 25° C					0.592		
Conductivity (µS/cm)					0.394		
TDS (g/L)							
Dissolved Oxygen (% sat.)					78.9		
Dissolved Oxygen (mg/L)					9.44		
pH					8.03		
ORP (mV)					230.0 pHmV 170.4 ORP		
Turbidity (FTU)					19.67		
Air Temperature (°C)					18.0		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 13 / 12 **Time** 1500 **Station Number** MST0128

Completed by: _____ **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 4.0 ft **L.E.W.** 9.0 ft **Total Width** 10.2 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
4.0	1	1.8	+0.13				
4.4	2	1.3	+0.44				
4.8	3	1.35	+0.63				
5.2	4	1.20	+0.76				
5.6	5	1.35	+0.79				
6.0	6	1.35	+0.76				
6.4	7	1.25	+0.80				
6.8	8	1.25	+0.80				
7.2	9	1.15	+0.76				
7.6	10	1.15	+0.72				
8.0	11	1.15	+0.51				
8.4	12	1.20	+0.23				
8.8	13	1.10	+0.05				
	14						
	15						

Reading left to right facing upstream

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Arrival Time** 1030

Field Personnel

E. Upciger **Signatures** ey

B. Braaglon BB

SITE DESCRIPTION

Station Name Rasmussen Creek above Angus Creek **Station Number** MST131

Latitude N 42° 51' 08" **Longitude** W 111° 22' 31"

Elevation _____ ft **Datum** NAD 27 **Photo Number** 29

Site & Stream Description sampled apx 20' above where Rasmussen enters Angus Creek, 5"-8" wide, 1"-3" deep

Surface Water Characteristics (color, odor, appearance): clear water, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: ~~1205~~MST 120558WMST131 **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1040		
Water Temperature (°C)					10.19		
Specific Conductivity (µS/cm) @ 25° C					0.611		
Conductivity (µS/cm)					0.438		
TDS (g/L)							
Dissolved Oxygen (% sat.)					39.5		
Dissolved Oxygen (mg/L)					4.44		
pH					6.71		
ORP (mV)					171.7 pH mV 174.9 ORP		
Turbidity (FTU)					6.62		
Air Temperature (°C)					18.0		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Time** 1045 **Station Number** MST131

Completed by: E. Yeager, B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	15	0.4L
2	15	0.35L
3	15	0.45L

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Arrival Time** 1130

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name Angus creek above no name creek and below Rasmussen **Station Number** MST132

Latitude N 42 ° 51 ' 07 " **Longitude** W 111 ° 22 ' 29 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 31

Site & Stream Description _____

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1205SWMST132 **Sample Time:** 1150

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1150	1152	
Water Temperature (°C)					9.01	9.03	
Specific Conductivity (µS/cm) @ 25° C					0.589	0.589	
Conductivity (µS/cm)					0.409	0.409	
TDS (g/L)							
Dissolved Oxygen (% sat.)					76.4	76.3	
Dissolved Oxygen (mg/L)					8.80	8.81	
pH					7.96	7.96	
ORP (mV)					149.9 pHmV 188.8 ORP	150.3 pHmV 185.5 ORP	
Turbidity (FTU)					19.8	19.8	
Air Temperature (°C)					19.0	19.0	

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/13/12 **Time** 1502 **Station Number** MST ~~138~~ 132

Completed by: E. Upager, B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 13.1 ft **L.E.W.** 6.4' ft **Total Width** 19.6 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
13.1	1	1.4	+0.14	7.1	~~1.50~~ web	1.50	+0.30
12.7	2	1.5	+0.16	6.7	E.	1.40	-0.24
12.3	3	1.6	+0.24	6.4	—	—	—
11.9	4	1.5	+0.28				
11.5	5	1.65	+0.31				
11.1	6	1.65	+0.35				
10.7	7	1.65	+0.47				
10.3	8	1.65	+0.54				
9.9	9	1.70	+0.30				
9.5	10	1.70	+0.06				
9.1	11	1.70	-0.02				
8.7	12	1.60	-0.01				
8.3	13	1.50	+0.34				
7.9	14 1.40	~~0.90~~ web	~~+0.45~~ web	0.51			
7.5	15	0.30	+0.52				

Readings from right to left facing upstream

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 11 / 2012 **Arrival Time** 1752

Field Personnel

E. Yeager **Signatures** EY

B. Bragdon BB

SITE DESCRIPTION

Station Name Rasmussen Creek below Enoch Valley Mine **Station Number** MST 133

Latitude N 42 ° 51 ' 48 " **Longitude** W 111 ° 23 ' 50 "

Elevation ft **Datum** NAD 27 **Photo Number** 26

Site & Stream Description chanel apx 12"-18" wide, 2"-4" deep

Surface Water Characteristics (color, odor, appearance): clear water, foaming bubbles when collected in bottle at stream, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1205SWMST133 **Sample Time:** 1800

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1800		
Water Temperature (°C)					14.61		
Specific Conductivity (µS/cm) @ 25° C					0.303		
Conductivity (µS/cm)					0.243		
TDS (g/L)							
Dissolved Oxygen (% sat.)					72.3		
Dissolved Oxygen (mg/L)					7.35		
pH					7.58		
ORP (mV)					148.5 pH mV 170.0 ORP		
Turbidity (FTU)					14.17		
Air Temperature (°C)					16.5		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 13 / 12 **Time** 1100 **Station Number** MST 133

Completed by: E. Yeager, B. Braaflon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. ~~0.3~~ 2.1 **ft** **L.E.W.** ~~2.1~~ 0.3 **ft** **Total Width** 3.7 **ft**

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
2.0	1	0.10	—				
1.7	2	0.20	+0.32				
1.4	3	0.20	+0.76				
1.1	4	0.20	+0.22				
0.8	5	0.20	muddy brown/probe				
0.5	6	0.15	"				
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

reading from right to left facing upstream

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Arrival Time** 1532

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name Rasmussen Creek Head Waters near Enoch Valley Mine Shop pond **Station Number** MST136

Latitude N 42 ° 52 ' 34 " **Longitude** W 111 ° 25 ' 03 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 35

Site & Stream Description _____

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

DRY

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Time** 1532 **Station Number** MST136

Completed by: E. Yeager B. Bragdon **Checked by:** ~~MST136~~

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Arrival Time** 0927

Field Personnel

E. Yeager **Signatures** EY

B. Braydon BB

SITE DESCRIPTION

Station Name East Fork Rasmussen Creek above Rasmussen Creek **Station Number** MST143

Latitude N 42 ° 51 ' 31 " **Longitude** W 111 ° 23 ' 01 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 23

Site & Stream Description _____

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

DRY

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Time** 0927 **Station Number** MST143

Completed by: E. Yeager, B. Brodgdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7	DRY					
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Arrival Time** 1504

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name West Pond Creek headwaters, below west Pond **Station Number** MST144

Latitude N 42 ° 52 ' 16 " **Longitude** W 111 ° 24 ' 18 "

Elevation ft **Datum** NAD 27 **Photo Number** 34

Site & Stream Description

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Time** 1504 **Station Number** MST 144

Completed by: E. Yeager B. Braaglon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 10 / 2012 **Arrival Time** 1135

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon

SITE DESCRIPTION

Station Name Tributary to Lone Pine Creek **Station Number** MST 226

Latitude N 45° 51 ' 42 " **Longitude** W 111 ° 25 ' 55 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 9

Site & Stream Description range from 12" - 18" wide, flat, depth 1" - 4"

Surface Water Characteristics (color, odor, appearance): clear in flowing areas, no odor, flowing over fairly flat area with slight down slope of draw

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1205SWMST226 **Sample Time:** 1220

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1220		
Water Temperature (°C)					6.45		
Specific Conductivity (µS/cm) @ 25° C					0.331		
Conductivity (µS/cm)					0.214		
TDS (g/L)							
Dissolved Oxygen (% sat.)					33.7		
Dissolved Oxygen (mg/L)					4.14		
pH					7.20		
ORP (mV)					234.7 pH mV 291.6 ORP		
Turbidity (FTU)					1.1 *		
Air Temperature (°C)					16		

* using monsanto turb. meter scientific meter inc.

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 10 / 2012 **Time** 1230 **Station Number** MST226

Completed by: E. Yeager B. Braaglon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	4	1L
2	5	1L
3	4	1L

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 11 / 2012 **Arrival Time** 1651

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name East Fork Rasmussen Creek headwaters **Station Number** MST269

Latitude N 42 ° 52 ' 16 " **Longitude** W 111 ° 23 ' 41 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 24

Site & Stream Description _____

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

DRY

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 11 / 2012 **Time** 1451 **Station Number** MST269

Completed by: E. Yeager, B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

DRY

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Arrival Time** 0834

Field Personnel

E. Yeager **Signatures** ey

B. Bragdon BB

SITE DESCRIPTION

Station Name West Fork of Rasmussen Creek **Station Number** MST 274

Latitude N 42 ° 51 ' 31 " **Longitude** W 111 ° 23 ' 34 "

Elevation _____ ft **Datum** NAD 27 **Photo Number** 27

Site & Stream Description Stream 3.0' wide, 0.1", 0.5" deep, vegetation growing in chanel

Surface Water Characteristics (color, odor, appearance): clear water, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1205SWMST274 **Sample Time:** 0844

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					0844	0846	0848
Water Temperature (°C)					4.41	4.42	4.43
Specific Conductivity (µS/cm) @ 25° C					0.644	0.644	0.644
Conductivity (µS/cm)					0.391	0.391	0.391
TDS (g/L)							
Dissolved Oxygen (% sat.)					77.3	77.3	77.3
Dissolved Oxygen (mg/L)					10.01	10.01	10.00
pH					8.05	8.05	8.05
ORP (mV)					279.0 pH mV 308.4 ORP	281.7 306.5	281.3 304.4
Turbidity (FTU)					1.33	1.33	1.33
Air Temperature (°C)					10.5	10.5	10.5

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/13/12 **Time** 1547 **Station Number** MST274

Completed by: E. Yeager B. Bragdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 3.5 ft **L.E.W.** 5.6 ft **Total Width** 7.8 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
3.5	1	0.1	—				
3.9	2	0.2	+0.03				
4.3	3	0.5	+0.02				
4.7	4	0.5	+0.07				
5.1	5	0.4	+0.30				
5.5	6	0.1	—				
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Reading right to left facing upstream

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5/12/12 **Arrival Time** 1434

Field Personnel

E. Yeager **Signatures** ey

BHB Brogdon BB

SITE DESCRIPTION

Station Name _____ **Station Number** MST275

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation _____ ft **Datum** NAD 27 **Photo Number** 33

Site & Stream Description _____

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

DRY

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2012 SW Sampling

Date 5 / 12 / 12 **Time** 1434 **Station Number** MST275

Completed by: E. Yeager B. Brogdon **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

COC No. A 30183

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MWH

Project Contact: Betty Van Pelt

Contact Phone #: 801-61[illegible]-3200

Turn Around Requirements:

Location: Monsanto

Project ID: 2012 Spring Sampling

Sampler (print): B. Downey

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

ADDITIONAL REQUIREMENTS

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	SW6020A	E160.1	EPA 300.0 Filtered												TOTAL # (LAB USE)
1205GWMMW09E			5-8-12	1425	Water	1				X												
1205GWMMW09U			↑	1425	Water	2		X	X													
1205GWMMW07E				1655	W	1				X												
1205GWMMW07U				1655	W	2		X	X													
1205GWMMW07EMS				1655	W	1				X												
1205GWMMW07UMS				1655	W	2		X	X													
1205GWMMW07EMSD				1655	W	1				X												
1205GWMMW07UMSD				1655	W	2		X	X													
1205GWMMW07E				1755	W	1				X												
1205GWMMW07U				1755	W	2		X	X													

5-8-12

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	5-9-12	0800	Plant				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

COC No. A 30182

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MWH

Project Contact: Betty Van Wolf

Contact Phone #: 801-617-3200

Turn Around Requirements:

Location: Monsanto

Project ID: Monsanto SW/GW Spring 2012

Sampler (print): B. Lawrence

Signature:

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	SW6020A	E-160.1	EPA 300.0 (Filtered)	SW6010B	E160.2	SW7471	EPA 353.2 (Filtered)	EPA Dissolved 300.0 (Filtered)	SW6010B dissolved (Filtered)	EPA 310.2 (Filtered)	SM2340B-Calc.				TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1205GWMMW037-1-U			5-9-12	1145	W			X	X		X	X	X	X	X	X	X	X					
1205GWMMW037-1-F				1145	W					X				X	X	X	X	X					
1205GWMMW037-2-U				1145	W			X	X		X	X	X										
1205GWMMW037-2-F				1145	W					X													
1205GWMMW035-U				1344	W			X	X														
1205GWMMW035-F				1344	W					X													
1205GWMMW026-U				1635	W			X	X														
1205GWMMW026-F			5-9-12	1635	W					X													

Program
- ☐ CWA
- ☐ RCRA
- ☐ DOD
- ☐ AFCEE
- ☐ Other _____

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	5-10-12	0700	Fed-Ex				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

COC No. A 30181

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: monsanto MINT

Project Contact: Beth VanPelt

Contact Phone #: 801-1017-3200

Turn Around Requirements: standard

Location: monsanto

Project ID: monsanto SW/GW Spring 2012

Sampler (print): E. Yeager B. Paradon

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	6020A metals	6010B metals	EPA 300.0 anions	EPA 160.1 TDS	Total Se SW 6020A	Dissolved Cd SW6020A	Dissolved Ca, Mg, V SW6010B	Dissolved SO4 E300.0	TDS E160.1	Hardness SM2340B					TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
~~MSTA0692~~		X	5/8/12	1640	W	4		X	X	X	X												
1205SWMST0692E		X	5/9/12	1640	W	2			X	X			X	X	X		X						
1205SWMST0692U		X	5/8/12	1640	W	2		X			X	X				X							
1205SWMST0445-1-E		X	5/9/12	1552	W	2							X	X	X		X						
1205SWMST0445-1-U		X	5/9/12		W	2						X				X							
1205SWMST0445-2-E		X	5/9/12		W	2							X	X	X		X						
1205SWMST0445-2-U		X	5/9/12		W	2						X				X							
1205SWMST0444-E		X	5/9/12	1310	W	2							X	X	X		X						
1205SWMST0444-U		X	5/9/12		W	2						X				X							
1205SWMST0403-E		X	5/9/12	1504	W	2							X	X	X		X						
1205SWMST0403-U		X	5/9/12	1504	W	2						X				X							
1205SWMST0403-E-MS		X	5/9/12	1507	W	2							X	X	X		X						
1205SWMST0403-U-MS		X	5/9/12	1507	W	2						X				X							
1205SWMST0403-E-MSD		X	5/9/12	1510	W	2							X	X	X		X						
1205SWMST0403-U-MSD		X	5/9/12	1510	W	2						X				X							
1205SWMST0457-E		X	5/9/12	1020	W	2							X	X	X		X						
1205SWMST0457-U		X	5/9/12	1020	W	2						X				X							
1205EB-SW-01-E		X	5/9/12	1743	W	2							X	X	X		X						
1205EB-SW-01-U		X	5/9/12	1743	W	2						X				X							
1205-SW-01-E		X	5/9/12	1743	W	2							X	X	X		X						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
E. Yeager	5/10/12	1800	Fed EX				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

COC No. A 30172

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: Monsanto MNH

Project Contact: Beth VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto

Project ID: Monsanto SW/GW Spring 2012

Sampler (print): E. Yeager B. Brandon

Signature: [illegible]

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Se SW 6020A	Dissolved Cd SW 6020A	Dissolved Ca, Mg, V SW 6020B	Dissolved SO4 E300.0	TDS E 160.1	Hardness SM 2340B									TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1305-SW-01-11		X	5/9/12	1743	W	2		X				X											

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
E. Yeager	5/10/12	0800	FedEX				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

PLEASE PRINT- Provide as much information as possible.

Company Name: MWH	Project Name, PWS, Permit, Etc.: Monsanto Spring Sampling	Sample Origin State: Idaho	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: NA	Contact Name: Betty VanPelt Phone/Fax: 801-617-3200	Email: NA	Sampler: (Please Print) Blake Downey
Invoice Address: Monsanto	Invoice Contact & Phone: NA	Purchase Order:	Quote/Bottle Order:

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

NA

☐ DW ☐ A2LA
☐ GSA ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format: _____
☐ State: _____ ☐ LEVEL IV
☐ Other: _____ ☐ NELAC

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: Fed-Ex
Cooler ID(s): NA
Receipt Temp _____ °C
On Ice: Yes No
Custody Seal Y N
Bottles/Coolers B C
Intact Y N
Signature Match Y N

ANALYSIS REQUESTED

Number of Containers; Sample Type: A W S V B O; Air Water Soils/Solids Vegetation Bioassay Other

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	SW6020A	160.1	300.0 (Attached)							SEE ATTACHED	Normal Turnaround (TAT)	RUSH
1	1205GW MMW021-A	5-10-12		W	X	X										
2	1205GW MMW021-F	↑		W			X									
3	1205GW MMW006-A			W	X	X										
4	1205GW MMW006-F			W			X									
5	1205GW MMW030-A	↓		W	X	X										
6	1205GW MMW030-F	5-10-12		W			X									
7																
8			BD													
9				I-10-12												
10																

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Blake Downey	5-11-12 0900		Fed-Ex	5-11-12	
			Received by Laboratory:	Date/Time:	Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.
Visit our web site at www.energylab.com for additional information, downloadable fee schedule, forms, and links.

COC No. A 30174

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MWH

Project Contact: Betty VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto

Project ID: Spring 2012 SW/GW Sampling

Sampler (print): E. Yeager

Signature: D Yeager

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

ADDITIONAL REQUIREMENTS

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Se SW6020A	Dissolved Cd SW6020A	Dissolved Ca, Mg, V SW6020	Dissolved SO4 E300.0	TDS E160.1	Dissolved Hardness										TOTAL # (LAB USE)
1205SWMST220-F		X	5/10/12	1220	W				X	X	X		X										
1205SWMST220-U		X		1220				X				X											
1205SWMST048-F		X		1050					X	X	X		X										
1205SWMST048-U		X		1050				X				X											
1205SWMST050-F		X		1300					X	X	X		X										
1205SWMST050-U		X		1300				X					X										
1205SWMST093-F		X		1420					X	X	X		X										
1205SWMST093-U		X		1420				X				X											
1205SWMST095-F		X		1510					X	X	X		X										
1205SWMST095-U		X		1510				X				X											
1205SWMST0910-F		X		1520					X	X	X		X										
1205SWMST0910-U		X		1520				X				X											
1205SWMST0910-F		X		1720					X	X	X		X										
1205SWMST0910-U		X		1720				X				X											
1205-ER-SW-02-F		X		1752					X	X	X		X										
1205-ER-SW-02-U		X		1752				X				X											

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
D Yeager	5/11/12	1830	FedEx				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

COC No. A 30175

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MWH

Project Contact: Bethany Pitt

Contact Phone #: 801-1017-3260

Turn Around Requirements: Standard

Location: Monsanto

Project ID: Monsanto Spring 2012 SW/GW

Sampler (print): E. Vercier

Signature: [illegible]

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Se SW6020A	Dissolved Cd SW6020A	Dissolved Ca, Mg, V SW6010B	Dissolved SO4 E300.0	TDS E160.1	Dissolved Hardness SM 2340B									TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1205SWMST092-F		X	5/14/2012	1050	W				X	X	X		X										
1205SWMST092-U		X		~~1023~~ 1050				X				X											
1205SWMST089-F		X		1133					X	X	X		X										
1205SWMST089-U		X		1133				X				X											
1205SWMST089-F-MS		X		1133					X	X	X		X										
1205SWMST089-U-MS		X		1133				X				X											
1205SWMST089-F-MSD		X		1133					X	X	X		X										
1205SWMST089-U-MSD		X		1133				X				X											
1205SWMST090-F		X		1243					X	X	X		X										
1205SWMST090-U		X		1243				X				X											
1205SWMSGMG-F		X		1320					X	X	X		X										
1205SWMSGMG-U		X		1320				X				X											
1205SWMDSM30-1-F		X		1432					X	X	X		X										
1205SWMDSM30-1-U		X		1432				X				X											
1205SWMDSM30-2-F		X		1432					X	X	X		X										
1205SWMDSM30-2-U		X		1432				X				X											
1205SWMST067-F		X		1525					X	X	X		X										
1205SWMST067-U		X		1525				X				X											
1205FR-SW-03-F		X		1542					X	X	X		X										
1205FR-SW-03-U		X		1542				X				X											

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[illegible]	5/14/12	0810	FedEX				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

Page 1 of 1

PLEASE PRINT- Provide as much information as possible.

Company Name: MWH	Project Name, PWS, Permit, Etc.: Monsanto Spring Sampling	Sample Origin State: Idaho	EPA/State Compliance: Yes ☐ No ☐
Report Mail Address: NA	Contact Name: Betty VanPelt Phone/Fax: 801-617-3200	Email:	Sampler: (Please Print) B. Downey
Invoice Address: Monsanto	Invoice Contact & Phone:	Purchase Order:	Quote/Bottle Order:

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

NA

☐ DW ☐ A2LA
☐ GSA ☐ EDD/EDT (Electronic Data)
☐ POTW/WWTP Format: _____
☐ State: _____ ☐ LEVEL IV
☐ Other: _____ ☐ NELAC

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: Fed-Ex
Cooler ID(s):
Receipt Temp _____ °C
On Ice: (Yes) No
Custody Seal (Y) N
Bottles/Coolers B C
Intact Y N
Signature Match Y N

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O; Air Water Soils/Solids Vegetation Bioassay Other)	SW6020 1L	1L	300.0 (Filtered)							SEE ATTACHED	Normal Turnaround (TAT)	RUSH
1 1205GWMBW087-U	5-11-12	1545	W	X	X										
2 1205GWMBW087-F	5-11-12	1545	W			X									
3															
4															
5															
6															
7															
8															
9															
10															

BL

5-11-12

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Blake Downey	5-12-12 (1400)		Fed-Ex	5-12-12 (0800)	
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory:	Date/Time:	Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.
Visit our web site at www.energylab.com for additional information, downloadable fee schedule, forms, and links.

COC No. A 30173

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MWH

Project Contact: Betty VanPelt

Contact Phone #: 801-617-3320

Turn Around Requirements: Standard

Location: monsanto

Project ID: monsanto spring 2012 SW/GW

Sampler (print): E. Denoyer

Signature: [illegible]

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Se SW6020A	Dissolved Cd SW6020A	Dissolved Ca, Mg, V SW6020	Dissolved SO4 E 300.0	TDS E160.1	Dissolved Hardness										TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1205SWMD5026-F		X	5/12/12	1715	W				X	X	X		X											
1205SWMD5026-U		X		1715	W			X				X												
1205SWMST133-F		X		1800	W				X	X	X		X											
1205SWMST133-U		X		1800	W			X				X												
1205SWMST274-F		X	5/12/12	0844	W				X	X	X		X											
1205SWMST274-U		X		0844	W			X				X												
1205SWMST274-F-MS		X		0844	W				X	X	X		X											
1205SWMST274-U-MS		X		0844	W			X				X												
1205SWMST274-F-MSD		X		0844	W				X	X	X		X											
1205SWMST274-U-MSD		X		0844	W			X				X												
1205SWMST131-F		X		1040	W				X	X	X		X											
1205SWMST131-U		X		1040	W			X				X												
1205SWMST138-F		X		1050	W				X	X	X		X											
1205SWMST138-U		X		1050	W			X				X												
1205SWMST132-1-F		X		1150	W				X	X	X		X											
1205SWMST132-1-U		X		1150	W			X				X												
1205SWMST132-2-F		X		1150	W				X	X	X		X											
1205SWMST132-2-U		X		1150	W			X				X												
1205SWMD5025-F		X		1320	W				X	X	X		X											
1205SWMD5025-U		X		1320	W			X				X												

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[illegible]	5/14/12	0801	FedEx				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

ENERGY LABORATORIES microbac

Chain of Custody and Analytical Request Record

PLEASE PRINT- Provide as much information as possible.

Company Name:	Project Name, PWS, Permit, Etc.	Sample Origin	EPA/State Compliance:
MWH	Monsanto Spring 2012 SW/GW	State:	Yes ☐ No ☐
Report Mail Address:	Contact Name: / Phone/Fax:	Email:	Sampler: (Please Print)
	Betty Van Pelt 801-617-3200		E. Upager
Invoice Address:	Invoice Contact & Phone:	Purchase Order:	Quote/Bottle Order:

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

☐ DW ☐ GSA ☐ POTW/WWTP ☐ State: _____ ☐ Other: _____

☐ A2LA ☐ EDD/EDT (Electronic Data) Format: _____ ☐ LEVEL IV ☐ NELAC

RUSH: Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by:

Cooler ID(s):

Receipt Temp _____ °C

On Ice: Yes No

Custody Seal Y N

Bottles/Coolers B C

Intact Y N

Signature Match Y N

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O; Air Water Soils/Solids Vegetation Bioassay Other)	Total Se SW 6020A	Dissolved Cd SW6020A	Dissolved Ca, Mg, V SW6020A	Dissolved SO4 E300.0	TDS E160.1	Dissolved Hardness				SEE ATTACHED	Normal Turnaround (TAT)
1	1205ER-SW-04-F	5/12/12	1545	W		X	X	X		X					X
2	1205ER-SW-04-U		1545	W	X				X						X
3	1205SWMST006-F		1050	W		X	X	X		X					X
4	1205SWMST006-U		1050	W	X				X						X
5	1205SWMST020-F	5/13/12	1015	W		X	X	X		X					X
6	1205SWMST020-U		1015	W	X				X						X
7	1205SWMST019-F		1220	W		X	X	X		X					X
8	1205SWMST019-U		1220	W	X				X						X
9	1205ER-SW-05-F	5/13/12	1235	W		X	X	X		X					X
10	1205ER-SW-05-U	5/13/12	1235	W	X				X						X

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
E. Upager	5/14/12 0800	[signature]	FedEx	5/14/12 0800	
Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
			Received by Laboratory:	Date/Time:	Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

Visit our web site at www.energylab.com for additional information, downloadable fee schedule, forms, and links.

COC No. A 30180

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MWH

Project Contact: Brian Van Dolt

Contact Phone #: 401-617-3200

Turn Around Requirements: Standard

Location: Idaho (Monsanto)

Project ID: Monsanto

Sampler (print): B. Downey

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	SW 6020A	160.1	300.0 (Filtered)												TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1205GW MMW017U			5-13-12	0900	W			X	X														
1205GW MMW017F				0900	W					X													
1205GW MMW017UMS				0900	W			X	X														
1205GW MMW017UMSD				0900	W			X	X														
1205 GW MMW017FMS				0900	W					X													
1205GW MMW017FMSD				0900	W					X													
1205GW MMW011U				1045	W			X	X														
1205GW MMW011F				1045	W					X													
1205GW MMW028U				1144	W			X	X														
1205GW MMW028-2F				1144	W					X													
1205GW MMW028-2U				1144	W			X	X														
1205GW MMW028-2F				1144	W					X													
1205GW MMW023U				1245	W			X	X														
1205GW MMW023F				1245	W					X													
1205GW MMW027U				1448	W			X	X														
1205GW MMW027F				1448	W					X													
1205GW MMW019U				1548	W			X	X														
1205GW MMW019F				1548	W					X													
1205GW MMW028U				1655	W			X	X														
1205GW MMW028F				1655	W					X													

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	5-14-12	0800	Fed-Ex		5-14-2	0800	

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

COC No. A 30178

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MWH

Project Contact: Betty VanPolt

Contact Phone #: 801-619-3200

Turn Around Requirements: Standard

Location:

Project ID: Monsanto Spring Sampling

Sampler (print): Blake Downey

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	SW6020A	160.1	300.0 (Filtered)												TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1205GWMBW10U			5-14-12	1122	W			X	X														
1205GWMBW10F				1122	W					X													
1205GWMBW09U				1205	W			X	X														
1205GWMBW09F				1205	W					X													
1205GWMBW031U				1312	W			X	X														
1205GWMBW03F				1312	W					X													
1205GWMBW35U				1413	W			X	X														
1205GWMBW35F				1413	W					X													
1205GWMBW033U				1726	W			X	X														
1205GWMBW033F			5-14-12	1726	W					X													

5-14-12

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	5-15-12	0800			5-15-12	0800	

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

COC No. A 25846

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MINH

Project Contact: Betty VanPelt

Contact Phone #: 801-7017-3000

Turn Around Requirements: Standard

Location: monsanto

Project ID: 2012 Spring SW/GW

Sampler (print): E. Uperder

Signature: [illegible]

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

ADDITIONAL REQUIREMENTS

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total cd, mn, se SW1000	TDS E 160.1	SO4 EPA 300.0	TOTAL # (LAB USE)
1205GWMBW048-U		X	5/14/12	1630	W			X	X		
1205GWMBW048-F		X		1630						X	
1205GWMBW032-1-U		X		1734				X	X		
1205GWMBW032-1-F		X		1734						X	
1205GWMBW032-2-U		X		1734				X	X		
1205GWMBW032-2-F		X		1734						X	
1205GWMBW131-U		X	5/15/12	0954				X	X		
1205GWMBW131-F		X		0954						X	
1205GWMBW001a-U		X		1158				X	X		
1205GWMBW001a-F		X		1158						X	
1205GWMW-16A-U		X		1334				X	X		
1205GWMW-16A-F		X		1334						X	
1205GWMBW009-U		X		1453				X	X		
1205GWMBW009-F		X		1453						X	
1205GWMBW130-U		X		1025				X	X		
1205GWMBW130-F		X		1025						X	
1205GWMBW011-U		X		1704				X	X		
1205GWMBW011-F		X		1704						X	
1205GWMBW152-U		X		1805				X	X		
1205GWMBW152-F		X		1805						X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[illegible]	5/16/12	1700	Fed Ex				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:
[illegible]						

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

Page ____ of ____

COC No. A 30179

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MWH

Project Contact: Betty Van Pelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Idaho

Project ID: Monsanto Spring Sampling

Sampler (print): Blake Primrose

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	5x 40 ml	1 liter	3000 (Hard)												TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1205GWMW02AU			5-15-12	0912	W																		
1205GWMW02AF				0912	W					X													
1205GWMW03AU				0955	W				X														
1205GWMW03AF				0955	W					X													
1205GWMW03AUMS				0955	W				X														
1205GWMW03AFMS				0955	W					X													
1205GWMW03AUMSD				0955	W				X														
1205GWMW03AFMSD				0955	W					X													
1205GWMW03AU				1211	W				X														
1205GWMW03AF				1211	W					X													
1205GWMW01SAU				1505	W				X														
1205GWMW01SAF				1505	W					X													
1205GWMW02SAU				1415	W				X	X													
1205GWMW02SAF			5-15-12	1418	W					X													

Relinquished by: (Signature) — Date: 5-16-12 — Time: 0800
Received by: (Signature)
Relinquished by: (Signature) — Date: 5-16-12 — Time: 0800
Received by: (Signature)

Relinquished by: (Signature)
Date
Time
Received for Laboratory by: (Signature)
Date
Time
Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

Page _____ of _____

COC No. A 25686

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MWH

Project Contact: Betty VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto

Project ID: Spring 2012 GW/SW

Sampler (print): E. Yeager

Signature: E Yeager

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

ADDITIONAL REQUIREMENTS

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Cd, Cr, Mn, Ni, Se, Zn SW6020A	Total Al, Fe, V SW6010B	TDS E160.1	TSS E160.2	Gross Alpha, Gross Beta EPA900	Nitrate/Nitrite as N EPA353.2	Dissolved Cl, SO4 EPA300.0	Dissolved Ca, Fe, Mg, K, Na EPA 6010B	Total Alkalinity EPA310.2	Dissolved Hardness					TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
12056GWMPW019-1-U		X	5/16/12	0950				X	X	X	X	X											
12056GWMPW019-1-F		X											X	X	X	X	X						
12056GWMPW019-2-U		X						X	X	X	X	X											
12056GWMPW019-2-F		X											X	X	X	X	X						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
E Yeager	5/16/12	1800	FED EX				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

No. A 24480

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MWH

Project Contact: Betty Van Pelt
Contact Phone #: 901-617-3200

Turn Around Requirements: Standard
Location:

Project ID: Monsanto Spring Sampling

Sampler (print): Blake Downey
Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	SW6020A	160.1	300.0 (Alford)												TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1205GWMMW0221			5-16-12	1005	W			X	X														
1205GWMMW0222			↑	1005	W					X													
1205GWMMW0221			↓	1105	W			X	X														
1205GWMMW0322			5-16-12	1105	W					X													

Relinquished by: (Signature) — Date 5-16-12 — Time 1500 — Received by: (Signature) Fed-Ex

Relinquished by: (Signature) — Date 5-16-12 — Time 1500 — Received by: (Signature)

Relinquished by: (Signature) — Date — Time — Received for Laboratory by: (Signature) — Date — Time — Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

Page 1 of 1

Clear
2

Monsanto G.W.S. pg. 1

5-8-12 BD, LF

0700 - Left Lodge,
0720 - Picked up ice,
0739 - Arrived @ maintenance shed gathered supplies, & calibrated YSI & turbidity meter,
* All parameters were good except SC which was calibrated.
0930 - Left shed,
1002 - Arrived @ MMW-009 DTW = 207.14'
* WL indicator was not functional, left site to get a new WL indicator, 1103 - back on-site,
1126 - pump on, Final flow rate = 0.6 L/min.
Final param: pH = 7.30, SC = 552, T° = 9.43,
ORP = 15.8, DO = 0.07, Turb. = 4.2,
72 L. purged prior to sampling @ 1425 4: Filtered Anions, unfiltered metals & TDS,
1435 - Left site, * Turbidity caused a prolonged purge time,
1505 - Arrived @ MMW-037 DTW = 112.60,
~~= pump on @ L/min,~~
Final param: pH = , SC = , T° = BD,
* Bladder pump not working, move to next well,
1550 - Set up on MMW-036 DTW = 112.13',
1354 - pump on, Final flow rate = 5.0 L/min,
Final param: pH = 7.58, SC = 385, T° = 8.29,
ORP = 61.2, DO = 7.56, Turb. = 0.6,

→ Cont.

pg. 2

5-8-12 Cont.

1655 - Sampled 4: Filtered Anions, Unfiltered TDS & Metals, Collected MS/MSD.
1704 - Left site, * changed tanks @ 1630,
1705 - Arrived @ MMW-027 DTW = 104.10',
1719 - pump on, Final flow rate = 0.65 L/min,
Final param: pH = 7.18, SC = 1082, T° = 7.95,
ORP = 73.9, DO = 3.72, Turb. = 0.4,
1755 - Sampled for same as MMW-009,
~~1840~~ 1835 - Left site,
1839 - Picked up new tanks @ Mine shop
1900 - Picked up ratchet tie downs @ ACE hardware ~~Tmp~~ for securing tanks

BD

5-8-12

Monsanto G.W.S. pg. 1

5-9-12 B. Downey, L. Fahrig

0645 - Left lodge,
0704 - Arrived @ ACE hardware to pick up laths & make a key, got laths but could make key
0730 - Stopped @ True Value to make a key
0802 - Arrived @ maintenance shop, checked cal. of eq. & gathered supplies,
0858 - Arrived @ MMW-037 attempt to fix bladder pump, 1015 - fixed pump & put back in well,
1024 - pump on, Final flow rate = 0.46 L/min.,
DTW = 112.50', 1039 changed tanks,
Final param: pH = 7.37 SC = 357, T° = 9.01,
ORP = 207.7, DO = 7.46, Turb. = 3.54,
*Removed 19.3 L, also we pulled the transducer & baro troll from the well when fixing pump & replaced them when done,
1145 - Sampled well, & collected a dup. sample,
1232 - left well
1235 - Arrived @ MMW-035 DTW = 105.11',
1247 - pump on, Final flow rate = 0.30 L/min.,
Final param: pH = 6.87, SC = 1306, T° = 8.69,
ORP = 193.4, DO = 2.21, Turb. = 0.11,
*Removed 13.5 L, 1344 - Sampled well,
1350 - Left site,

Cont.

5-9-12 Cont. pg. 2

1351 - Arrived @ MBW-107 DTW = 38.26',
TD = 39.00', Water is not G.W. just condensate, well is considered dry,
1355 - Left site,
1358 - Arrived @ MBW-112 DTW = 14.31',
TD = 14.38', No GW - Well is dry
1400 - Left site,
1435 - Switched out tanks @ Mine shop,
1510 - Arrived @ MMW-026 DTW = 277.71',
1525 - Pump on, Final flow rate = 0.60 L/min.
Final param: pH = 7.49, SC = 369, T° = 10.73,
ORP = 17.3, DO = 0.06, Turb. = 0.19,
*Removed 22.0 L, 1635 - Sampled well,
1640 - Left site,
1655 - Picked up cradle & radio charger @ mine ~~shop~~ office
1723 - Picked up more tanks @ Mine shop,
1804 - Arrived @ Lodge

BD

5-9-12

Clear

Monsanto G.W.S. pg. 1

5-10-12 B. Downey, L. Fahrig

0650 - Repacked coolers 4 shipment
0707 - Left Lodge,
0736 - Picked up ice/gas/supplies @ Phillip lde,
0839 - Picked up supplies @ maintenance shop,
0847 - Arrived @ MMW-021 DTW = 202.97',
0858 - Pumpon, Final flow rate = 0.275 L/min,
Final param: pH = 7.10, SC = 540, T° = 9.47,
ORP = 325.2, DO = 4.29, Turb. = 0.50,
*Removed 16.0 L., 1000 - Sampled well,
1031 - Left well, ~~*collected from dwer - dwlop~~
Lid to well wouldn't shut, due to casing being to high,
1035 - Arrived @ MMW-006 DTW = 255.22',
1048 - Pump on, Final flow rate = 0.26 L/min,
Final param: pH = 7.49, SC = 412, T° = 9.86,
ORP = 506.11, DO = 4.30, Turb. = 0.21,
*Removed 20.75 L., 1210 - Sampled well,
1219 - Left site,
1225 - Arrived @ MMW-20, DTW = 271.46',
1322 - Pump on, Final flow rate = 0.83 L/min,
Final param: pH = 7.07, SC = 595, T° = 9.34,
ORP = 283.6, DO = 8.22, Turb. = 0.96,
*Removed 29.0 L., 1416 - Sampled well,
1426 - Left site, *Air hose had a hole

Cont.

5-10-12 Cont. pg. 2

in it & the seal in the connector failed, fixed both,
~~1600~~ 1600 - Located sample port 4 MPW-019 in mine shop, & dropped off tanks & rack,
1715 - Left mine after well orientation
1752 - Arrived @ the lodge

80

5-10-12

Monsanto GW

5-11-12

0700 - Left lodge for town, stopped 2 coolers, bought ice, water

0830 - Arrived at shed

0900 - Calibrated YSI meter

0935 - Arrived @ MBW-099

TD = ~~29'~~ RY 17.7' Depth to water = 0.94' below casing

1022 - Stopped pump due to dry well, will return to sample later

↳ 90% recharge will DTW = ~~15.65'~~ RY 1.64' below MP

1040 - Arrived @ MMW-025

TD = 200' DTW = 28.82' below MP

1107 - Started pump, drawdown issues encountered w/ low flow

1137 - Standard purge deemed inefficient, therefore will allow to recharge and then low-flow at slower rate

1210 - Arrived @ MMW-007

TD = 93.7' DTW = 34.31' below MP

1230 - Low flow method would not support adequate flow for sampling... Standard purge begun

1322 - Reduced rate to 0.25 gal/min | 0.94 L/min but water level continued to drop

1355 - Well dry @ 80.7' below MP

↳ 90% recharge will be DTW = 40.25' below MP

1420 - Arrived @ MBW-085

TD = 12.0' DTW = 3.0' below T.O.C.

- intake tubing @ 9' below T.O.C.

1429 - Pump on, won't low-flow due to drawdown issues, pumped well dry

1433 - Began standard purge

1445 - Pump off, dry well

↳ 5.50 L total volume

1450 - Left MBW-085

1453 - Arrived @ MBW-037 Tubing to 8.85' below TOC

TD = 10' DTW = ~~8.85~~ RY 1.80 below TOC

1500 - Started pump, final flow rate 0.15 L/min

Final parameters:

Time: 1545	pH: 6.73
DTW: 2.06'	ORP: 224.1 mV
Purge: 0.15 L/min	DO: 1.36 mg/L
Purge Vol: 6.00 L	Cond: 432 µS/cm
Temp: 5.64°C	Turb: 242 NTU

1545 - Sampled 1205 GW MBW 087 (U, F)

1555 - Left site

1605 - Arrived @ MMW-025 to do standard purge method

TD: 200' DTW = 38.4' below MP (Gray Disc)

1610 - Pump started, pumped 253.0 L

1832 - Pump stopped, end of day

Monsanto GW Sampling

5-12-12

0700 - Left lodge, town for gas

0745 - At shed, performed YSI calibration

0825 - Arrived @ MBW-099 to check recharge, water level @ 10.30' below MP
↳ return tomorrow

0835 - Arrived @ MMW-025 to check recharge, WL = 106.30' below MP
↳ will return later next week

0840 - Arrived @ MMW-007 to check recharge, WL = 50.25' below MP, will return tomorrow
↳ 80% recharge needs WL → 46.18' b/MP

855 - Arrived @ MBW-085 to sample
↳ recharged, DTW = 3.07' below TOC (sample)

0910 - Sampled 1205GWMBW085 (U,F) ~~[illegible]~~

0913 - Final parameters:

WL - 5.69' below TOC	pH - 6.85
Purge Rt - 0.16 L/min	ORP - 314.0 mV
Cum Pg - 7.25 L	DO - 8.38 mg/L
Temp - 5.32°C	Cond - 127 µS/cm
Turb - 4.80 NTU	

0925 - Left site

0928 - Arrived @ MMW-034

T.D. = DTW - 10.96' to gray disc

0938 - Started pump, final flow rate = 0.4 L/min

5-12-12 RY BD

1009 - Sampled 1205GWMMW034-(1,2)-(U,F)

Final parameters:

Time: 1009	ORP - 278.1 mV
WL - 11.21' below MP	DO - 8.74 mg/L
Purge Rt - 0.4 L/min	Cond - 204 µS/cm
Purge Vol - 11.5 L	Turb - 0.63 NTU
Temp - 7.52°C	
pH - 7.22	

1018 - Remained in place @ MMW-013
WL - 4.70' below MP = T.O.C.

1025 - Pump started, final flow = 0.37 L/min

1045 - Sampled 1205GWMMW013 (U,F)

Final parameters:

Time - 1045	pH - 7.03
WL - 4.80' below TOC	ORP - 272.5 mV
Purge Rt - 0.37 L/min	DO - 9.22 mg/L
Cum Purge - 11.50 L	Cond - 225 µS/cm
Temp - 7.29°C	Turb - 0.61 NTU

1055 - Downloaded transducer data for MMW-013 transducer

1100 - Left site

1105 - Arrived @ MMW-024, ~~final flow =~~ RY
T.D = 200' WL = 58.88' below gray disc (MP)

1112 - Pump started, final flow = 0.87 L/min

1135 - Sampled 1205GWMMW024 (U,F)

5-12-12 cont..

Final Parameters:

Time - 1135 | Temp - 7.75°C
WL - 59.06' below MP | ORP - 258.1 mV
Purge Rt - 0.87 L/min | DO - 3.19 mg/L
Purge Vol - 18.75 L | Cond - 279 mS/cm
pH - 7.11 | Turb - 0.27 NTU

1138 - Pump off
1142 - Downloaded transducer data from MMW-024 transducer
1150 - Left site
1205 - Arrived @ MMW-030
T.D. = 155' WL = 23.10' MP = Gray Disc
1213 - Pump started for initial low-flow attempt... not able to maintain water level, began standard purge method @1230
1421 - Downloaded transducer data from MMW-~~024~~ 030 RY transducer, purge continues
1546 - Purged dry, reached top of screen interval
↳ final purge rate = 1.43 L/min, total vol = 350.0 L
1553 - Left site
1630 - Arrived @ MBW-135
T.D. = 19.55' WL = 1.40' below MP = T.O.C.
1640 - Pump started, low-flow attempted but peristaltic cannot pump slow enough to maintain WL
1650 - Pumped MBW-135 dry @ 18.0' below MP
↳ final pump rate 0.92 L/min 1715 - End of Day

5-13-12

0700 - Left lodge for town, bought lunch and truck maintenance
0750 - At shed, calibrated YSI meter, checked calibration on turbidimeter.
0830 - Checked WL @ MBW-099 for recharge
↳ 6.36' below MP, not enough recharge yet
0838 - Checked WL @ MMW-025 for recharge
↳ ~~81.8~~ RY 81.10' below MP, not 80% recharge
0841 - Checked MMW-007 WL for recharge
↳ WL = 37.57' below MP, good for 80% rech.
0842 - At MMW-007 for sampling
TD = 93.7' WL = 37.57' below MP
Tubing Length = 87.0'
Purge Vol = (Tubing Length x 0.03) + 0.5 (pump)
= (87.0 x 0.03 L/ft) + 0.5 L
Purge Vol = 3.11 L
0900 - Sampled 1205GWMMW007(U,F) with an MS/MSD sample set
0900 - Final cumulative purge 158.3 w/ greater than 3.5 L purge today
0910 - Downloaded baro logger data from MMW007
0915 - Left site
0943 - Arrived at MMW-011
WL - 77.15' below MP (gray disc)
0950 - Pump started, final purge rate = 0.12 L/min

5-13-12 cont..

1045. Sampled 1205GWMMW011(U,F)

Final Parameters:

Time - 1045	pH - 7.35
WL - 77.31'	ORP - 218.6 mV
Purge Rt - 0.12 L/min	DO - 8.26 mg/L
Purge Vol - 8.10 L	Cond - 582 µS/cm
Temp - 9.35°C	Turb - 1.19 NTU

* Air bubbles observed in the purge tube throughout purge and sampling

1055 - Downloaded data from baro-transducer and H_2O level transducer @ MMW-011

1101 - Left site

1110 - Arrived @ MMW-028

WL = 65.70' below MP (gray disc)

1118 - Pump started, final flow rate = 0.8 L/min

1145 - Sampled ~~1205GWMMW028(U,F)~~ ~~and~~ Rep 1205GWMMW028-(1,2)-(U,F)

Final parameters:

Time - 1145	pH - 7.41
WL - 65.72'	ORP - 201.8 mV
Purge Rt - 0.80 L/min	DO - 7.82 mg/L
Purge Vol - 19.0 L	Cond. - 529 µS/cm
Temp - 8.24°C	Turb - 0.67 NTU

1148 - Pump off

1155 - Left site

5-13-12 cont..

1208 - Arrived @ MMW-023

WL → 105.38' below MP (gray disc)

1212 - Pump started, initial purge 73 PSI

1245 - Sampled 1205GWMMW023(U,F)

FINAL PARAMETERS:

TIME - 1245	pH - 7.13
WL - 105.98'	ORP - -31.5 mV
PURGE Rt - 0.48 L/min	DO - 0.07 mg/L
PURGE VOL - 26.50 L	COND - 989 µS/cm
TEMP - 9.89°C	TURB - 0.43 NTU

1251 - Downloaded H_2O level transducer data from MMW-023 transducer

1300 - Left site

1410 - Arrived @ MBW-027

WL = ~~5.17~~ 5.40 below MP (Top of Casing)

1424 - Pump started, low flow attempted

↳ appears to maintain adequate flow while maintaining WL, despite notes

1440 - Downloaded H_2O level transducer in neighboring MMW-017

1448 - Sampled 1205GWMBW027(U,F)

↳ Final purge rate 0.08 L/min

1450 - Begun at MMW-017

WL - 24.63' below MP (gray disc)

1506 - Started pump, initial 33 PSI

5-13-12 cont...

1548 - Sampled 1205GWMMW017 (U,F)
↳ Final flow rate 0.10 L/min

Final Parameters:

TIME - 1548	pH - 6.88
H_2O Level - 24.93'	ORP - 142.1 mV
PURGE Rt - 0.10 L/min	DO - 5.06 mg/L
PURGE VOL - 4.55 L	COND - 1304 µS/cm
TEMP - 12.88°C	TURB - 0.33 NTU

1605 - Left site
1606 - Arrived at MBW-028
WL - 5.40' from MP (T.O.C)
TD = 19.78', despite recorded TD of 21'
1619 - Pump started, low-flow attempted
1621 - Adequate flow cannot be maintained w/ low flow method...drawdown too much
↳ Standard purge used, final rate 0.27 L/min
1655 - Sample 1205GWMBW028(U,F) taken

FINAL PARAMETERS:

TIME: 1655	pH: 6.59
WL: 13.22'	ORP: 141.1 mV
PURGE Rt: 0.27 L/min	DO: 0.21 mg/L
PURGE VOL: 15.75 L	COND: 1263 µS/cm
TEMP: 7.12°C	TURB: 1.73 NTU

1710 - Left site
1725 - Back to machine shop
1800 - End of day

5-14-12

0650 - Left lodge, town for supplies
~~0737~~ 0830 - Machine shop for YSI calibration, tube cutting + other prep
0930 - Mine office for tools + generator?
1000 - Ballard shop for generator
1025 - Arrive @ MMW-010, no grumfos?
• WL - 2.01' below MP (gray disc)
• Initial PSI calculation = 21 PSI
1035 - Pump started, final pg rate 0.10 L/min
1122 - Sample 1205GWMMW010(U,F)

FINAL PARAMETERS

TIME: 1122	pH: 6.41
WL: 2.15'	ORP: 222.5 mV
PURGE Rt: 0.10 L/min	DO: 0.97 mg/L
PURGE VOL: 8.25 L	COND: 1448 µS/cm
TEMP: 10.25°C	TURB: 4.74 NTU

1135 - Downloaded transducer data from the MMW-010 H_2O level transducer
1142 - Left site
1155 - Arrived @ MBW-099
WL - 3.75' below TOC ... ≈ 80% recharge
1216 - Pumped dry again
1205 - Sampled 1205GWMBW099(U,F), final params:

WL - 15.72'	Temp - 6.00°C	DO - 7.99 mg/L
Purge Rt - 0.35 L/min	pH - 6.57	COND - 199 µS/cm
Purge VOL - 11.80 L	ORP - 177.1 mV	TURB - 8.35 NTU

MONSANTO GW SAMPLING

5-14-12 cont..

1225 - Left site

1238 - Arrived @ MMW-031

WL - 87.69' below MP (top gray disc)

Initial PSI calculation = 64 PSI

1247 - Pump started, initial PSI = 64

1313 - Sampled 1205GWMMW031(U,F)

FINAL PARAMS:

TIME: 1313 pH: 7.52

H_2O LEVEL: 87.89' ORP: 173.1 mV

PURGE RE: 0.64 L/min DO: 7.97 mg/L

PURGE VOL: 14.50 L COND: 202 µS/cm

TEMP: 9.69°C TURB: 0.08 NTU

1322 - Left site after downloading transducer data from MMW-031 H_2O level transducer

1402 - Arrived at MBW-035

WL - 1.97' below MP (TOC)

1406 - Pump started

1413 - Sampled 1205GWMBW135(U,F)

FINAL PARAMETERS:

TIME: 1413 pH: 7.22

H_2O LEV: 9.04' ORP: 163.9 mV

PURGE RE: 0.50 L/min DO: 1.04 mg/L

PURGE VOL: 11.25 L COND: 334 µS/cm

TEMP: 6.99°C TURB: 7.87 NTU

1425 - Left site

1428 - Arrived @ MMW-030

WL - 51.10' below MP (gray disc)

*Needs to recharge to 49.5' to be 80%

1433 - Left site

1445 - Arrived @ MMW-033

WL - 11.55' below MP (gray disc)

1452 - Pump started, possible drawdown issues, will attempt low flow method

1542 - Pump stopped to try and recharge to maintain low-flow method

1555 - Little to no recharge observed, move to standard purge method (will likely pump dry), sample 1205GWMMW033(U,F) @ 1626

1646 - Stabilized head and took sample, field judgement call based on ~~100~~ RY purge 10x the tubing volume, stabilization of parameters, inability to maintain lowflow, and time/vol required to purge dry, as well as difficulty w/ bladder pump at this depth. In addition, the water level was stabilized @ 34.61' & only dropped to 34.78' while the pump recharge, which is less than 0.20', we recommend changing the sampling method or equipment.

1740 - Downloaded transducer data for MMW-0~~32~~ ~~(Ke~~ RY, for H_2O level transducer

1830 - END OF DAY

GW Sampling - Monsanto

5-15-12

0700 - Left TCLodge for town for supplies

0730 - Met w/ Rachel regarding MMW-033 and get her approval for our field modified sampling method. Also suggested to her a grundfos or alternative sampling method for 033 and other deep drawdown issue wells

0800 - @ machine shop for supplies and YSI and turbidimeter calibration

0835 - Arrived @ MMW-029

WL - 20.13' below MP (gray disc)

0845 - Pump started, initial PSI calc = 30 PSI

↳ will start w/ low flow

0913 - Sampled 1205GWMMW029(U,F)

FINAL PARAMETERS:

TIME: 0913	pH: 7.20
WL: 20.32'	ORP: 138.1 mV
PURGE RT: 0.22 L/min	DO: 6.29 mg/L
PURGE VOL: 5.30 L	COND: 554 µS/cm
TEMP: 8.19°C	TURB: 0.74 NTU

0925 - Left site

0930 - Arrived @ MMW-018

WL - 10.0' below MP (gray disc)

0931 - Pump started, initial PSI calc = 25 PSI

5-15-12 cont...

0955 - Sampled 1205GWMMW018 (U,F) w/ 1205GWMMW018 (U,F) - (MS, MSD)

FINAL PARAMS:

Time - 0953	pH - 7.25
H_2O Level - 10.28'	ORP - 123.5 mV
Purge Rt - 0.18 L/min	DO - 6.83 mg/L
Purge Vol - 3.90 L	Cond - 151 µS/cm
Temp - 8.53°C	Turb - 1.38 NTU

1010 - Left site after downloading MMW-018's H_2O level transducer data

1040 - Arrive @ MMW-032

WL - 19.46' below MP (gray disc)

* Will attempt low-flow, but 032 is another drawdown issue well where WL's were not maintained. Will try low flow but it can't be maintained, will move to standard purge and sample w/ a stable head, or dry out

1045 - Pump started, initial PSI calc = 30 PSI

1058 - Not able to maintain WL w/ low flow, switched to standard purge

1140 - MMW-032 pumped dry @ 58.11' below MP

↳ will return in AM to check for 80% recharge (28.6' below MP)

1200 - Arrived @ MMW-030 to sample

WL - 39.40' below MP... > 80% recharge

5-15-12 cont...

1208 - Pump started, will purge tube (5.15L) and then collect samples

1216 - Sampled 1205GWMMW030 (U,F)

Final params:

Time - 1214	pH - 7.58
H_2O level - 42.40'	ORP - 101.0 mV
Purge Rt - 1.20 L/min	DO - 0.57 mg/L
Purge Vol - 357.5 L	Cond - 150 µS/cm
Temp - 9.56°C	Turb - 0.97 NTU

1225 - Left site

1239 - Arrived @ MMW-021 to put the transducer back in the well

* CANNOT SHUT WELL CAP!

1247 - Left Site

1255 - Arrived at MMW-006 to download water level transducer data

1257 - Left Site

1259 - Arrive @ MMW-020 to download water level transducer data

1314 - Arrive @ MMW-015A, download transducer data, go to retrieve tubing

WL - 20.81' below MP (top of casing)

TD - 36.39' below T.O.C.

- Tubing, ~28.0'

1322 - Arrived @ MMW-016A

↳ downloaded transducer data

5-15-12 cont...

RY ~~1328~~ 1328 - Left site

~~1330~~ 1330 - Arrived back at MMW-015A

~~1338~~ 1338 - Pump started

1505 - Sampled 1205GWMMW015A (U,F)

↳ turbidity slow to stabilize

Final Parameters:

Time: 1501	pH - 6.84
H_2O level: 20.84'	ORP - 100.7 mV
Purge Rt - 0.10 L/min	DO - 4.10 mg/L
Purge Vol - 13.70 L	Cond: 645 µS/cm
Temp - 11.27°C	Turb - 4.81 NTU

1515 - Left site

1538 - Arrive @ MMW-026

↳ collected H_2O level transducer data from MMW-026

1550 - Left site

1555 - Arrive @ MMW-025

↳ water level has recharged > 80%

WL - 48.25' below MP (grey disc)

1605 - Pump started, will purge at least tubing volume (6.35 L)

1618 - Sampled 1205GWMMW025 (U,F)

Final parameters:

Time: 1615	Purge Vol - 262.75 L	ORP - 79.4 mV
WL - 53.42'	Temp - 8.48°C	DO - 1.15 mg/L
Purge Rt - 0.90 L/min	pH - 7.66	Turbid - 1.83 NTU

5-15-12 cont...

1622 - Downloaded H_2O level transducer data from MMW-025

1630 - Left site

1647 - Arrived @ MMW-027, download transducer data

1650 - Arrived @ MMW-035 download transducer data

1700 - Arrived @ MMW-~~036~~ 037 download both baro + H_2O level transducer data

1705 - Arrived @ MMW-~~037~~ 036 download H_2O level transducer data

1723 - Arrived @ MMW-009 → NO trans

1651 - Also, checked MMW-012 → DRY.

1720 - Dropped H_2O level meter off w/ Bill and Emily

1750 - End of sampling day,

RY

5-16-12

0650 - Left lodge, town for cooler ice, and nitrogen tank for last well

0800 - Machine shop for supplies and cooler packing

0850 - Arrive @ MMW-022, hookup N

WL - 202.67' below MP (gray disc)

0905 - Pump started, initial PSI = 200

1005 - Sampled 1205GWMMW022(U,F)

FINAL PARAMETERS:

TIME: 1002	pH: 7.22
H_2O LEV: 202.92'	ORP: 85.0 mV
PURGE RT: 0.20 L/min	DO: 4.16 mg/L
PURGE VOL: 21.20 L	COND: 297 µS/cm
TEMP: 8.85 °C	TURB: 2.85 NTU

1015 - Left site after downloading H_2O level transducer data from MMW-022 transducer

1048 - Arrived @ MMW-032 to check recharge

WL = 28.50' below MP = >80% recharge

1052 - Pump started

1105 - Sampled 1205GWMMW032(U,F)

Final Parameters:

Time: 1058	pH: 7.35
H_2O Level: 32.31'	ORP: 74.0 mV
Purge Rt: 1.22 L/min	DO: 7.71 mg/L
Purge Vol: 106.60 L	Cond: 126 µS/cm
Temp: 6.84 °C	Turb: 3.07 NTU

Monsanto GW Sampling

5-16-12 cont...

1110 - left MMW-032

E. yeager
B. Bragdon

08 May 2012 Monsanto SW/GW
0700 leave for field, call Rachel
0745 arrive at shop to get supplies
0900 calibrate YSI, PH probe broken, ~~PH~~ 10.0, notified Rachel.
1000 - 1100 drive to SLC to get new water quality meter.
1136 sample MST069
1700 leave site
1750 back at lodge

EY 05/08/12

EY BB

09 May 2012 Monsanto SW/GW
0645 leave lodge
0715 in town for supplies
0750 machine shop, calibrate YSI, H&S meet
0837 leave for field
0900 arrive at mine office, pick up maps
0944 arrive at MST045, DUP
1052 sample MST045, take stream flow
1130 shop for new meter
1215 arrive at MST044
1310 sample MST044
1335 arrive at MSD034, Dry.
1420 arrive at MST051, Dry.
1456 arrive at MST063
1504 sample MST063, MS/MSD
1610 arrive at MST057
1620 sample MST057
1710 shop to organize equipment
1723 ER and source blanks
1803 leave shop

EY 05/09/12

E. Yeager
B. Bragdon

10 may 2012 ~~18~~ 2012 monsanto spring
0645 leave lodge
0710 in town, supplies pack coolers
0800 drop off 2 coolers to shipping at plant
0835 shop, H&S meet, calibrate equip.
0915 mine office, wait for radio to be available to pickup
1005 leave mine office
1025 arrive at MST048
1050 sample MST048
1122 arrive at MST226
1220 sample MST226
1250 arrive at MST050
1300 sample MST050
1345 arrive at MST093
1420 sample MST093
1445 arrive at MST095
1523 arrive at MSG066
1530 sample MSG066
1700 arrive at MSG007, Dry
1710 arrive at MST096
1726 sample MST096
1737 machine shop
1752 ER taken
1800 done for day 10 may 2012

E. Yeager
B. Bragdon

11 may 2012 2012 monsanto spring
0700 download transducer software
0745 leave lodge
0815 drop off 2 coolers to fed ex
call lab to notify
0910 shop, H&S meet, calibrate equipment
1005 arrive at MST094, dry
1015 craig holmgren stopped by, gave him Rachel's contact info. He is owner of property we are on.
1035 arrive at MST092
1050 sample MST092
1127 arrive at MST089
1133 sample MST089, MS/MSD
1229 arrive at MST090
1243 sample MST089
1317 arrive at MSG005
1320 sample MSG005
1345 arrive at MSG004, Dry
1426 arrive at MDS030
1432 sample MDS030, DUP
1504 arrive at MST067
1525 sample MST067
1542 shop, ER, pick up more supplies
1651 arrive at MST269, Dry
1710 arrive at MDS026

11 may 2012 (2) cont. EYBB
1715 sample MSD026
1752 arrive at MST133
1800 sample MST133
1915 back in town

ey 05/11/12

E Yeager
B. Bragdon

12 may 2012 2012 monsanto spring SW/GW
0645 leave lodge
0715 town, supplies
0755 shop, H&S meet, calibrate
0834 arrive at MST274, MS/MSD
0844 sample MST274
0927 arrive at MST143, Dry
1030 arrive at MST131, MST128
1040 sample MST131
1050 sample MST128
1130 arrive at MST132
1150 sample MST, 132 DUP
1316 arrive at MDS025
1320 sample MDS025
1434 arrive at MST275, Dry
1507 arrive at MST144, Dry
1532 arrive at MST136, Dry
1646 arrive at MST066
1650 sample MST066
1730 leave site

ey 12 may 2012

E. Yeager
B. Braydon

13 may 2012 Monsanto GW/SW Spring
0715 leave lodge
0735 town, supplies
0800 shop, H&S meet, calibrate
0841 arrive at MST020
1015 sample MST020
1056 arrive at MST019
~~1230~~ 1228 sample MST019
1325 arrive at MST090 for stream flow
1353 arrive at MST089, stream flow
1452 MST 128, MST 132 stream flow
1547 MST 274 stream flow
1600 ~~sty~~ MST 133 stream flow
1635 MST050 stream flow
1703 MST044 stream flow
1728 MST045 stream flow
1804 MST048 stream flow
1845 back in town

ey 13 may 2012

E. Yeager
B. Braydon

14 may 2012 Monsanto GW/SW Sampling
0715 leave lodge
~~0745~~ 0735 town supplies
0815 drop off 4 coolers at plant shipping for fedex
0900 shop, H&S meet, calibrate
0945 mine office, pick up generator
1020 MMW010 to help Blake and rob
1156 arrive at MBW152
1212 MBW152 pumped dry, removed 5.5L
1342 at MBW130
42° 49' 39.987 N
111° 27' 12.869 W
WG-84
1419 MBW130 pumped dry, removed 10.35L
1532 arrive at MBW048 42° 50' 03.594" N, 111° 27' 56.166 W
1548 start to pump MBW048
1630 sample MBW048
WL 2.51' bgs, 5.91 °C, 225.2 mV ORP, DO 0.30 mg/L, SC 0.161 µS/cm, Turb 3.41 NTU. 18 total L removed
1704 arrive at MBW032, matches GPS on table 42° 49' 33.827" N
111° 28' 11.087" W

14 may 2012 (2) cont.
1734 sample MBW032
5.18 °C
211.1 ORP mv
6.60 DO mg/L
1.885 SC µs/cm
1.42 Turb NTU
11.37 WL
8 8L total volume
1800 leave site

ej 14 may 2012

E. y cooper
B. Braggdon

15 may 2012 monsanto 2012 spring SW/GW
0700 leave lodge
0715 town, supplies
0810 shop, H&S meet, calibrate
0851 arrive at MBW131
0934 begin sampling, WL holding steady at 4.11, 1.2L/min
0955 sample MBW131
6.86 °C
210.4 ORP mv
6.01 DO mg/L
0.115 SC µs/cm
3.55 Turb NTU
2.52L total volume
4.12 WL final
lat. 42°50'23.984" N
long 111°28'35.632" W
WGS84
above 50m off of Table 3
1020 arrive at MBW130
1025 sample MBW130, purge & sample
7.06°C
358.7 ORP mv
2.19 DO mg/L
0.179 SC µs/cm
62.40 Turb NTU
1102 arrive at MBW006

15 may 2012 (2) cont.

1127 begin low flow pumping
lat 42°49'01.650"n } WGS84
long 111°29'28.885"W
1158 Sample MBW006
~~weather 8.3°C~~ 7.93°C
50.1 mV ORP
4.60 mg/L DO
0.822 µs/cm SC
1.90 NTU Turb
1231 arrive at MW16A - cut lock
1248 begin purge
lat 42°49'07.535n } WGS84
long 111°29'23.656"W
1334 sample MW16A
15.63°C
208.00 mV ORP
0.63 DO mg/L
1.446 SC µs/cm
4.83 NTU TURB
5.58' WL
3.0L total purge
1352 arrive at MBW009
1406 begin purge
42°49'12.033n } WGS 84, 36m off
111°29'49.700W } of Table 3

15 may 2012 (3) cont.

1453 sample MBW009
8.40 °C
209.5 ORP mV
2.29 DO mg/L
1.000 SC µs/cm
4.69 Turb NTU
7.55' WL
9.25 total L (volume)
1513 arrive at MBW011
1522 begin purging
lat. 42°49'21.958"n } WGS84
long 111°29'41.253"W } 70m off of Table 3.
1703 sample MBW011
6.72 °C
238.5 ORP mV
1.20 DO mg/L
0.658 SC µs/cm
5.98 Turb NTU
8.90' WL
14.0L total volume
1805 arrive at MBW152, sample
1836 back at truck, leave for night

15 may 2012

E. Yeager
B. Bragdon

16 may 2012 monsanto spring SW/GW
0715 leave lodge
0730 town supplies
0800 shop, H&S meet, calibrate
0922 arrive at MPW019
0950 sample MPW019
10.60°C
187.9 ORPmV
1.60 DO mg/L
0.388 SC µs/cm
4.86 Turb NTU
26L total purged
lat 42°52'38.322"N
long 111°25'16.169"W
WGS84 30m off of table 3
1047 machine shop, clean up, organize supplies
1215 leave shop
1300 Drop off 3 full sample coolers and 5 extra bottle coolers to plant shipping dept.
1310 meet with Rachel, drop off keys and paperwork copies
1325 depart for SLC
1600 back in SLC
5/16/12

A. Pettley
E. Yeager

17 Sept 2012 monsanto Fall SW/GW
0700 leave SLC
0915 monsanto plant / training
1145 machine shop, supply pickup
1220 mine office pick up radios
1259 Arrived at MST144 to inspect site for sample possibility
1330 Arrived at MDS034 Henry Mine, Dump Seep #3. Dry took photo.
1358 Started work at MST044 Immediately below Henry Mine
1515 Sampled MST044 + Dup. Also, Stream gauge.
1615 Sampled MST045 with stream flow sample.
1650 Arrived at MDS030 (seep). Dry NO sample photo #5.
1735 Sampled MST069 Short creek below Ballard Mine. W/MS/MSD. Also, collected flow rate. (Holmgren spring)
1820 At MSG004 to inspect the seep (Dry) took photo #7. NO sample.
1840 Returned to equipment shed to unload truck
1930 Arrived in Soda Springs, ID. Finished for the day.

WELL SAMPLING FORM

Project No.: Fall GW Client: monsanto Date: 9/18/12 Well ID: MAW001

Task: Fall GW Field Crew: E. Yeager A. Pettey

Measuring Point (MP): _____ Water Level (WL): NA ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
Continue stabilization readings on additional pages if necessary									

Sampled from spigot in field, allowed parameters to stabilize.

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1110	NA	NA	NA	13.3	7.52	413.0	6.86	~~489.1~~ 491.1	0.79

SAMPLE ID: 1209GWMAW001 U,F **TIME:** 1115

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

*Mr. Peterson stopped by to let us know this is a spring not a well. It is piped from the eye of the spring at the base of the mountain slope axp. 1 mile

WELL SAMPLING FORM

Page: 1 of 1

Project No.: Fall GW Client: Monsanto Date: 9/19/12 Well ID: MAW002

Task: GW Sampling Field Crew: E. Yeager A. Pettley

Measuring Point (MP): _____ Water Level (WL): _____ ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
Continue stabilization readings on additional pages if necessary									

NO sample

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)

SAMPLE ID: _____ **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

spoke to Mr. Sharp, there is no power running to pump right now, they will not have power turned back on for 2 years. Can not sample

WELL SAMPLING FORM

Page: 1 of 1

Project No.: Fall GW Client: monsanto Date: 9/18/12 Well ID: MAW003

Task: GW sample Field Crew: E.yeager A. Pettley

Measuring Point (MP): _____ Water Level (WL): NA ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5

Continue stabilization readings on additional pages if necessary

sampled from spigot on west side of house by back fence.

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1150	—	—	—	13.1	7.62	340.4	6.81	417.8	0.00

SAMPLE ID: 1209 GWMAW003 U,F **TIME:** 1200

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

Mr. Peterson showed us sample location, this is from the same spring as MAW001 to the east. This is water not a well.

WELL SAMPLING FORM

Project No.: Fall GW Client: Monsanto Date: 9/19/12 Well ID: MAW004

Task: GW Sampling Field Crew: E. Yeager A. Pettley

Measuring Point (MP): _____ Water Level (WL): _____ ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5

no sample

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)

SAMPLE ID: _____ **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

* spoke to Sid Thompson who pumped well for MWH in 2004. He said we would not be able to get a sample, the pipe is buried and flows into a pond for cattle. can't get to outlet.

WELL SAMPLING FORM

Project No.: Fall GW Client: monsanto Date: 9/18/12 Well ID: MAW005

Task: _____ Field Crew: E. Yeager A. Pettley

Measuring Point (MP): _____ Water Level (WL): _____ ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5

DRY

Photo #8

no access to water, windmill not pumping, no water in trough.

Continue stabilization readings on additional pages if necessary

well head sanitary cap sealed, all one unit attached to windmill.

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)

SAMPLE ID: _____ **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Project No.: Fall GW Client: monsanto Date: 9/19/12 Well ID: MAW006

Task: GW sampling Field Crew: E. Yeager A. Pettley

Measuring Point (MP): _____ Water Level (WL): _____ ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5

Continue stabilization readings on additional pages if necessary

sampled from spigot east of well at Godfrey shop.

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0950	—	—	—	10.2	7.56	170.5	6.91	330.5	9.83

SAMPLE ID: 1209GWMAW006 U,F **TIME:** 0955

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

~~measured~~ met John Godfrey to turn on generator to well, sampled after parameters stabilized.

WELL SAMPLING FORM

Project No.: Fall GW Client: Monsanto Date: 9/18/12 Well ID: MAW007

Task: GW Sampling Field Crew: E. Yeager A. Pettley

Measuring Point (MP): _____ Water Level (WL): _____ ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5

no sample

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)

SAMPLE ID: _____ **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

wiring on control box rotten, could not safely sample

WELL SAMPLING FORM

Project No.: Fall GW Client: monsanto Date: 9/18/12 Well ID: MDW001

Task: GW sampling Field Crew: A. Pettey E. Yeager

Measuring Point (MP): — Water Level (WL): — ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
Continue stabilization readings on additional pages if necessary									

Sampled from spigot on NW corner of back shed. allowed flow until stable parameters.

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1155	—	—	—	10.3	7.41	342.3	7.57	466.0	0.14

SAMPLE ID: 1209GWMDW001 F,U **TIME:** 1220

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

Mr. Peterson showed us sample location, this is a well

WELL SAMPLING FORM

Project No.: Fall GW Client: monsanto Date: 9/18/12 Well ID: MDW002

Task: GWSampling Field Crew: E. Yeager A. Pettley

Measuring Point (MP): _____ Water Level (WL): _____ ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
Continue stabilization readings on additional pages if necessary									

Sample from spigot at power pole adjacent to barn. Ran water until stable params.

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1440	—	—	—	9.9	7.07	244.8	4.49	403.8	1.39

SAMPLE ID: 1209 GWMDW002 F,U DUP **TIME:** 1445

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

This is the deep well on the property screened in the Thaynes. There is a shallow well for the house screened in the alluvium that we did not sample.

WELL SAMPLING FORM

Project No.: Fall GW Client: Monsanto Date: 9/18/12 Well ID: MDW003

Task: GW sampling (Fall) Field Crew: A. Pittley, E. Yeager

Measuring Point (MP): NA Water Level (WL): NA ft below MP

Sampling Method (see applicable calculations below): Spigot near fence and house Device: Grab

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
Continue stabilization readings on additional pages if necessary									

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1020	NA	NA	NA	11.6	7.17	443.4	0.61	~~40~~ 387	1.28

SAMPLE ID: 1209GWMDW003U,F **TIME:** 1030

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

Water is free flowing from spigot, let run until parameters were stable.

WELL SAMPLING FORM

Project No.: Fall GW Client: Monsanto Date: 9/19/12 Well ID: MDW004

Task: GW Sampling Field Crew: E. Yeager A. Pettey

Measuring Point (MP): _____ Water Level (WL): _____ ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
Continue stabilization readings on additional pages if necessary									

Sampled from spigot next to well head. This house is north of

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0840	—	—	—	10.1	7.48	171.2	6.79	539.9	1.93

SAMPLE ID: 1209GWMDW004 (U,F) MS/MSD **TIME:** 0845

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

China Hat store, 3rd driveway, behind silos. let water run until parameters stabilized.

WELL SAMPLING FORM

Project No.: Fall GW Client: Monsanto Date: 9/18/12 Well ID: MDW005

Task: GW Sampling Field Crew: E. Yeager A. Pettley

Measuring Point (MP): _____ Water Level (WL): _____ ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
Continue stabilization readings on additional pages if necessary									

sampled from spigot in well house behind cafe at RV park.

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1520	—	—	—	15.1	7.03	266.3	4.88	1230	0.96

SAMPLE ID: 1209GWMDW005 U,F **TIME:** 1530

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Project No.: Fall GW Client: monsanto Date: 9/18/12 Well ID: MDW006

Task: GW sampling Field Crew: A. Pettley E. Yeager

Measuring Point (MP): — Water Level (WL): — ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5

Continue stabilization readings on additional pages if necessary.

Sample from spigot on west side of house

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1620	—	—	—	13.3	7.38	238	4.46	578.4	0.17

SAMPLE ID: 1209GWMDW006 U,F **TIME:** 1630

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Arrival Time** 1650

Field Personnel

A. Pettley **Signatures** AP

E. Yeager EY

SITE DESCRIPTION

Station Name Pit #2 Upper Dump Seep **Station Number** MDS030

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number** 5

Site & Stream Description _____

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Time** 1050 **Station Number** MDS030

Completed by: E. Yeager A. Pettley **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Arrival Time** 1340

Field Personnel

A. Pettley **Signatures** AP

E. Yeager EY

SITE DESCRIPTION

Station Name Henry Mine Dump Seep #3 **Station Number** MDS034

Latitude N 42 ° 53 · 48 ··9 **Longitude** W 111 ° 29 · 28 ··4

Elevation _____ ft **Datum** NAD 27 **Photo Number** 2

Site & Stream Description Dry

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

Dry

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Time** 1340 **Station Number** MDS034

Completed by: Eyeager APetley **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Arrival Time** 1820

Field Personnel

Eyeager **Signatures** ey

APettley AP

SITE DESCRIPTION

Station Name Holmgren Spring **Station Number** MSG004

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description _____

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: _____ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Time** 1820 **Station Number** MSG004

Completed by: Eugenger Appthury **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Arrival Time** 1340

Field Personnel

E. Yeager **Signatures** ey

A. Pettley AP

SITE DESCRIPTION

Station Name Immediately below Henry mine (1997 #24) **Station Number** MST044

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number**

Site & Stream Description free flowing, clear, cobble and silt bottom

Surface Water Characteristics (color, odor, appearance): clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream, Across-stream

Sample ID: 1209SWMST044 – F, U (DUP) **Sample Time:** 1515

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1350		
Water Temperature (°C)					17		
Specific Conductivity (µS/cm) @ 25° C					0.79		
Conductivity (µS/cm)					0.67		
TDS (g/L)					~~162~~.7		
Dissolved Oxygen (% sat.)					162.7 ~~94.2~~		
Dissolved Oxygen (mg/L)					9.88		
pH					8.85		
ORP (mV)					167.3		
Turbidity (FTU)					3.92		
Air Temperature (°C)					24		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Time** 1400 **Station Number** MST 044

Completed by: E. Yeager A Pettley **Checked by:** E. Yeager

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 0.2 ft **L.E.W.** 8.3 ft **Total Width** 9.0 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0.2	1	~~0.6~~ 0.5	0.12	7.7	16	0.65	-0.14
0.7	2	0.6	0.00				
1.2	3	0.6	0.19				
1.7	4	0.45	0.18				
2.2	5	0.5	0.03				
2.7	6	0.55	0.50				
3.2	7	0.75	0.94				
3.7	8	0.70	1.45				
4.2	9	0.50	1.46				
4.7	10	0.80	1.72				
5.2	11	0.80	0.17				
5.7	12	0.75	0.46				
6.2	13	0.85	0.66				
6.7	14	0.70	0.86				
7.2	15	0.70	0.49				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9/17/12 **Arrival Time** 1550

Field Personnel

E. Yeager **Signatures** EY

A. Pettey AP

SITE DESCRIPTION

Station Name Little Blackfoot River above Henry Creek **Station Number** MST045

Latitude N ° ' " **Longitude** W ° ' "

Elevation ft **Datum** NAD 27 **Photo Number** 4

Site & Stream Description clear, slow flowing, a lot of veg. growth in stream bed

Surface Water Characteristics (color, odor, appearance): Slightly turbid, slow flowing, no color, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ) Up-stream / Across-stream

Sample ID: 1209SWMST045U, F **Sample Time:** 1615

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1557		
Water Temperature (°C)					19.2		
Specific Conductivity (µS/cm) @ 25° C					0.79		
Conductivity (µS/cm)					0.71		
TDS (g/L)					~~104.3~~		
Dissolved Oxygen (% sat.)					104.3		
Dissolved Oxygen (mg/L)					9.106		
pH					8.90		
ORP (mV)					89.1		
Turbidity (FTU)					7.78		
Air Temperature (°C)					25°C		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Time** 1550 **Station Number** MST045

Completed by: Ellyager Apothley **Checked by:** EY-AP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 8.18 ft L.E.W. 18.15 ft Total Width 38.85 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
~~10 - 20~~	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
8.2	1	0.35	-0.02				
8.9	2	0.70	-0.02				
9.6	3	0.70	0.01				
10.3	4	0.85	-0.01				
11.0	5	0.95	0.02				
11.7	6	1.05	0.01				
12.5	7	1.25	0.06				
13.2	8	1.80	0.66				
13.9	9	1.80	0.76				
14.6	10	1.75	0.79				
15.3	11	1.90	0.50				
16.0	12	1.85	0.20				
16.7	13	1.90	0.51				
17.5	14	0.70	0.00				
18.2	15	0.35	0.13				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Arrival Time** 1720

Field Personnel

E Yeager **Signatures** EY

A Pettley AP

SITE DESCRIPTION

Station Name Short Creek Below Ballard mine **Station Number** MST069

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number** 6

Site & Stream Description very shallow, flow chanel 8"-12" wide,

Surface Water Characteristics (color, odor, appearance): clear, no color

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1209SWMST069-1 U,F MS/MSD **Sample Time:** 1735

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1730		
Water Temperature (°C)					11.6		
Specific Conductivity (µS/cm) @ 25° C					1.96		
Conductivity (µS/cm)					1.47		
TDS (g/L)							
Dissolved Oxygen (% sat.)					62.8		
Dissolved Oxygen (mg/L)					6.78		
pH					7.71		
ORP (mV)					65.3		
Turbidity (FTU)					124		
Air Temperature (°C)					22		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Time** 1725 **Station Number** MST069

Completed by: Eugenger APettley **Checked by:** eyAP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	5	~~500~~ 1L
2	4.2	1L
3	3.6	1L

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Arrival Time** 1259

Field Personnel

Aaron Pettley **Signatures** AP

Emily Yeager EY

SITE DESCRIPTION

Station Name West Pond Creek headwaters below (pond) West **Station Number** MST144

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number** 1

Site & Stream Description Dry.

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time							
Water Temperature (°C)							
Specific Conductivity (µS/cm) @ 25° C							
Conductivity (µS/cm)							
TDS (g/L)							
Dissolved Oxygen (% sat.)							
Dissolved Oxygen (mg/L)							
pH							
ORP (mV)							
Turbidity (FTU)							
Air Temperature (°C)							

Dry

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – FALL 2012 SW Sampling

Date 9 / 17 / 12 **Time** 1259 **Station Number** MST144

Completed by: A. Pettley / E. Yeager **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

DRY

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft = 0.6TD (standard setting rod); >2.0ft = 0.2TD (TDX2) and 0.8TD (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

DRY

COC No. A 31843

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MINH

Project Contact: Patty VanPett

Contact Phone #: 801-1017-3200

Turn Around Requirements: standard

Location: monsanto

Project ID: monsanto Fall 2012 SW/GW

Sampler (print): EY AP

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	6020A Total Se	6020A Diss Cd	6010B/C Diss Ca, Mg, V	DISS SO4 EPA 300	1600.1 TDS	Diss Hard SM2340B-Calc	SW6020A Total Cd, Cr, Mn, Ni, Se, Zn	SW6010B Total Al, Fe, V	TDS E160.1	TSS E160.2	Gross Alpha/Beta EPA 900	Nitrate/Nitrite as N EPA 353.2	Dissolved SO4, Cl, EPA300.0	Diss Ca, Fe, Mg, K, Na EPA 6010B	Total Alkalinity EPA 310.2	TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1209SWMST044-1-U		X	9/17/12	1515	SW			X				X												
1209SWMST044-1-F		X							X	X	X		X											
1209SWMST044-2-U		X						X				X												
1209SWMST044-2-F		X							X	X	X		X											
1209SWMST045-1-U		X		1015				X				X												
1209SWMST045-1-F		X							X	X	X		X											
1209SWMST049-1-U		X		1735																				
1209SWMST049-1-F		X																						
1209SWMST049-1-UMS		X																						
1209SWMST049-1-FMS		X																						
1209SWMST049-1-UMSD		X																						
1209SWMST049-1-FMSD		X																						
1209GWMDW003-U		X	9/18/12	1030	GW									X	X	X	X	X						
1209GWMDW003-F		X											X						X	X	X	X		
1209GWMAW001-U		X		1115										X	X	X	X	X						
1209GWMAW001-F		X											X						X	X	X	X		
1209GWMAW003-U		X		1200										X	X	X	X	X						
1209GWMAW003-F		X											X						X	X	X	X		
1209GWMDW001-U		X		1220										X	X	X	X	X						
1209GWMDW001-F		X											X						X	X	X	X		

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[illegible]	9/19/12	1730	monsanto FedEX				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

COC No. A 31847

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MWH

Project Contact: Petra VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto

Project ID: Monsanto Fall SW/GW

Sampler (print): EJ AP

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

ADDITIONAL REQUIREMENTS

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Diss Hard Sm 2340B calc	SW6020A Total Cd, Cr, Mn, Ni	SW6010B Total Al, Fe, V	TDS E160.1	TSS E160.2	Gross Alpha/Beta EPA900	Nitrate/Nitrite as N EPA 353.2	Dissolved SO4, Cl, EPA 300.0	Diss Ca, Fe, Mg, K, Na EPA 6010B	Total Alkalinity EPA 310.2					TOTAL # (LAB USE)
1209GWMDIN002-1-U		X	9/18/12	1445	GW				X	X	X	X	X									
1209GWMDIN002-1-F		X						X						X	X	X	X					
1209GWMDIN002-2-U		X							X	X	X	X	X									
1209GWMDIN002-1-F		X						X						X	X	X	X					
1209GWMDIN005-U		X		1530					X	X	X	X	X									
1209GWMDIN005-F		X						X						X	X	X	X					
1209GWMDIN010-U		X		1030					X	X	X	X	X									
1209GWMDIN010-F		X						X						X	X	X	X					

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	9/19/12	0730	Monsanto FedEx				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

COC No. A 31848

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Fax: 740-373-4835

Company Name: MMH

Project Contact: PATHALKUTPH

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto

Project ID: Monsanto Fall GW/SW

Sampler (print): EM AD

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Diss Hard Ca 2340B Calc	SW6020A Total Cd Cr Pb Ni Se Ag	SW6010B Total Al Fe V	TSS Filtered	Tag TSS Filtered	SW8270 Alpha Pcb EPA 900	Nitrate/Nitrite as N EPA 353.2	Dissolved Cl EPA Cl FAP 300.0	Diss Ca Fe Mg K Na EPA 6010B	Total Alkalinity EPA 310.2					TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1209GWMTDN004-U		X	9/19/12	0845	GW				X	X	X	X	X										
1209GWMTDN004-F		X						X						X	X	X	X						
1209GWMTDN004-UMS		X							X	X	X	X	X										
1209GWMTDN004-FMS		X						X						X	X	X	X						
1209GWMTDN004-UMSD		X							X	X	X	X	X										
1209GWMTDN004-FMSD		X						X						X	X	X	X						
1209GWMAIN010-U		X		0955					X	X	X	X	X										
1209GWMAIN010-F		X						X						X	X	X	X						
1209B-GW-01-U		X	09/19/12	1130	W				X	X	X	X	X										
1209B-GW-01-F		X						X						X	X	X	X						
1209FR-GW-01-U		X							X	X	X	X	X										
1209FR-GW-01-F		X						X						X	X	X	X						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[illegible]	9/19/12	11:00	FedEX				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

Page 1 of 1

E. Yeager
A. Pettley

9/18/12

0700 A. Pettley and E. Yeager leaving Soda Springs for Monsanto mine.

0800 Arrived at the equipment shed to calibrate the YSI water quality meter #3397

- pH 4 reading 4.16 @ 10.6°C Calibrated to 4.00, Now reading 4.00.
- pH 10 reading 9.99 @ 12.9°C No calibration Needed.
- pH 7 reading 7.01 @ 12.3°C No calibration Needed.
- Conductivity Standard 1413 µS/cm reading 1503 @ 12.4°C. Calibrated sensor to 1413 µS/cm cal. good.
- ORP 465 mV reading 465 mV No calibration Needed.
- D.O. mg/L reading 8.95 mg/L @ 610.8 baro
- D.O. % reading 78.6% @ 610.6 baro good.

0835 Leaving storage shed.

0935 Arrived at the Vasser Windmill Field well MAW005 "Dry" No sample.

1030 Sampled MDW003, spigot at ranch house parameters = pH 7.17, Temp 11.6°C, ORP 443.4, DO 6.61 SC 387, NTU 1.28

9/18/12

A. Pettley

1115 At MAW001 to collect sample. parameters = pH 7.52, temp 13.3, ORP 43.0, D.O. 6.86, SC 491.1, NTU 0.79. Mr. Peterson stopped by and informed us that the source water for MAW001 sample point is actual a spring that is located ~ 1 mile to the East toe of the slope.

1200 Sampled MAW003 Peterson property water spigot (Spring source to the East). pH 7.62, Temp 13.1°C, ORP 340.4, D.O. 6.81 SC 417.8, NTU 0.0

1220 Sampled MDW001 Peterson property house well. pH 7.41, Temp 10.3, ORP 342.3 D.O. 7.57, SC 466.0, NTU 0.14.

1445 Sampled MDW002, Thompson property (Yellow house) well located adjacent to barn on the NE corner. Parameters = Temp 9.9°C, pH 7.07, ORP 244.8, D.O. mg/L 4.49, SC 403.8, NTU 1.39. Also collected DUP sample.

1520 Sampled MDW005, Cedar Bay RV park, pump house well. parameters = Temp 15.1°C, pH 7.03, ORP 266.3, D.O. 4.88, SC 1230, NTU 0.96

E. Yeager
A. Pettley

9/18/12

1630 Sampled MDW006, Ellis well, located spigot on West of house.
pH 7.38, Temp 13.3, ORP 238, D.O. 4.46, SC 578.4, NTU 0.17.

1810 Met Jeff Godfrey at the MAW006 well. He will have his son (John) meet us on 9/19/12 @ 0800 am.

1820 Leaving the site for Soda Springs.

1900 Returned to Soda Springs to unload the truck. Finished work for the day.

E. Yeager
A. Pettley

9/19/12

0700 Leaving for Monsanto ~~Mx~~ Office

0730 At the Monsanto office to ship (4) sample coolers to the lab.

0750 Leaving the office for Mr. Godfrey's residence to collect a water sample.

0845 At MDW004, Godfrey res. well. Collected sample + MS/MSD.
final parameters = Temp 10.1°c, pH 7.48, ORP 171.2, D.O. 6.79, SC 539.9, NTU 1.93
Met w/ John Godfrey at residence to collect sample.

0940 At MAW006, Godfrey West well. Sampling water from a water spigot located on the SW corner of the shop blds. Godfrey Ag. facility. Parameters = Temp 10.2°c pH 7.56, ORP 170.5, ~~D.O. 170.5, D.O.~~ D.O. 6.91, SC 330.5, NTU 9.83

1000 Left the Godfrey West well.

1020 Arrived at the Monsanto Mine office to drop off the radio and make copies of the paperwork.

APPENDIX B - 2010 AND 2012 SURFACE WATER AND GROUNDWATER ANALYTICAL DATA

B-1 2010 and 2012 Surface Water and Groundwater Analyte Lists

B-2 2010 and 2012 Surface Water Analytical Data

B-3 2010 and 2012 Groundwater Analytical Data

B-1 2010 and 2012 Surface Water and Groundwater Analyte Lists

Table B-1* 2010 Surface Water Analyte List					
Parameter	**Basis**	**Method**	**RL**	**Reporting Units**	**Holding Times (days)**
cadmium	dissolved	6020A	0.0005	mg/L	180
calcium	dissolved	6010B	0.2	mg/L	180
chloride	dissolved	300.0	0.2	mg/L	28
hardness	dissolved	2340B-Calculation	5	mg/L	n/a
iron	dissolved	6010B	0.1	mg/L	180
magnesium	dissolved	6010B	0.5	mg/L	180
selenium	total	6020A	0.001	mg/L	180
sulfate	dissolved	300.0	1	mg/L	28
total dissolved solids	total	160.1	10	mg/L	7
vanadium	dissolved	6010B	0.01	mg/L	180

Notes:
Method—Method to be utilized by Microbac.
RL—Reporting Limit of Microbac.

* MWH, 2009a. *Final - 2009 and 2010 Surface Water Monitoring Sampling and Analysis Plan*. Revision 2, prepared for P4 Production L.L.C., May 2009.

TABLE B-2 * 2010 GROUNDWATER ANALYTE LIST		
Category	**Fraction**	**Analytes (Analytical Method)**
2009 monitoring wells (spring 2010 event only)		Expanded Analyte List
	Unfiltered	TDS (EPA 160.1)
	Unfiltered	TSS (EPA 160.2)
	Unfiltered	Al, Ba, Be, Fe, Mo, V (EPA 6010B)
	Unfiltered	Sb, As, Cd, Cr, Co, Cu, Pb, Mn, Ni, Se, Ag, Tl, U, Zn (EPA 6020A)
	Unfiltered	Hg (EPA 7471)
	Unfiltered	Gross alpha, gross beta (EPA 900)
	Filtered	Nitrogen - total nitrate-nitrite (EPA 353.2)
	Filtered	SO_4, Cl (EPA 300.0)
	Filtered	Ca, Fe, Mg, K, Na (EPA 6010B)
	Filtered	Alkalinity (EPA 310.2)
	Filtered	Hardness (SM2340B)
2008 & older monitoring wells and direct push borehole wells (excluding MMW009)		Primary Analyte List
	Unfiltered*	Cd, Se (EPA 6020A)
	Filtered	SO_4 (EPA 300.0)
	Unfiltered	TDS (EPA 160.1)
MMW009	Unfiltered	Cd, Se, Pb (EPA 6020A)
	Filtered	SO_4 (EPA 300.0)
	Unfiltered	TDS (EPA 160.1)
Potential 2010 wells		Regular Analyte List
	Unfiltered	TDS (EPA 160.1)
	Unfiltered	TSS (EPA 160.2)
	Unfiltered	Al, Fe, V (EPA 6010B)
	Unfiltered	Cd, Cr, Mn, Ni, Se, Zn (EPA 6020A)
	Unfiltered	Gross alpha, gross beta (EPA 900)
	Filtered	Nitrogen - total nitrate-nitrite (EPA 353.2)
	Filtered	SO_4, Cl (EPA 300.0)
	Filtered	Ca, Fe, Mg, K, Na (EPA 6010B)
	Filtered	Alkalinity (EPA 310.2)
	Filtered	Hardness (SM2340B)
Seeps, springs, and streams	Unfiltered	TDS (EPA 160.1)
	Unfiltered	Cd, Se (EPA 6020A)
	Unfiltered	V (EPA 6010B)
	Filtered	Cd (EPA 6020A)
	Filtered	Ca, Mg (EPA 6010B)
	Filtered	SO_4, Cl (EPA 300.0)

Notes:
Hardness is calculated on filtered fractions of Ca and Mg
Direct-push monitoring wells may be sampled for dissolved or dissolved and total fractions depending on turbidity.

* MWH, 2010a. *Final - 2010 Groundwater Monitoring Memorandum.* Revision 2, prepared for P4 Production L.L.C., May 2010.

TABLE B-3*
2012 SURFACE WATER AND GROUNDWATER
ANALYTE LIST

Category	Fraction	Analytes (Analytical Method)
Surface Water		
Streams , Seeps, and Springs,	Unfiltered	Se (EPA 6020A)
	Filtered	Cd (EPA 6020A)
	Filtered	V (EPA 6010B)
	Filtered	Ca, Mg (EPA 6010B)[a]
	Filtered	SO_4 (EPA 300.0)
	Unfiltered	TDS (EPA 160.1)
Groundwater		
2009 and Older Monitor Wells and Direct Push Borehole Wells		*Primary Analyte List*
	Unfiltered[b]	Cd, Mn, Se (EPA 6020A)
	Filtered	SO_4 (EPA 300.0)
	Unfiltered	TDS (EPA 160.1)
Agricultural, Domestic and Production Wells		Regular Analyte List
	Unfiltered	TDS (EPA 160.1)
	Unfiltered	TSS (EPA 160.2)
	Unfiltered	Al, Fe, V (EPA 6010B)
	Unfiltered	Cd, Cr, Mn, Ni, Se, Zn (EPA 6020A)
	Unfiltered	Gross alpha, gross beta (EPA 900)
	Filtered	Nitrogen - total nitrate-nitrite (EPA 353.2)
	Filtered	SO_4, Cl (EPA 300.0)
	Filtered	Ca, Fe, Mg, K, Na (EPA 6010B)
	Filtered	Alkalinity (EPA 310.2)
	Filtered	Hardness (SM2340B)
2010 Monitor Wells[c]		*Expanded Analyte List*
	Unfiltered	Al, Ba, Be, Fe, Mo, V (EPA 6010B)
	Unfiltered	Sb, As, Cd, Cr, Co, Cu, Pb, Mn, Ni, Se, Ag, Tl, U, Zn (EPA 6020A)
	Unfiltered	Hg (EPA 7471)
	Unfiltered	Gross alpha, gross beta (EPA 900)
	Filtered	Nitrogen - total nitrate-nitrite (EPA 353.2)
	Filtered	SO_4, Cl (EPA 300.0)
	Filtered	Ca, Fe, Mg, K, Na (EPA 6010B)
	Filtered	Alkalinity (EPA 310.2)
	Filtered	Hardness (SM2340B)
	Unfiltered	TDS (EPA 160.1)
	Unfiltered	TSS (EPA 160.2)

Notes:
[a]Hardness is calculated on filtered fractions of Ca and Mg
[b]Direct-push monitoring wells may be sampled for dissolved or dissolved and total fractions depending on turbidity (see *2010 Groundwater SAP*).
[c]The only 2010 well is MMW037, it will be sampled for the expanded list once in 2012 and subsequently will be sampled for the primary list based on the spring 2012 analytical results.

* MWH, 2012. *Final - 2012 Surface and Groundwater Monitoring Programs.* Revision 2, prepared for P4 Production L.L.C., May 2012.

B-2 2010 and 2012 Surface Water Analytical Data

TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		MDS025		MDS025		MDS025		MDS025		MDS026		MDS026		MDS026	
Location Identification		Dump Seep		Dump Seep		Dump Seep		Dump Seep		Dump Seep		Dump Seep		Dump Seep	
Date Collected		5/15/2010		5/16/2010		9/15/2010		5/12/2012		5/16/2010		9/15/2010		5/11/2012	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)															
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.0006	**0.000347 J**	--	**0.000594 J**	**0.00175**	<0.0006	<0.0006	<0.0012 D	--	<0.0003	**0.000826**	<0.0006	**0.00148 J-,B**	<0.0012 D	--
Calcium	--	**275**	--	**282**	--	**245**	--	**206**	--	**282**	--	**328**	--	**286**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.16	**1.41**	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	--	**72.9**	--	**70.8**	--	**66.9**	--	**58.2**	--	**67.7**	--	**79.8**	--	**74.7**	--
Manganese	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	--	**0.00434**	--	**0.00422**	--	**0.00159 J**	--	**0.00718 D**	--	**0.118**	--	**0.0949**	--	**0.368 D**
Silver	0.0034	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.02	<0.005	--	--	<0.005	--	<0.005	<0.01	--	--	<0.005	--	<0.005	<0.01	--
Zinc	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)															
Chloride (as Cl)	--	**3.54**	--	**3.18**	--	**4.35**	--	--	--	**5.65**	--	**6.14**	--	--	--
Hardness (as $CaCO_3$)	--	**987**	--	--	--	**887**	--	**755**	--	--	--	**1150**	--	**1020**	--
Sulfate (as SO_4)	--	**746**	--	**730**	--	**644**	--	**516 D**	--	**648**	--	**759**	--	**736 D**	--
Total dissolved solids (Residue, filterable)	--	--	**1490**	--	**1360**	--	**1230**	--	**966 J**	--	**1370**	--	**1490**	--	**1330**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
UJ Potential low bias, possible false negative.

TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		MDS030		MDS030		MDS030 Dup		MDS030		MDS030 Dup		MDS034		MSG004	
Location Identification		Dump Seep		Dump Seep		Dump Seep		Dump Seep		Dump Seep		Dump Seep		Spring	
Date Collected		5/17/2010		9/14/2010		9/14/2010		5/11/2012		5/11/2012		5/16/2010		5/17/2010	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)															
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0003	<0.0003	<0.0015	<0.0015 UJ	<0.0015	<0.0015 UJ	<0.0012 D	--	<0.0012 D	--	<0.0003	**0.000438 J**	<0.0003	<0.0003
Calcium	--	**156**	--	**178**	--	**163**	--	**142**	--	**147**	--	**126**	--	**62.5**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	--	**17.4**	--	**18.7**	--	**17.1**	--	**17.5**	--	**17.8**	--	**37.6**	--	**22**	--
Manganese	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	--	**0.65**	--	**0.833**	--	**0.866**	--	**0.849 D**	--	**0.964 D**	--	**0.0475**	--	**0.00898**
Silver	0.0034	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.02	--	<0.005	--	**0.00927 J**	--	**0.00853 J**	<0.01	--	<0.01	--	--	<0.005	--	<0.005
Zinc	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)															
Chloride (as Cl)	--	**4.36**	--	**5.12**	--	**4.97**	--	--	--	--	--	**2.6**	--	**2.58**	--
Hardness (as $CaCO_3$)	--	--	--	**522**	--	**477**	--	**426**	--	**441**	--	--	--	--	--
Sulfate (as SO_4)	--	**151**	--	**170**	--	**170**	--	**149 D**	--	**142 D**	--	**117**	--	**28.7**	--
Total dissolved solids (Residue, filterable)	--	--	**590**	--	**612**	--	**610**	--	**528**	--	**520**	--	**658**	--	**274**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
UJ Potential low bias, possible false negative.

TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Location Identification Date Collected	MSG004 Dup Spring 5/17/2010		MSG004 Spring 9/14/2010		MSG005 Spring 5/17/2010		MSG005 Spring 5/11/2012		MSG006 Spring 5/17/2010		MSG006 Spring 5/10/2012		MSP014 Spring 9/29/2010	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--	--	--	<0.003	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	**0.00248**	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--	--	--	**0.028**	--
Cadmium	0.0006	<0.0003	<0.0003	<0.0006	**0.00277 J-,B**	<0.0003	<0.0003	<0.0012 D	--	<0.0003	<0.0003	<0.0006	--	**0.000018 J**	--
Calcium	--	**66.3**	--	**82.9**	--	**77.7**	--	**73.6**	--	**193**	--	**242**	--	**76.8**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--	--	--	**0.00078**	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--	--	--	**0.00218**	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--	--	--	**0.00068**	--
Iron	0.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	--	**22.5**	--	**25.7**	--	**19.9**	--	**20.8**	--	**39.2**	--	**53.8**	--	**62.6**	--
Manganese	0.05	--	--	--	--	--	--	--	--	--	--	--	--	**0.0204**	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--	--	--	<0.00002	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--	--	--	**0.0037**	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--	--	--	**0.0048**	--
Selenium	0.005	--	**0.00874**	--	**0.0124**	--	**0.00741**	--	**0.00731 D**	--	**0.0964**	--	**0.212**	**0.005**	**0.0053**
Silver	0.0034	--	--	--	--	--	--	--	--	--	--	--	--	<0.000008	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--	--	--	0.000008 UB	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--	--	--	**0.0022**	--
Vanadium	0.02	--	<0.005	--	**0.017**	--	<0.005	<0.01	--	--	<0.005	<0.01	--	**0.00185**	--
Zinc	0.12	--	--	--	--	--	--	--	--	--	--	--	--	**0.0008 J**	--
Chemistry Parameters (mg/l)															
Chloride (as Cl)	--	**2.59**	--	**3.56**	--	**3.57**	--	--	--	**4.22**	--	--	--	--	--
Hardness (as $CaCO_3$)	--	--	--	**313**	--	--	--	**270**	--	--	--	**826**	--	**449**	--
Sulfate (as SO_4)	--	**28.4**	--	**37.6**	--	**31.4**	--	**29.3**	--	**421**	--	**587 D**	--	--	--
Total dissolved solids (Residue, filterable)	--	--	**308**	--	**306**	--	**3690**	--	**286**	--	**1090**	--	**996**	--	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
J+	Data are estimated due to associated quality control data. Potential high bias.
UB	Analyte considered not detected based on associated blank data.
UJ	Potential low bias, possible false negative.

TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Location Identification Date Collected	MST019 Stream 5/15/2010		MST019 Stream 9/16/2010		MST019 Stream 5/13/2012		MST020 Stream 5/14/2010		MST020 Stream 9/16/2010		MST020 Stream 5/13/2012		MST044 Stream 5/14/2010	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0003	--	<0.0006 UJ	--	<0.0012 D	--	<0.0003	--	<0.0006 UJ	--	<0.0012 D	--	<0.0003	--
Calcium	--	**57**	--	**46.4**	--	**56.8**	--	**55.5**	--	**46.1**	--	**56.3**	--	**77.3**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.16	<0.025	--	**0.0346 B**	--	--	--	<0.025	--	**0.0342 B**	--	--	--	<0.025	--
Magnesium	--	**11.1**	--	**14.1**	--	**12.3**	--	**11**	--	**13.8**	--	**12**	--	**22.3**	--
Manganese	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	--	**0.0035**	--	**0.00164 J**	--	**0.00341 D**	--	**0.0035**	--	**0.00197 J**	--	**0.00357 D**	--	**0.000901 J**
Silver	0.0034	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.02	<0.005	--	<0.005	--	<0.01	--	<0.005	--	<0.005	--	<0.01	--	<0.005	--
Zinc	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)															
Chloride (as Cl)	--	**3.35**	--	**2.66**	--	--	--	**3.34**	--	**2.68**	--	--	--	**35.9**	--
Hardness (as $CaCO_3$)	--	**188**	--	**174**	--	**192**	--	**184**	--	**172**	--	**190**	--	**285**	--
Sulfate (as SO_4)	--	**11.8**	--	**12**	--	**9.05**	--	**11.4**	--	**12.5**	--	**9.25**	--	**70.1**	--
Total dissolved solids (Residue, filterable)	--	--	**232**	--	**174**	--	**190 J**	--	**182**	--	**176**	--	**204 J**	--	**380**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
UJ Potential low bias, possible false negative.

TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification / Location Identification / Date Collected	MST044 Stream 9/16/2010		MST044 Stream 5/9/2012		MST044 Stream 9/17/2012		MST044 Dup Stream 9/17/2012		MST045 Stream 5/14/2010		MST045 Dup Stream 5/14/2010		MST045 Triplicate Stream 5/14/2010	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0006 UJ	--	<0.0012 D	--	<0.0006	--	<0.0006	--	<0.0003	--	<0.0003	--	<0.0003	--
Calcium	--	**66.8**	--	**65.5**	--	**65.3**	--	**65.1**	--	**78.9**	--	**78.5**	--	**81.2**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.16	**0.0367 B**	--	--	--	--	--	--	--	<0.025	--	<0.025	--	<0.025	--
Magnesium	--	**31.7**	--	**22.6**	--	**30.1**	--	**30.2**	--	**22.3**	--	**23.1**	--	**23.1**	--
Manganese	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	--	<0.001	--	**0.00114 F,J+**	--	**0.00141**	--	**0.0013**	--	**0.000867 J**	--	**0.000824 J**	--	**0.000698 J**
Silver	0.0034	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.02	<0.005	--	<0.01	--	<0.01	--	<0.01	--	<0.005	--	<0.005	--	<0.005	--
Zinc	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)															
Chloride (as Cl)	--	**76.2**	--	--	--	--	--	--	--	**36.8**	--	**38.2**	--	**38.4**	--
Hardness (as $CaCO_3$)	--	**297**	--	**257**	--	**287**	--	**287**	--	**289**	--	**291**	--	**298**	--
Sulfate (as SO_4)	--	**155**	--	**110 J+**	--	**151 D**	--	**151 D**	--	**71.1**	--	**73.1**	--	**73.8**	--
Total dissolved solids (Residue, filterable)	--	--	**482**	--	**426**	--	**458**	--	**496**	--	**362**	--	**380**	--	**576**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
UJ Potential low bias, possible false negative.

TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification / Location Identification / Date Collected	MST045 Stream 9/16/2010		MST045 Dup Stream 9/16/2010		MST045 Triplicate Stream 9/16/2010		MST045 Stream 5/9/2012		MST045 Dup Stream 5/9/2012		MST045 Stream 9/17/2012		MST048 Stream 5/10/2012	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0006 UJ	--	<0.0006 UJ	--	<0.0006 UJ	--	<0.0012 D	--	<0.0012 D	--	<0.0006	--	<0.0006	--
Calcium	--	**69.6**	--	**65**	--	**66.5**	--	**65.7**	--	**66.1**	--	**62.3**	--	**58.4**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.16	**0.0382 B**	--	<0.025	--	<0.025	--	--	--	--	--	--	--	--	--
Magnesium	--	**32.1**	--	**30**	--	**30.6**	--	**22.4**	--	**22.5**	--	**29.9**	--	**11.1**	--
Manganese	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	--	<0.001	--	<0.001	--	<0.005 UJ	--	**0.00121 F,J+**	--	**0.00196 F,J+**	--	**0.00166**	--	<0.001
Silver	0.0034	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.02	<0.005	--	<0.005	--	<0.005	--	<0.01	--	<0.01	--	<0.01	--	<0.01	--
Zinc	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)															
Chloride (as Cl)	--	**75**	--	**76.7**	--	**76.4**	--	--	--	--	--	--	--	--	--
Hardness (as $CaCO_3$)	--	**306**	--	**286**	--	**292**	--	**256**	--	**257**	--	**279**	--	**192**	--
Sulfate (as SO_4)	--	**153**	--	**156**	--	**156**	--	**110 J+**	--	**109 J+**	--	**151 D**	--	**6.75**	--
Total dissolved solids (Residue, filterable)	--	--	**494**	--	**512**	--	**528**	--	**420**	--	**502**	--	**450**	--	**160**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
UJ Potential low bias, possible false negative.

TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Location Identification Date Collected	MST050 Stream 5/14/2010		MST050 Stream 5/10/2012		MST057 Stream 5/14/2010		MST057 Stream 5/9/2012		MST063 Stream 5/15/2010		MST063 Stream 5/9/2012	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0003	--	<0.0006	--	<0.0003	--	<0.0012 D	--	<0.0003	--	**0.00373 D**	--
Calcium	--	**52**	--	**34.8**	--	**71.6**	--	**62.3**	--	**90**	--	**83.6**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.16	**0.0901 J**	--	--	--	<0.025	--	--	--	<0.025	--	--	--
Magnesium	--	**11.7**	--	**12.2**	--	**13.1**	--	**12**	--	**15.7**	--	**28**	--
Manganese	0.05	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	--	<0.0005	--	**0.0012**	--	**0.00617**	--	<0.002 D	--	**0.00234**	--	**0.0052 J+**
Silver	0.0034	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.02	<0.005	--	<0.01	--	<0.005	--	<0.01	--	<0.005	--	<0.01	--
Zinc	0.12	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)													
Chloride (as Cl)	--	**4.05**	--	--	--	**3.2**	--	--	--	**7.66**	--	--	--
Hardness (as $CaCO_3$)	--	**177**	--	**137**	--	**231**	--	**205**	--	**287**	--	**324**	--
Sulfate (as SO_4)	--	**8.73**	--	**17.3**	--	**53.2**	--	**16 J+**	--	**35.9**	--	**49.3 J+**	--
Total dissolved solids (Residue, filterable)	--	--	**188**	--	**138**	--	**330**	--	**238**	--	**356**	--	**404**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
UJ Potential low bias, possible false negative.

TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Location Identification Date Collected	MST066 Stream 5/14/2010		MST066 Stream 5/12/2012		MST067 Stream 5/14/2010		MST067 Stream 5/11/2012		MST067 Stream 5/11/2012	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Total**	**Dissolved**
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0003	--	<0.0012 D	--	**0.000399 J**	--	<0.0012 D	--	--	**0.000779**
Calcium	--	**51.6**	--	**54**	--	**241**	--	**238**	--	--	**496**
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--
Iron	0.16	**0.155**	--	--	--	<0.025	--	--	--	--	**0.0989 J**
Magnesium	--	**15.8**	--	**15.7**	--	**63.1**	--	**65**	--	--	**92.9**
Manganese	0.05	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	--	**0.0146**	--	**0.0257 D**	--	**0.099**	--	**0.681 D**	--	--
Silver	0.0034	--	--	--	--	--	--	--	--	--	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--
Vanadium	0.02	<0.005	--	**0.00725 F**	--	**0.00877 J**	--	**0.0177**	--	--	<0.005
Zinc	0.12	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)											
Chloride (as Cl)	--	**5.8**	--	--	--	**5.08**	--	--	--	--	**11.5**
Hardness (as $CaCO_3$)	--	**192**	--	**199**	--	**849**	--	**861**	--	--	**1650**
Sulfate (as SO_4)	--	**31.5**	--	**35.3**	--	**576**	--	**668 D**	--	--	**1230**
Total dissolved solids (Residue, filterable)	--	--	**260**	--	**268 J**	--	**1180**	--	--	**1110**	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.
UJ Potential low bias, possible false negative.

TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification / Location Identification / Date Collected	MST069 Stream 5/13/2010		MST069 Stream 5/17/2010		MST069 Stream 9/14/2010		MST069 Stream 5/8/2012		MST069 Stream 9/17/2012		MST089 Stream 5/13/2010		MST089 Stream 5/11/2012	
Metals (mg/l)	**Screening Limits**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.0006	--	**0.000816**	**0.00451**	<0.0015	**0.00973 J-,B**	**0.00145 D**	**0.00145 D**	--	**0.00143**	--	<0.0003	--	<0.0012 D	--
Calcium	--	--	**445**	--	**490**	--	**405**	**405**	--	**491 D**	--	**54.8**	--	**57.3**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.16	--	--	--	**0.0584 J**	--	--	--	--	--	--	**0.0678 J**	--	--	--
Magnesium	--	--	**90.6**	--	**90.5**	--	**86.9**	**86.9**	--	**98.2**	--	**9.41**	--	**10.5**	--
Manganese	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	**2.84**	--	**1.15**	--	**1.17**	--	--	**1.43 J+**	--	**1.26 D**	--	**0.000758 J**	--	**0.00165 F,D**
Silver	0.0034	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.02	--	--	<0.005	<0.005	<0.005	<0.01	<0.01	--	<0.01	--	<0.005	--	**0.00697 F**	--
Zinc	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)															
Chloride (as Cl)	--	--	**11.1**	--	**10.5**	--	--	--	--	--	--	**5.29**	--	--	--
Hardness (as $CaCO_3$)	--	--	--	--	**1600**	--	**1370**	**1370**	--	**1630**	--	**176**	--	**187**	--
Sulfate (as SO_4)	--	--	**1220**	--	**1220**	--	**1440 J+**	**1440 J+**	--	**1140 D**	--	**14.3**	--	**15.8**	--
Total dissolved solids (Residue, filterable)	--	**2290**	--	**2320**	--	**2180**	--	--	**2180**	--	**2060**	--	**188**	--	**200**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
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UB Analyte considered not detected based on associated blank data.
UJ Potential low bias, possible false negative.

TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS
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	Location Identification	**MST090**		**MST090**		**MST092**		**MST092**		**MST093**		**MST093**		**MST094**	
	Location Identification	**Stream**		**Stream**		**Stream**		**Stream**		**Stream**		**Stream**		**Stream**	
	Date Collected	**5/13/2010**		**5/11/2012**		**5/13/2010**		**5/11/2012**		**5/13/2010**		**5/10/2012**		**5/13/2010**	
Analyte/Methods (Units)															
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0003	--	<0.0012 D	--	<0.0003	--	<0.0012 D	--	<0.0003	--	<0.0006	--	<0.0003	--
Calcium	--	**61.8**	--	**57.3**	--	**70.9**	--	**62.3**	--	**41.1**	--	**38.8**	--	**47.5**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.16	**0.0598 J**	--	--	--	**0.0786 J**	--	--	--	**0.0319 J**	--	--	--	<0.025	--
Magnesium	--	**9.26**	--	**8.69**	--	**12.6**	--	**10**	--	**6.97**	--	**6.89**	--	**6.58**	--
Manganese	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	--	<0.0005	--	<0.002 D	--	**0.00272**	--	**0.00209 D**	--	**0.000544 J**	--	<0.001	--	**0.000842 J**
Silver	0.0034	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.02	<0.005	--	<0.01	--	<0.005	--	<0.01	--	<0.005	--	<0.01	--	<0.005	--
Zinc	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)															
Chloride (as Cl)	--	**5.68**	--	--	--	**4.83**	--	--	--	**7.12**	--	--	--	**2.92**	--
Hardness (as $CaCO_3$)	--	**193**	--	**179**	--	**229**	--	**197**	--	**131**	--	**125**	--	**146**	--
Sulfate (as SO_4)	--	**2.89**	--	**2.15**	--	**64.2**	--	**27.9**	--	**10.7**	--	**4.18**	--	**7.44**	--
Total dissolved solids (Residue, filterable)	--	--	**212**	--	**204**	--	**296**	--	**226**	--	**166**	--	**172**	--	**154**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
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TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS
(Page 11 of 13)

Analyte/Methods (Units)	Location Identification Location Identification Date Collected	MST095 Stream 5/13/2010		MST095 Stream 5/10/2012		MST096 Stream 5/10/2012		MST128 Stream 5/16/2010		MST128 Stream 5/12/2012		MST131 Stream 5/16/2010	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0003	--	<0.0006	--	<0.0006	--	<0.0003	--	<0.0012 D	--	<0.0003	--
Calcium	--	**130**	--	**90.4**	--	**91.2**	--	**63.6**	--	**64.5**	--	**49.1**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.16	<0.025	--	--	--	--	--	<0.025	--	--	--	**0.271**	--
Magnesium	--	**36.1**	--	**26.1**	--	**20.8**	--	**12.4**	--	**12**	--	**8.65**	--
Manganese	0.05	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	--	**0.2**	--	**0.0772**	--	**0.071**	--	**0.00157**	--	**0.00246 D**	--	**0.00184**
Silver	0.0034	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.02	<0.005	--	<0.01	--	<0.01	--	<0.005	--	<0.01	--	<0.005	--
Zinc	0.12	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)													
Chloride (as Cl)	--	**4.19**	--	--	--	--	--	**5.49**	--	--	--	**7.71**	--
Hardness (as $CaCO_3$)	--	**474**	--	**333**	--	**313**	--	**210**	--	**211**	--	**158**	--
Sulfate (as SO_4)	--	**265**	--	**132 D**	--	**122 D**	--	**42.5**	--	**31.7**	--	**27.7**	--
Total dissolved solids (Residue, filterable)	--	--	**572**	--	**346**	--	**342**	--	**256**	--	**242 J**	--	**238**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
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UJ Potential low bias, possible false negative.

TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Location Identification Date Collected	MST131 Stream 5/12/2012		MST132 Stream 5/16/2010		MST132 Dup Stream 5/16/2010		MST132 Triplicate Stream 5/16/2010		MST132 Stream 5/12/2012		MST132 Dup Stream 5/12/2012		MST133 Stream 5/15/2010	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0012 D	--	<0.0003	--	<0.0003	--	<0.0003	--	<0.0012 D	--	<0.0012 D	--	<0.0003	--
Calcium	--	**67.8**	--	**60.7**	--	**59.5**	--	**58.9**	--	**65.5**	--	**63.5**	--	**32.2**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.16	--	--	**0.0464 J**	--	**0.0319 J**	--	**0.0288 J**	--	--	--	--	--	**0.0702 J**	--
Magnesium	--	**9.6**	--	**12**	--	**11.6**	--	**11.5**	--	**12.2**	--	**11.9**	--	**4.76**	--
Manganese	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	--	**0.00163 F,D**	--	**0.0017**	--	**0.00148**	--	**0.00167**	--	**0.0023 D**	--	**0.00159 F,D**	--	**0.00146**
Silver	0.0034	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.02	<0.01	--	<0.005	--	<0.005	--	<0.005	--	<0.01	--	<0.01	--	<0.005	--
Zinc	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)															
Chloride (as Cl)	--	--	--	**5.97**	--	**6.06**	--	**6.06**	--	--	--	--	--	**5.43**	--
Hardness (as $CaCO_3$)	--	**209**	--	**201**	--	**196**	--	**195**	--	**214**	--	**208**	--	**100**	--
Sulfate (as SO_4)	--	**58 D**	--	**39.8**	--	**39.7**	--	**39.5**	--	**31**	--	**31.2**	--	**13.4**	--
Total dissolved solids (Residue, filterable)	--	--	**258 J**	--	**260**	--	**268**	--	**244**	--	**208 J**	--	**228 J**	--	**154**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
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TABLE B-4

SUMMARY OF 2010 AND 2012 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification / Location Identification / Date Collected	MST133 Stream 5/11/2012		MST143 Stream 5/15/2010		MST144 Stream 5/16/2010		MST226 Stream 5/10/2012		MST274 Stream 5/12/2012	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--
Boron	0.0016	--	--	--	--	--	--	--	--	--	--
Cadmium	0.0006	<0.0012 D	--	<0.0003	--	<0.0003	<0.0003	<0.0006	--	<0.0012 D	--
Calcium	--	**52.4**	--	**46.4**	--	**110**	--	**50.3**	--	**72.2**	--
Chromium, Total	0.000031	--	--	--	--	--	--	--	--	--	--
Cobalt	0.004	--	--	--	--	--	--	--	--	--	--
Copper	0.011	--	--	--	--	--	--	--	--	--	--
Iron	0.16	--	--	**0.0401 J**	--	--	--	--	--	--	--
Magnesium	--	**7.58**	--	**7.96**	--	**27.6**	--	**10.2**	--	**10.7**	--
Manganese	0.05	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.078	--	--	--	--	--	--	--	--	--	--
Nickel	0.052	--	--	--	--	--	--	--	--	--	--
Selenium	0.005	--	**0.00698 D**	--	**0.0024**	--	**0.211**	--	**0.00833**	--	**0.00393 D**
Silver	0.0034	--	--	--	--	--	--	--	--	--	--
Thallium	0.00024	--	--	--	--	--	--	--	--	--	--
Uranium	0.0026	--	--	--	--	--	--	--	--	--	--
Vanadium	0.02	<0.01	--	<0.005	--	--	<0.005	<0.01	--	<0.01	--
Zinc	0.12	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)											
Chloride (as Cl)	--	--	--	**7.96**	--	**7.33**	--	--	--	--	--
Hardness (as $CaCO_3$)	--	**162**	--	**149**	--	--	--	**167**	--	**224**	--
Sulfate (as SO_4)	--	**23.8**	--	**28.9**	--	**275**	--	**29.7**	--	**47.1**	--
Total dissolved solids (Residue, filterable)	--	--	**166**	--	**198**	--	**604**	--	**166**	--	**234 J**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
J+	Data are estimated due to associated quality control data. Potential high bias.
UB	Analyte considered not detected based on associated blank data.
UJ	Potential low bias, possible false negative.

B-3 2010 and 2012 Groundwater Analytical Data

TABLE B-5

SUMMARY OF 2010 AND 2012 GROUNDWATER SAMPLE RESULTS
P4 RI/FS

	Location Identification	MAW001		MAW003		MAW006		MBW006		MBW006		MBW009		MBW009		MBW011		MBW011	
	Location Type	AW		AW		AW		BW		BW		BW		BW		BW		BW	
	Date Collected	9/18/2012		9/18/2012		9/19/2012		5/21/2010		5/15/2012		5/20/2010		5/15/2012		5/18/2010		5/15/2012	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)																			
Aluminum	0.2	--	<0.1	--	<0.1	--	**1.36**	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.005	--	<0.0006	--	<0.0006	--	<0.0006	<0.0003	<0.0003	--	<0.0012 D	<0.0003	<0.0003	--	**0.000715 F,D**	<0.0003	--	--	<0.0012 D
Calcium	--	**64.8**	--	**64.4**	--	**39.2**	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Total	0.1	--	**0.00147 F**	--	**0.00156 F**	--	**0.00351**	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	**1.18**	--	--	--	--	--	--	--	--	--	--	--	--
Lead	0.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	--	**13**	--	**12.8**	--	**10.8**	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	0.05	--	**0.00431**	--	**0.00183 F**	--	**0.0797**	--	--	--	**0.0474 J+**	--	--	--	**0.371 J+**	--	--	--	**0.0361 J+**
Mercury	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.73	--	**0.00265 F**	--	**0.00282 F**	--	**0.00363 F**	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	--	**0.668 F**	--	**0.649 F**	--	**2.06**	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.05	--	**0.00493**	--	**0.00521**	--	**0.00116**	**0.243**	**0.328**	--	**0.456 D**	**0.00571**	**0.00495**	--	**0.00231 D**	**0.459**	--	--	**0.474 D**
Silver	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	--	**5.37**	--	**5.38**	--	**9.06**	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.26	--	<0.01	--	<0.01	--	**0.00831 F**	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	5	--	<0.025 UJ	--	**0.067 J**	--	**0.0996 J**	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)																			
Alkalinity, Total (as $CaCO_3$)	--	--	**181 D**	--	**172 D**	--	**167 J-**	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (as Cl)	250	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as $CaCO_3$)	--	**215**	--	**214**	--	**143**	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrogen, nitrate-nitrite	10	--	**0.774**	--	**0.796**	--	**8.64 D**	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate (as SO_4)	250	**14.7**	--	**14.8**	--	**14.3**	--	**311**	--	**341 D**	--	**441**	--	**392 D**	--	**157**	--	**175 D**	--
Suspended solids (Residue, non-filterable)	--	--	<5.0	--	<5.0	--	**22.5**	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids (Residue, filterable)	500	--	**236**	--	**244**	--	**224**	--	**676**	--	**756**	--	**962**	--	**852**	--	**456**	--	**504**
Radionuclides (PicoCuries/l)																			
alpha, Gross	--	--	**20.9**	--	**33.5**	--	<5	--	--	--	--	--	--	--	--	--	--	--	--
beta, Gross	--	--	**5.44**	--	**7.85**	--	**4.91 F**	--	--	--	--	--	--	--	--	--	--	--	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
UK	Analyte is considered not detected based on data validation.

AW	Agriculture well.
BW	Bore hole well.
DW	Domestic well.
MW	Monitoring well.

TABLE B-5

SUMMARY OF 2010 AND 2012 GROUNDWATER SAMPLE RESULTS
P4 RI/FS

Location Identification		MBW027		MBW027		MBW028		MBW028		MBW032		MBW032 Dup		MBW032		MBW032 Dup		MBW048	
Location Type		BW		BW		BW		BW		BW		BW		BW		BW		BW	
Date Collected		5/21/2010		5/13/2012		5/19/2010		5/13/2012		5/20/2010		5/20/2010		5/14/2012		5/14/2012		5/20/2010	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)																			
Aluminum	0.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.005	<0.0003	**0.000344 J**	--	<0.0012 D	**0.000513 J**	**0.000475 J**	--	<0.0012 D	**0.000899**	**0.00106**	<0.015	**0.00205**	--	**0.00108 F,D**	--	**0.000971 F,D**	<0.0003	<0.0003
Calcium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Total	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	0.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	0.05	--	--	--	<0.004 D	--	--	--	**0.0579 D**	--	--	--	--	--	**0.00977 J+**	--	**0.00699 J+**	--	--
Mercury	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.05	**0.198**	**0.198**	--	**0.36 D**	**0.891**	**0.888**	--	**0.916 D**	**0.756**	**0.723**	**0.776**	**0.634**	--	**1.01 D**	--	**1.01 D**	<0.0005	**0.000534 J**
Silver	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)																			
Alkalinity, Total (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (as Cl)	250	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrogen, nitrate-nitrite	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate (as SO_4)	250	**322**	--	**282 J+**	--	**499**	--	**549 J+**	--	**1110**	--	**1130**	--	**1280 D**	--	**1090 D**	--	**6.09**	--
Suspended solids (Residue, non-filterable)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids (Residue, filterable)	500	--	**830**	--	**666**	--	**1040**	--	**998**	--	**2030**	--	**2000**	--	**2010**	--	**2130**	--	**108**
Radionuclides (PicoCuries/l)																			
alpha, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
beta, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
UK	Analyte is considered not detected based on data validation.

AW	Agriculture well.
BW	Bore hole well.
DW	Domestic well.
MW	Monitoring well.
PW	Production well.

TABLE B-5

SUMMARY OF 2010 AND 2012 GROUNDWATER SAMPLE RESULTS
P4 RI/FS

	Location Identification	**MBW048**		**MBW085**		**MBW085**		**MBW087**		**MBW087**		**MBW099**		**MBW099**		**MBW130**		**MBW130**	
	Location Type	**BW**		**BW**		**BW**		**BW**		**BW**		**BW**		**BW**		**BW**		**BW**	
	Date Collected	**5/14/2012**		**5/19/2010**		**5/12/2012**		**5/19/2010**		**5/11/2012**		**5/23/2010**		**5/14/2012**		**5/18/2010**		**5/15/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)																			
Aluminum	0.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.005	--	<0.0012 D	<0.0003	<0.0003	--	<0.0012 D	<0.0003	<0.0003	--	<0.0012 D	<0.0003	--	--	<0.0012 D	--	<0.0003	--	<0.0012 D
Calcium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Total	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	0.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	0.05	--	**0.362 J+**	--	--	--	**0.03 D**	--	--	--	**0.0203 D**	--	--	--	**0.0116 D**	--	--	--	**0.054 J+**
Mercury	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.05	--	<0.002 D	**0.00206**	**0.00209**	--	**0.00539 B**	**0.003**	**0.0034**	--	**0.00277**	**0.00111**	--	--	**0.0013 F,D**	--	**0.000654 J**	--	**0.00127 F,D**
Silver	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)																			
Alkalinity, Total (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (as Cl)	250	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrogen, nitrate-nitrite	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate (as SO_4)	250	**4.77**	--	**34.3**	--	**35.4 J+**	--	**43.3**	--	**25.2**	--	**31.9**	--	**26**	--	**10.1**	--	**11.9**	--
Suspended solids (Residue, non-filterable)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids (Residue, filterable)	500	--	**106**	--	**222**	--	**164**	--	**254**	--	**234**	--	**282**	--	**174**	--	**148**	--	**180**
Radionuclides (PicoCuries/l)																			
alpha, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
beta, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
UK	Analyte is considered not detected based on data validation.

AW	Agriculture well.
BW	Bore hole well.
DW	Domestic well.
MW	Monitoring well.
PW	Production well.

TABLE B-5

SUMMARY OF 2010 AND 2012 GROUNDWATER SAMPLE RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification	MBW131		MBW131		MBW135		MBW135		MBW152		MBW152		MDW001		MDW002		MDW002 Dup	
	Location Type	BW		BW		BW		BW		BW		BW		DW		DW		DW	
	Date Collected	5/20/2010		5/15/2012		5/21/2010		5/14/2012		5/24/2010		5/15/2012		9/18/2012		9/18/2012		9/18/2012	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.1	--	<0.1	--	<0.1
Antimony	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.005	<0.0003	<0.0003	--	<0.0012 D	<0.0003	<0.0003	--	<0.0012 D	<0.0003	<0.0003	--	<0.0012 D	--	<0.0006	--	<0.0006	--	<0.0006
Calcium	--	--	--	--	--	--	--	--	--	--	--	--	--	**74.6**	--	**43.3**	--	**42.3**	--
Chromium, Total	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.00317**	--	**0.00249**	--	**0.00217**
Cobalt	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--	--	--	--	--	--	--	<0.1	<0.1	<0.1	**0.0737 F**	<0.1	**0.0728 F**
Lead	0.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--	--	--	--	--	--	--	--	**7.67**	--	**16.2**	--	**16.1**	--
Manganese	0.05	--	--	--	<0.004 D	--	--	--	**0.323 D**	--	--	--	**0.108 J+**	--	**0.00108 F**	--	**0.00821**	--	**0.00866**
Mercury	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.73	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.00342 F**	--	**0.00236 F**	--	**0.00252 F**
Potassium	--	--	--	--	--	--	--	--	--	--	--	--	--	**1.23**	--	**2.24**	--	**2.26**	--
Selenium	0.05	**0.00311**	**0.00299**	--	**0.00456 D**	**0.00061 J**	**0.000656 J**	--	<0.002 D	**0.00199**	**0.00206**	--	**0.0023 D**	--	**0.0013**	--	**0.00129**	--	**0.00131**
Silver	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--	--	--	--	--	--	--	**14.8**	--	**17**	--	**17.2**	--
Thallium	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.26	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	--	<0.01	--	<0.01
Zinc	5	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.0924 J**	--	**0.0328 J**	--	**0.0303 J**
Chemistry Parameters (mg/l)																			
Alkalinity, Total (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**194 D**	--	**136 D**	--	**145 D**
Chloride (as Cl)	250	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	**218**	--	**175**	--	**172**	--
Nitrogen, nitrate-nitrite	10	--	--	--	--	--	--	--	--	--	--	--	--	--	**8.66 D**	--	**2.73 D**	--	**2.72 D**
Sulfate (as SO_4)	250	**5.21**	--	**3.63**	--	**42.7**	--	**42.1**	--	**128**	--	**111**	--	**8.89**	--	**29.4**	--	**28.9**	--
Suspended solids (Residue, non-filterable)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<5.0	--	<5.0	--	<5.0
Total dissolved solids (Residue, filterable)	500	--	**82**	--	**86**	--	**256**	--	**258**	--	**510**	--	**434**	--	**282**	--	**258**	--	**256**
Radionuclides (PicoCuries/l)																			
alpha, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<5	--	--	--	--
beta, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<5	--	--	--	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
UK	Analyte is considered not detected based on data validation.

AW	Agriculture well.
BW	Bore hole well.
DW	Domestic well.
MW	Monitoring well.
PW	Production well.

TABLE B-5

SUMMARY OF 2010 AND 2012 GROUNDWATER SAMPLE RESULTS
P4 RI/FS

Location Identification		MDW003		MDW004		MDW005		MDW006		MMW006		MMW006		MMW007		MMW007		MMW009	
Location Type		DW		DW		DW		DW		MW		MW		MW		MW		MW	
Date Collected		9/18/2012		9/19/2012		9/18/2012		9/18/2012		5/17/2010		5/10/2012		5/25/2010		5/13/2012		5/19/2010	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)																			
Aluminum	0.2	--	<0.1	--	<0.1	--	<0.1	--	<0.1	--	--	--	--	--	--	--	--	--	--
Antimony	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.005	--	<0.0006	--	<0.0006	--	<0.0006	--	<0.0006	--	<0.0003	--	<0.0012 D	--	<0.0003	--	<0.0012 D	--	<0.0003
Calcium	--	**66.9**	--	**59.9**	--	**133**	--	**48.9**	--	--	--	--	--	--	--	--	--	--	--
Chromium, Total	0.1	--	**0.00185 F**	--	**0.00251**	--	**0.00243**	--	**0.00303**	--	--	--	--	--	--	--	--	--	--
Cobalt	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	--	--	--	--	--	--	--	--
Lead	0.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.0005
Magnesium	--	**6.83**	--	**22.4**	--	**37.4**	--	**22.3**	--	--	--	--	--	--	--	--	--	--	--
Manganese	0.05	--	**0.00196 F**	--	<0.002	--	<0.002	--	**0.00177 F**	--	--	--	<0.004 D	--	--	--	**0.0215 D**	--	--
Mercury	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.73	--	**0.003 F**	--	**0.00346 F**	--	**0.00813**	--	**0.00278 F**	--	--	--	--	--	--	--	--	--	--
Potassium	--	**0.655 F**	--	**2.17**	--	**2.2**	--	**2.18**	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.05	--	**0.0109**	--	**0.00212**	--	**0.00249**	--	**0.00111**	--	**0.0744**	--	**0.101 D**	--	**0.00155**	--	**0.00176 F,B**	--	<0.0005
Silver	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	--	**5.78**	--	**20.2**	--	**14.7**	--	**35.5**	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.26	--	<0.01	--	<0.01	--	<0.01	--	<0.01	--	--	--	--	--	--	--	--	--	--
Zinc	5	--	<0.025 UJ	--	**0.0291 J**	--	<0.025 UJ	--	**0.0716 J**	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)																			
Alkalinity, Total (as $CaCO_3$)	--	--	**189 D**	--	**282 J-**	--	**467 D**	--	**139 D**	--	--	--	--	--	--	--	--	--	--
Chloride (as Cl)	250	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as $CaCO_3$)	--	**195**	--	**242**	--	**486**	--	**214**	--	--	--	--	--	--	--	--	--	--	--
Nitrogen, nitrate-nitrite	10	--	**0.469**	--	**4.36 D**	--	**0.222**	--	**2.36 D**	--	--	--	--	--	--	--	--	--	--
Sulfate (as SO_4)	250	**9.54**	--	**18.7**	--	**47.1**	--	**105**	--	**65.8**	--	**77.3**	--	**22.3**	--	**5.8 J+;27.4 J-**	--	**57.2**	--
Suspended solids (Residue, non-filterable)	--	--	<5.0	--	<5.0	--	<5.0	--	<5.0	--	--	--	--	--	--	--	--	--	--
Total dissolved solids (Residue, filterable)	500	--	**222**	--	**338**	--	**516**	--	**368**	--	**330**	--	**310**	--	**168**	--	**144 J**	--	**388**
Radionuclides (PicoCuries/l)																			
alpha, Gross	--	--	**29.2**	--	<5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
beta, Gross	--	--	**9.01**	--	<5	--	--	--	--	--	--	--	--	--	--	--	--	--	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
UK	Analyte is considered not detected based on data validation.

AW	Agriculture well.
BW	Bore hole well.
DW	Domestic well.
MW	Monitoring well.
PW	Production well.

TABLE B-5

SUMMARY OF 2010 AND 2012 GROUNDWATER SAMPLE RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification	MMW009		MMW010		MMW010		MMW011		MMW011		MMW013		MMW013		MMW013		MMW017	
	Location Type	MW		MW		MW		MW		MW		MW		MW		MW		MW	
	Date Collected	5/8/2012		5/23/2010		9/17/2010		5/16/2010		5/13/2012		5/20/2010		9/17/2010		5/12/2012		5/16/2010	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.005	--	**0.000683**	--	**0.00448**	--	**0.00421**	--	**0.000569 J**	--	<0.0012 D	--	<0.0003	--	<0.0003	--	<0.0012 D	--	**0.000596 J**
Calcium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Total	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	0.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	0.05	--	**0.0885**	--	--	--	--	--	--	--	**0.00339 F,D**	--	--	--	--	--	**0.0055 D**	--	--
Mercury	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.05	--	**0.000521 F**	--	**0.105**	--	**0.0213**	--	**0.00153**	--	**0.00124 F,B**	--	**0.109**	--	**0.108**	--	**0.148 D**	--	**0.108**
Silver	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)																			
Alkalinity, Total (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (as Cl)	250	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrogen, nitrate-nitrite	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate (as SO_4)	250	**65.3 J+**	--	**599**	--	**674**	--	**87.7**	--	**69 J+**	--	**243**	--	**253**	--	**239 J+**	--	**481**	--
Suspended solids (Residue, non-filterable)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids (Residue, filterable)	500	--	**300**	--	**1330**	--	**1280**	--	**438**	--	**320**	--	**498**	--	**534**	--	**458**	--	**1090**
Radionuclides (PicoCuries/l)																			
alpha, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
beta, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
UK	Analyte is considered not detected based on data validation.

AW	Agriculture well.
BW	Bore hole well.
DW	Domestic well.
MW	Monitoring well.
PW	Production well.

TABLE B-5

SUMMARY OF 2010 AND 2012 GROUNDWATER SAMPLE RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification	MMW017		MMW018		MMW018 Dup		MMW018		MMW020		MMW020		MMW021		MMW021		MMW022	
	Location Type	MW		MW		MW		MW		MW		MW		MW		MW		MW	
	Date Collected	5/13/2012		5/15/2010		5/15/2010		5/15/2012		5/17/2010		5/10/2012		5/18/2010		5/10/2012		5/22/2010	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.005	--	<0.0012 D	--	<0.0003	--	<0.0003	--	<0.0012	--	**0.0106**	--	**0.0112 D**	--	<0.0003	--	<0.0012 D	--	<0.0003
Calcium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Total	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	0.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	0.05	--	**0.00841 D**	--	--	--	--	--	**0.0783 J+**	--	--	--	<0.004 D	--	--	--	<0.004 D	--	--
Mercury	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.05	--	**0.321 D**	--	**0.0256**	--	**0.0262**	--	**0.0369**	--	**0.0491**	--	**0.439 D**	--	**0.0485**	--	**0.0467 D**	--	**0.0215**
Silver	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)																			
Alkalinity, Total (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (as Cl)	250	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrogen, nitrate-nitrite	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate (as SO_4)	250	**483 J+**	--	**44.9**	--	**44.5**	--	**42.8**	--	**139**	--	**229 D**	--	**48.1**	--	**52.6**	--	**257**	--
Suspended solids (Residue, non-filterable)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids (Residue, filterable)	500	--	**864**	--	**248**	--	**302**	--	**266**	--	**346 J-,B**	--	**458**	--	**406**	--	**296**	--	**618**
Radionuclides (PicoCuries/l)																			
alpha, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
beta, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
UK	Analyte is considered not detected based on data validation.

AW	Agriculture well.
BW	Bore hole well.
DW	Domestic well.
MW	Monitoring well.
PW	Production well.

TABLE B-5

SUMMARY OF 2010 AND 2012 GROUNDWATER SAMPLE RESULTS
P4 RI/FS

	Location Identification	**MMW022**		**MMW023**		**MMW023**		**MMW024**		**MMW025**		**MMW025**		**MMW026**		**MMW027**		**MMW027**	
	Location Type	**MW**		**MW**		**MW**		**MW**		**MW**		**MW**		**MW**		**MW**		**MW**	
	Date Collected	**5/16/2012**		**5/21/2010**		**5/13/2012**		**5/12/2012**		**6/17/2010**		**5/15/2012**		**5/9/2012**		**5/17/2010**		**5/8/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)																			
Aluminum	0.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.005	--	<0.0012 D	--	<0.0003	--	<0.0012 D	--	<0.0012 D	--	<0.0003	--	<0.0012	--	<0.0006	--	<0.0003	--	<0.0006
Calcium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Total	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	0.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	0.05	--	**0.128 D**	--	--	--	**0.448 D**	--	<0.004 D	--	--	--	**0.00403 J+**	--	**0.00758**	--	--	--	<0.002
Mercury	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.05	--	**0.041 D**	--	**0.0017**	--	**0.00256**	--	**0.0818 D**	--	<0.0005	--	**0.0012 F**	--	**0.000841 F**	--	**0.319**	--	**0.888 D**
Silver	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)																			
Alkalinity, Total (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (as Cl)	250	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrogen, nitrate-nitrite	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate (as SO_4)	250	**251 D**	--	**198**	--	**217 J+**	--	**302 J+**	--	**13**	--	**11.7**	--	**21.9**	--	**247**	--	**427 J+**	--
Suspended solids (Residue, non-filterable)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids (Residue, filterable)	500	--	**672**	--	**670**	--	**634**	--	**606**	--	**190**	--	**162**	--	**382**	--	**728 J-,B**	--	**986**
Radionuclides (PicoCuries/l)																			
alpha, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
beta, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
UK	Analyte is considered not detected based on data validation.

AW	Agriculture well.
BW	Bore hole well.
DW	Domestic well.
MW	Monitoring well.
PW	Production well.

TABLE B-5

SUMMARY OF 2010 AND 2012 GROUNDWATER SAMPLE RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification	MMW028		MMW028		MMW028 Dup		MMW029		MMW029		MMW029 Dup		MMW029		MMW030		MMW030	
	Location Type	MW		MW		MW		MW		MW		MW		MW		MW		MW	
	Date Collected	5/16/2010		5/13/2012		5/13/2012		5/15/2010		9/17/2010		9/17/2010		5/15/2012		5/19/2010		5/15/2012	
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Aluminum	0.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.005	--	<0.0003	--	<0.0012 D	--	<0.0012 D	--	<0.0003	--	<0.0003	--	<0.0003	--	<0.0012	--	<0.0003	--	<0.0012
Calcium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Total	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	0.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	0.05	--	--	--	<0.004 D	--	<0.004 D	--	--	--	--	--	--	--	<0.004	--	--	--	**0.0404 J+**
Mercury	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.05	--	**0.00309**	--	**0.00936 D**	--	**0.0115 B**	--	**0.724**	--	**0.71**	--	**0.629**	--	**0.783**	--	<0.0005	--	<0.002
Silver	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	0.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry Parameters (mg/l)																			
Alkalinity, Total (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (as Cl)	250	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as $CaCO_3$)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrogen, nitrate-nitrite	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate (as SO_4)	250	**71.2**	--	**72.6 J+**	--	**72.8 J+**	--	**592**	--	**601**	--	**597**	--	**604 D**	--	**17.2**	--	**13.5**	--
Suspended solids (Residue, non-filterable)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids (Residue, filterable)	500	--	**380**	--	**294**	--	**312**	--	**1300**	--	**1060**	--	**1190**	--	**1210**	--	**232**	--	**208**
Radionuclides (PicoCuries/l)																			
alpha, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
beta, Gross	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
UK	Analyte is considered not detected based on data validation.

AW	Agriculture well.
BW	Bore hole well.
DW	Domestic well.
MW	Monitoring well.
PW	Production well.

TABLE B-5

SUMMARY OF 2010 AND 2012 GROUNDWATER SAMPLE RESULTS
P4 RI/FS

Location Identification		MMW031		MMW031		MMW032		MMW032		MMW033		MMW033		MMW034		MMW034 Dup		MMW034	
Location Type		MW		MW		MW		MW		MW		MW		MW		MW		MW	
Date Collected		5/17/2010		5/14/2012		5/20/2010		5/16/2012		5/20/2010		5/14/2012		5/21/2010		5/21/2010		5/12/2012	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)																			
Aluminum	0.2	--	--	--	--	--	**0.196**	--	--	--	**0.594**	--	--	--	<0.05	--	<0.05	--	--
Antimony	0.006	--	--	--	--	--	<0.0005	--	--	--	**0.000542 J**	--	--	--	<0.0005	--	<0.0005	--	--
Arsenic	0.01	--	--	--	--	--	**0.000815 J**	--	--	--	**0.0149**	--	--	--	**0.000637 J**	--	<0.0005	--	--
Barium	2	--	--	--	--	--	**0.0509**	--	--	--	**0.0261**	--	--	--	**0.0264**	--	**0.0274**	--	--
Beryllium	0.004	--	--	--	--	--	<0.0005	--	--	--	<0.0005	--	--	--	<0.0005	--	<0.0005	--	--
Cadmium	0.005	--	<0.0003	--	<0.0012 D	--	**0.000315 J**	--	<0.0012 D	--	<0.0003	--	<0.0012 D	--	<0.0003	--	<0.0003	--	<0.0012 D
Calcium	--	--	--	--	--	**50.6**	--	--	--	**21.1**	--	--	--	**111**	--	**112**	--	--	--
Chromium, Total	0.1	--	--	--	--	--	**0.00474**	--	--	--	**0.00237**	--	--	--	**0.00158 J**	--	**0.00176 J**	--	--
Cobalt	0.011	--	--	--	--	--	<0.0005	--	--	--	<0.0005	--	--	--	<0.0005	--	<0.0005	--	--
Copper	1.3	--	--	--	--	--	<0.001	--	--	--	<0.001	--	--	--	<0.001	--	<0.001	--	--
Iron	0.3	--	--	--	--	**0.0323 J**	**0.136 J**	--	--	**0.0392 J**	**0.273 J**	--	--	<0.025	<0.025	**0.0312 J**	**0.0305 J**	--	--
Lead	0.015	--	--	--	--	--	**0.000544 J**	--	--	--	**0.000523 J**	--	--	--	<0.0005	--	<0.0005	--	--
Magnesium	--	--	--	--	--	**15.1**	--	--	--	**14.1**	--	--	--	**5.97**	--	**5.87**	--	--	--
Manganese	0.05	--	--	--	<0.004 D	--	**0.0216**	--	**0.00493 D**	--	**0.0561**	--	**0.0578 D**	--	**0.00123 J-**	--	**0.00146 J-**	--	<0.004 D
Mercury	0.002	--	--	--	--	--	<0.0001	--	--	--	<0.0001	--	--	--	<0.0001	--	<0.0001	--	--
Molybdenum	0.18	--	--	--	--	--	<0.005	--	--	--	**0.0239 J**	--	--	--	<0.005	--	<0.005	--	--
Nickel	0.73	--	--	--	--	--	**0.00299 J**	--	--	--	<0.002	--	--	--	**0.00394 J-**	--	**0.00331 J-**	--	--
Potassium	--	--	--	--	--	**0.879 J**	--	--	--	**0.822 J**	--	--	--	**0.759 J**	--	**0.746 J**	--	--	--
Selenium	0.05	--	**0.001**	--	**0.00141 F,D**	--	**0.00133**	--	**0.00174 F,D**	--	**0.00101**	--	<0.002 D	--	**0.0731**	--	**0.0709**	--	**0.13 D**
Silver	0.1	--	--	--	--	--	**0.0165**	--	--	--	<0.0005	--	--	--	<0.0005	--	<0.0005	--	--
Sodium	--	--	--	--	--	**8.67**	--	--	--	**76.7**	--	--	--	**4.32**	--	**4.31**	--	--	--
Thallium	0.002	--	--	--	--	--	<0.0001	--	--	--	<0.0001	--	--	--	<0.0001	--	<0.0001	--	--
Uranium, Total	--	--	--	--	--	--	**0.0027**	--	--	--	**0.0172**	--	--	--	<0.0005	--	<0.0005	--	--
Vanadium	0.26	--	--	--	--	--	<0.005	--	--	--	<0.005	--	--	--	<0.005	--	<0.005	--	--
Zinc	5	--	--	--	--	--	<0.0125 UJ	--	--	--	<0.0125 UJ	--	--	--	<0.0125 UJ	--	<0.0125 UJ	--	--
Chemistry Parameters (mg/l)																			
Alkalinity, Total (as $CaCO_3$)	--	--	--	--	--	**204**	--	--	--	**253**	--	--	--	**138**	--	**152**	--	--	--
Chloride (as Cl)	250	--	--	--	--	**3.93**	--	--	--	**5.1**	--	--	--	**7.12 J-**	--	**7.1 J-**	--	--	--
Hardness (as $CaCO_3$)	--	--	--	--	--	**188**	--	--	--	**111**	--	--	--	**302**	--	**305**	--	--	--
Nitrogen, nitrate-nitrite	10	--	--	--	--	**0.485**	--	--	--	**0.026 J**	--	--	--	**0.403**	--	**0.431**	--	--	--
Sulfate (as SO_4)	250	**3.41**	--	**3.01**	--	**5.16**	--	**1.18**	--	**37.9**	--	**27.6**	--	**179**	--	**180**	--	**184 J+**	--
Suspended solids (Residue, non-filterable)	--	--	--	--	--	--	**5.5**	--	--	--	**9.0**	--	--	--	<2.5	--	<2.5	--	--
Total dissolved solids (Residue, filterable)	500	--	**172**	--	**148**	--	**226**	--	**206**	--	**324**	--	**252**	--	**432**	--	**428**	--	**394**
Radionuclides (PicoCuries/l)																			
alpha, Gross	--	--	--	--	--	4.08 UK	5.85 UK	--	--	**26.4**	**27.8**	--	--	--	<3.83	--	<4.22	--	--
beta, Gross	--	--	--	--	--	<4.97	5.76 UK	--	--	**8.34**	**8.86**	--	--	--	<4.25	--	<4.19	--	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
UK	Analyte is considered not detected based on data validation.
AW	Agriculture well.
BW	Bore hole well.
DW	Domestic well.
MW	Monitoring well.
PW	Production well.

TABLE B-5

SUMMARY OF 2010 AND 2012 GROUNDWATER SAMPLE RESULTS
P4 RI/FS

Location Identification		MMW034 Dup		MMW035		MMW035		MMW036		MMW036		MMW037		MMW037		MMW037 Dup		MMW10		MW15A	
Location Type		MW		MW		MW		MW		MW		MW		MW		MW		MW		MW	
Date Collected		5/12/2012		5/21/2010		5/9/2012		5/21/2010		5/8/2012		9/23/2010		5/9/2012		5/9/2012		5/14/2012		5/22/2010	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Total**	**Dissolved**	**Total**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)																					
Aluminum	0.2	--	--	--	**0.0579 J**	--	--	--	**0.0784 J**	--	--	<0.05	**0.209**	--	**0.195**	--	--	--	--
Antimony	0.006	--	--	--	<0.0005	--	--	--	<0.0005	--	--	--	<0.001	--	<0.001	--	--	--	--
Arsenic	0.01	--	--	--	<0.0005	--	--	--	**0.00108**	--	--	--	**0.000567 F**	--	**0.000563 F**	--	--	--	--
Barium	2	--	--	--	**0.0502**	--	--	--	**0.021**	--	--	--	**0.0158**	--	**0.0158**	--	--	--	--
Beryllium	0.004	--	--	--	<0.0005	--	--	--	<0.0005	--	--	--	<0.002	--	<0.002	--	--	--	--
Cadmium	0.005	--	<0.0012 D	--	<0.0003	--	<0.0006	--	<0.0003	<0.0006	--	<0.0003	<0.0006	--	<0.0006	--	**0.00628 D**	--	<0.0003
Calcium	--	--	--	**206**	--	--	--	**47.6**	--	--	**53.8**	--	--	**50.6**	--	--	--	--	--
Chromium, Total	0.1	--	--	--	**0.0143**	--	--	--	**0.00171 J**	--	--	--	**0.00192 F**	--	**0.00157 F**	--	--	--	--
Cobalt	0.011	--	--	--	**0.00893**	--	--	--	<0.0005	--	--	--	<0.001	--	<0.001	--	--	--	--
Copper	1.3	--	--	--	**0.00974**	--	--	--	<0.001	--	--	--	<0.002	--	<0.002	--	--	--	--
Iron	0.3	--	--	<0.025	**21.4**	--	--	<0.025	**0.0679 J**	--	<0.025	**0.0311 J**	**0.184**	<0.1	**0.17**	--	--	--	--
Lead	0.015	--	--	--	<0.0005	--	--	--	<0.0005	--	--	--	<0.001	--	<0.001	--	--	--	--
Magnesium	--	--	--	**61.3**	--	--	--	**15.5**	--	--	**17.6**	--	--	**19.7**	--	--	--	--	--
Manganese	0.05	--	<0.004 D	--	**0.0789 J-**	--	**0.00471**	--	**0.00515 J-**	<0.002	--	**0.00675**	**0.0221**	--	**0.0217**	--	**0.133 D**	--	--
Mercury	0.002	--	--	--	<0.0001	--	--	--	<0.0001	--	--	--	<0.0002	--	<0.0002	--	--	--	--
Molybdenum	0.18	--	--	--	<0.005	--	--	--	<0.005	--	--	--	<0.1	--	<0.1	--	--	--	--
Nickel	0.73	--	--	--	**0.0242 J-**	--	--	--	<0.002 UJ	--	--	<0.002	**0.00208 F**	--	<0.004	--	--	--	--
Potassium	--	--	--	**1.48**	--	--	--	**0.827 J**	--	--	**1.06**	--	--	**1.22**	--	--	--	--	--
Selenium	0.05	--	**0.139 D**	--	**0.835**	--	**1.29 D**	--	**0.00646**	**0.0151**	--	**0.00876**	**0.0188**	--	**0.0185**	--	**0.0976 D**	--	**2.46**
Silver	0.1	--	--	--	<0.0005	--	--	--	<0.0005	--	--	--	<0.001	--	<0.001	--	--	--	--
Sodium	--	--	--	**9.03**	--	--	--	**22.8**	--	--	**6.17**	--	--	**6.26**	--	--	--	--	--
Thallium	0.002	--	--	--	<0.0001	--	--	--	<0.0001	--	--	--	<0.0002	--	<0.0002	--	--	--	--
Uranium, Total	--	--	--	--	**0.00247**	--	--	--	**0.00162**	--	--	--	**0.00107**	--	**0.00108**	--	--	--	--
Vanadium	0.26	--	--	--	<0.005	--	--	--	<0.005	--	--	<0.005	<0.01	--	**0.00505 F**	--	--	--	--
Zinc	5	--	--	--	<0.0125 UJ	--	--	--	<0.0125 UJ	--	--	<0.0125	<0.025	--	<0.025	--	--	--	--
Chemistry Parameters (mg/l)																					
Alkalinity, Total (as $CaCO_3$)	--	--	--	**359**	--	--	--	**193**	--	--	**186**	--	--	**198**	--	--	--	--	--
Chloride (as Cl)	250	--	--	**16.4 J-**	--	--	--	**7.43 J-**	--	--	**7.03**	--	--	**6.98**	--	--	--	--	--
Hardness (as $CaCO_3$)	--	--	--	**766**	--	--	--	**183**	--	--	**207**	--	--	**208**	--	--	--	--	--
Nitrogen, nitrate-nitrite	10	--	--	**1.52**	--	--	--	**1.49**	--	--	**1.48**	--	--	**2.36 J-**	--	--	--	--	--
Sulfate (as SO_4)	250	**184 J+**	--	**422**	--	**537 D**	--	**39**	--	--	**21.1**	--	--	**25**	--	**782 D**	--	**690**	--
Suspended solids (Residue, non-filterable)	--	--	--	--	<2.5	--	--	--	<2.5	--	--	<2.5	**3.5 F**	--	**3.5 F**	--	--	--	--
Total dissolved solids (Residue, filterable)	500	--	**392**	--	**1030**	--	**1340**	--	**248**	**362**	--	**244**	**264**	--	**374**	--	**1720**	--	**1410**
Radionuclides (PicoCuries/l)																					
alpha, Gross	--	--	--	--	<4.24	--	--	--	<3.85	--	--	<4.04	<3.22;<5	--	<5;<3.59	--	--	--	--
beta, Gross	--	--	--	--	<4.25	--	--	--	<4.39	--	--	<4.34	<3.8;<5	--	<5;<3.85	--	--	--	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias is unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
J-	Data are estimated due to associated quality control data. Potential low bias.
UJ	Potential low bias, possible false negative.
UK	Analyte is considered not detected based on data validation.

AW	Agriculture well.
BW	Bore hole well.
DW	Domestic well.
MW	Monitoring well.
PW	Production well.

TABLE B-5

SUMMARY OF 2010 AND 2012 GROUNDWATER SAMPLE RESULTS
P4 RI/FS

	Location Identification	**MW15A**		**MW16A**		**MW16A**	
	Location Type	**MW**		**MW**		**MW**	
	Date Collected	**5/15/2012**		**5/21/2010**		**5/15/2012**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Metals (mg/l)							
Aluminum	0.2	--	--	--	--	--	--
Antimony	0.006	--	--	--	--	--	--
Arsenic	0.01	--	--	--	--	--	--
Barium	2	--	--	--	--	--	--
Beryllium	0.004	--	--	--	--	--	--
Cadmium	0.005	--	<0.0012	--	<0.0003	--	<0.0012 D
Calcium	--	--	--	--	--	--	--
Chromium, Total	0.1	--	--	--	--	--	--
Cobalt	0.011	--	--	--	--	--	--
Copper	1.3	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--
Lead	0.015	--	--	--	--	--	--
Magnesium	--	--	--	--	--	--	--
Manganese	0.05	--	**0.00641 J+**	--	--	--	**0.82 J+**
Mercury	0.002	--	--	--	--	--	--
Molybdenum	0.18	--	--	--	--	--	--
Nickel	0.73	--	--	--	--	--	--
Potassium	--	--	--	--	--	--	--
Selenium	0.05	--	**3.2**	--	**0.0151**	--	**0.0019 F,D**
Silver	0.1	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--
Thallium	0.002	--	--	--	--	--	--
Uranium, Total	--	--	--	--	--	--	--
Vanadium	0.26	--	--	--	--	--	--
Zinc	5	--	--	--	--	--	--
Chemistry Parameters (mg/l)							
Alkalinity, Total (as $CaCO_3$)	--	--	--	--	--	--	--
Chloride (as Cl)	250	--	--	--	--	--	--
Hardness (as $CaCO_3$)	--	--	--	--	--	--	--
Nitrogen, nitrate-nitrite	10	--	--	--	--	--	--
Sulfate (as SO_4)	250	**719 D**	--	**768**	--	**543 D**	--
Suspended solids (Residue, non-filterable)	--	--	--	--	--	--	--
Total dissolved solids (Residue, filterable)	500	--	**1450**	--	**1350**	--	**942**
Radionuclides (PicoCuries/l)							
alpha, Gross	--	--	--	--	--	--	--
beta, Gross	--	--	--	--	--	--	--

mg/l	milligrams per liter.	AW	Agriculture well.
Bold	Bolded result indicates positively identified compound.	BW	Bore hole well.
--	Not scheduled.	DW	Domestic well.
B	Analyte detected in an associated blank.	MW	Monitoring well.
D	Sample dilution required for analysis; reported values reflect the dilution.	PW	Production well.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.		
J	Data are estimated due to associated quality control data. Bias is unknown.		
J+	Data are estimated due to associated quality control data. Potential high bias.		
J-	Data are estimated due to associated quality control data. Potential low bias.		
UJ	Potential low bias, possible false negative.		
UK	Analyte is considered not detected based on data validation.		

APPENDIX C - 2010 DIRECT PUSH BOREHOLE INSTALLATION ANALYTICAL DATA

TABLE C-1

SUMMARY OF 2010 DIRECT PUSH BOREHOLE GROUNDWATER RESULTS
P4 RI/FS
(Page 1 of 2)

Analyte/Methods (Units)	Location Identification Mine Date Collected	BH159 Ballard 8/19/2010	BH160 Ballard 8/19/2010	BH161 Ballard 8/19/2010	BH162 Ballard 8/19/2010	BH164 Ballard 8/18/2010	BH166 Ballard 8/18/2010	BH166 Dup Ballard 8/18/2010
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Dissolved**	**Dissolved**	**Dissolved**	**Dissolved**	**Dissolved**	**Dissolved**
Selenium	0.05	**0.0409**	**0.000676 J**	**0.0164**	**0.00195**	**0.0108**	**0.000567 J**	**0.00143**
Chemistry Parameters (mg/l)								
Nitrogen, nitrate-nitrite	10	--	--	--	--	**0.932 J**	**0.207 J**	**0.165 J**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
J Data are estimated due to associated quality control data.

TABLE C-1

SUMMARY OF 2010 DIRECT PUSH BOREHOLE GROUNDWATER RESULTS
P4 RI/FS
(Page 2 of 2)

Analyte/Methods (Units)	Location Identification / Mine / Date Collected	BH167 Henry 8/17/2010	BH169 Henry 8/17/2010	BH171 Henry 8/17/2010	BH172 Ballard 8/19/2010
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Dissolved**	**Dissolved**	**Dissolved**
Selenium	0.05	**0.0183**	**0.00157**	<0.0005	**0.0144**
Chemistry Parameters (mg/l)					
Nitrogen, nitrate-nitrite	10	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
J Data are estimated due to associated quality control data.

APPENDIX D - 2010 RIPARIAN SOIL / SEDIMENT / SURFACE WATER ANALYTICAL DATA

D-1 2010 Riparian Soil Analytical Data

D-2 2010 Riparian Sediment Analytical Data

D-3 2010 Riparian Surface Water Analytical Data

D-1 2010 Riparian Soil Analytical Data

TABLE D-1

SUMMARY OF 2010 RIPARIAN SOIL SAMPLE RESULTS
P4 RI/FS
(Page 1 of 9)

Location Identification **Field Sample Identification** **Date Collected** **Analyte/Methods (Units)**	**Screening Limits**	**MST053** **1010-MST053-RS-001** **10/3/2010**	**MST053** **1010-MST053-RS-002** **10/3/2010**	**MST066** **1010-MST066-RS-001-1** **10/3/2010**	**MST066 Dup** **1010-MST066-RS-001-2** **10/3/2010**	**MST066** **1010-MST066-RS-002** **10/3/2010**
Metals (mg/kg)						
Antimony	0.27	<3.0	**7.0 J**	**3.0 J-**	**4.5 J-**	**3.3 J-**
Arsenic	0.39	**1.12**	**1.3**	**6.4**	**8.19**	**5.36**
Boron	0.5	**5.7 J**	**3.5 J**	**9.3 J**	**15.9**	**8.3 J**
Cadmium	0.36	**1.3**	**0.392**	**3.7**	**2.66**	**3.33**
Chromium, Total	0.4	**16.5**	**21.5**	**16.6**	**11.2**	**15.3**
Cobalt	13	**4.25**	**4.32**	**8.4**	**7.16**	**7.28**
Copper	28	**11.7**	**5.8**	**18.9**	**13.5**	**18**
Manganese	220	**145**	**146**	**268 J+**	**357 J+**	**255 J+**
Mercury	0.1	**0.023**	**0.024**	**0.049**	**0.073**	**0.052**
Molybdenum	2	<0.5	<0.5	0.9 UB	**2.5 B**	0.9 UB
Nickel	38	**10.3**	**11**	**22.8**	**23.4**	**21.2**
Selenium	0.52	**1.4**	**0.8 J**	**3.1**	**3.4**	**2.7**
Silver	4.2	**0.125**	**0.121**	**0.167**	**0.172**	**0.166**
Thallium	0.78	**0.105**	**0.11**	**0.178**	**0.187**	**0.164**
Uranium	5	**1.66**	**0.748**	**3.54**	**3.48**	**3.26**
Vanadium	2	**14.7**	**24.2**	**37.1**	**26.9**	**34.4**
Zinc	46	**65.4**	**64.3**	**94.4**	**61.7**	**87.3**
Chemistry Parameters (Percent)						
Total organic carbon	--	**5**	**1.36**	**7.31**	**6.86**	**7.01**
Total solids	--	**73.4**	--	**82.6**	**65.4**	**28.8**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-1

SUMMARY OF 2010 RIPARIAN SOIL SAMPLE RESULTS
P4 RI/FS
(Page 2 of 9)

Location Identification		**MST067**	**MST067**	**MST089**	**MST089**
Field Sample Identification		**1010-MST067-RS-001-1**	**1010-MST067-RS-002**	**1010-MST089-RS-001**	**1010-MST089-RS-002**
Date Collected		**10/3/2010**	**10/3/2010**	**10/5/2010**	**10/5/2010**
Analyte/Methods (Units)	**Screening Limits**				
Metals (mg/kg)					
Antimony	0.27	5.7 UB	7.1 UB	**3.0 J-,B**	**4.1 J-,B**
Arsenic	0.39	**5.49**	**8.91**	**1.83**	**3.44**
Boron	0.5	**10.7**	**14.4**	**10.3**	**10.8**
Cadmium	0.36	**6.92**	**14.5**	**3.89**	**4.85**
Chromium, Total	0.4	**34.7**	**66.5**	**25.9**	**30.4**
Cobalt	13	**7.0**	**5.16**	**3.6 J**	**4.88 J**
Copper	28	**19.9**	**33.6**	**21.6**	**21.9**
Manganese	220	**448**	**239**	**161**	**123**
Mercury	0.1	**0.051 J-**	**0.079 J-**	**0.054**	**0.068**
Molybdenum	2	**2.6**	**5.2**	<0.5	<0.5
Nickel	38	**35.7**	**71.6**	**19.3**	**25.7**
Selenium	0.52	**30.4**	**100**	**4.7**	**7.6**
Silver	4.2	**0.629**	**1.38**	**0.315**	**0.459**
Thallium	0.78	**0.44**	**0.668**	**0.173**	**0.241**
Uranium	5	**4.46**	**8.74**	**3.04**	**2.31**
Vanadium	2	**54.3**	**122**	**29.7**	**32.8**
Zinc	46	**209**	**424**	**136**	**162**
Chemistry Parameters (Percent)					
Total organic carbon	--	**4.89**	**5.71**	**12.4**	**13.5**
Total solids	--	**91.9**	**90.9**	**51.2**	**47.1**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-1

SUMMARY OF 2010 RIPARIAN SOIL SAMPLE RESULTS
P4 RI/FS

Location Identification Field Sample Identification Date Collected Analyte/Methods (Units)	Screening Limits	MST092 1010-MST092-RS-001 10/4/2010	MST092 1010-MST092-RS-002 10/4/2010	MST093 1010-MST093A-RS-001-1 10/4/2010	MST093 Dup 1010-MST093A-RS-001-2 10/4/2010	MST093 1010-MST093A-RS-002-1 10/4/2010
Metals (mg/kg)						
Antimony	0.27	**6.4 J-,B**	**4.7 J-,B**	**3.2 J-,B**	**6.1 J-,B**	**3.9 J-,B**
Arsenic	0.39	**2.29**	**2.5**	**3.03**	**3.05**	**3.05**
Boron	0.5	**9.3 J**	**10.4**	**10.1**	**9.8 J**	**9.7 J**
Cadmium	0.36	**5.84**	**4.49**	**1.81**	**1.99**	**3.63**
Chromium, Total	0.4	**42.9**	**36.4**	**18.7**	**18.3**	**17**
Cobalt	13	**2.67 J**	**2.33 J**	**5.14**	**5.01 J**	**4.58 J**
Copper	28	**25.2**	**23.7**	**17.5**	**18**	**17.6**
Manganese	220	**67.6**	**52.4**	**543**	**922**	**337**
Mercury	0.1	**0.06**	**0.082**	**0.023**	**0.024**	**0.046**
Molybdenum	2	0.8 UB	0.7 UB	<0.5	<0.5	<0.5
Nickel	38	**23.2**	**19.1**	**16**	**17.4**	**18.9**
Selenium	0.52	**7.6**	**5.5**	**0.7 J**	**0.7 J**	**1.4**
Silver	4.2	**0.709**	**0.635**	**0.164**	**0.155**	**0.194**
Thallium	0.78	**0.257**	**0.196**	**0.186**	**0.189**	**0.167**
Uranium	5	**3.14**	**3.71**	**2.21**	**2.29**	**3.69**
Vanadium	2	**45.1**	**53.2**	**23.5**	**24.6**	**24.9**
Zinc	46	**206**	**147**	**105**	**105**	**122**
Chemistry Parameters (Percent)						
Total organic carbon	--	**13.4**	**12.8**	**5.6**	**5.31**	**10.5**
Total solids	--	**44.3**	**36.8**	**91.9**	**92**	**79.4**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-1

SUMMARY OF 2010 RIPARIAN SOIL SAMPLE RESULTS
P4 RI/FS

Location Identification Field Sample Identification Date Collected Analyte/Methods (Units)	Screening Limits	MST093 Dup 1010-MST093A-RS-002-2 10/4/2010	MST093 1010-MST093B-RS-001 10/4/2010	MST093 1010-MST093B-RS-002 10/4/2010	MST095 1010-MST095-RS-001 10/4/2010	MST095 1010-MST095-RS-002 10/4/2010
Metals (mg/kg)						
Antimony	0.27	**4.8 J-,B**	**4.4 J-,B**	**3.6 J-,B**	**6.0 J-,B**	**6.3 J-,B**
Arsenic	0.39	**2.94**	**4.24**	**2.78**	**5.73**	**8.51**
Boron	0.5	**9.9 J**	**10**	**11.2**	**12.1**	**14.1**
Cadmium	0.36	**3.49**	**2.43**	**3.51**	**9.87**	**15.8**
Chromium, Total	0.4	**16.7**	**18.4**	**16.7**	**57.3**	**96.3**
Cobalt	13	**4.38 J**	**7.99 J**	**5.09 J**	**6.64 J**	**5.55 J**
Copper	28	**18.2**	**18.2**	**17.6**	**25.9**	**36.7**
Manganese	220	**351**	**1080**	**527**	**854**	**876**
Mercury	0.1	**0.049**	**0.035**	**0.069**	**0.058**	**0.109**
Molybdenum	2	<0.5	**0.7 J**	<0.5	**2.7 B**	**6.2**
Nickel	38	**18.3**	**19**	**17.1**	**38.3**	**73.8**
Selenium	0.52	**1.3**	**1.0 J**	**1.5**	**3.4**	**5.9**
Silver	4.2	**0.215**	**0.158**	**0.223**	**1.04**	**1.55**
Thallium	0.78	**0.176**	**0.16**	**0.17**	**0.275**	**0.681**
Uranium	5	**3.83**	**2.54**	**2.03**	**7.79**	**8.9**
Vanadium	2	**24.4**	**32.2**	**24.3**	**53**	**135**
Zinc	46	**120**	**104**	**117**	**270**	**459**
Chemistry Parameters (Percent)						
Total organic carbon	--	**11.6**	**7.54**	**16**	**6.24**	**4.78**
Total solids	--	**78.6**	**88.2**	**62.7**	**90.6**	**93.3**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-1

SUMMARY OF 2010 RIPARIAN SOIL SAMPLE RESULTS
P4 RI/FS
(Page 5 of 9)

Location Identification **Field Sample Identification** **Date Collected** **Analyte/Methods (Units)**	**Screening Limits**	**MST131** **1010-MST131-RS-001** **10/2/2010**	**MST131** **1010-MST131-RS-002** **10/2/2010**	**MST272** **1010-MST272-RS-001** **10/5/2010**	**MST272** **1010-MST272-RS-002** **10/5/2010**
Metals (mg/kg)					
Antimony	0.27	**11 B**	6.3 UB	4.6 UB	7.8 UB
Arsenic	0.39	**4.23**	**4.43**	**2.93**	**3.12**
Boron	0.5	**10.1**	**11.3**	**12.3**	**9.8 J**
Cadmium	0.36	**1.22**	**1.65**	**2.65**	**2.64**
Chromium, Total	0.4	**22.7**	**23.7**	**22.7**	**25.6**
Cobalt	13	**9.94**	**9.45**	**5.48**	**6.16**
Copper	28	**15.6**	**17.5**	**16.7**	**15.1**
Manganese	220	**1660**	**2800**	**736**	**721**
Mercury	0.1	**0.02 J-**	**0.035 J-**	**0.038**	**0.031**
Molybdenum	2	<0.5	<0.5	<0.5	0.6 UB
Nickel	38	**23.7**	**23.5**	**19.9**	**21.1**
Selenium	0.52	**1.6**	**1.4**	**1.8**	**1.9**
Silver	4.2	**0.135**	**0.148**	**0.235**	**0.246**
Thallium	0.78	**0.132**	**0.152**	**0.21**	**0.261**
Uranium	5	**2.16**	**1.48**	**2.23**	**2.67**
Vanadium	2	**25**	**25.7**	**32.1**	**36.2**
Zinc	46	**84**	**102**	**123**	**120**
Chemistry Parameters (Percent)					
Total organic carbon	--	**3.95**	**5.06**	**8.3**	**4.73**
Total solids	--	**79.2**	**93.2**	**83.5**	**87.4**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-1

SUMMARY OF 2010 RIPARIAN SOIL SAMPLE RESULTS
P4 RI/FS
(Page 6 of 9)

Location Identification		**MST273**	**MST273**	**MST274**	**MST274**
Field Sample Identification		**1010-MST273-RS-001**	**1010-MST273-RS-002**	**1010-MST274A-RS-001**	**1010-MST274A-RS-002**
Date Collected		**10/5/2010**	**10/5/2010**	**10/2/2010**	**10/2/2010**
Analyte/Methods (Units)	**Screening Limits**				
Metals (mg/kg)					
Antimony	0.27	<3.0	3.7 UB	6.7 UB	5.2 UB
Arsenic	0.39	**2.78**	**2.39**	**4.84**	**4.3**
Boron	0.5	**11.7**	**10**	**10.6**	**9.4 J**
Cadmium	0.36	**2.59**	**3.04**	**1.4**	**3.11**
Chromium, Total	0.4	**21**	**17.8**	**23.8**	**23.7**
Cobalt	13	**4.61**	**4.31**	**8.75**	**7.13**
Copper	28	**18.6**	**19.3**	**18**	**16.6**
Manganese	220	**769**	**294**	**931**	**500**
Mercury	0.1	**0.048**	**0.055**	**0.029 J-**	**0.04 J-**
Molybdenum	2	<0.5	<0.5	0.5 UB	0.8 UB
Nickel	38	**18.3**	**16.2**	**24.8**	**37.3**
Selenium	0.52	**3.2**	**5.1**	**2.3**	**3.4**
Silver	4.2	**0.251**	**0.227**	**0.107**	**0.128**
Thallium	0.78	**0.174**	**0.17**	**0.264**	**0.386**
Uranium	5	**2.82**	**3.56**	**1.44**	**2.39**
Vanadium	2	**25.8**	**22.2**	**25.4**	**30.6**
Zinc	46	**114**	**114**	**130**	**219**
Chemistry Parameters (Percent)					
Total organic carbon	--	**10.7**	**12.4**	**4.95**	**4.63**
Total solids	--	**81.6**	**75**	**93.6**	**93**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-1

SUMMARY OF 2010 RIPARIAN SOIL SAMPLE RESULTS
P4 RI/FS

Location Identification		**MST274**	**MST274**	**MST275**	**MST275**
Field Sample Identification		**1010-MST274B-RS-001**	**1010-MST274B-RS-002**	**1010-MST275A-RS-001**	**1010-MST275A-RS-002**
Date Collected		**10/2/2010**	**10/2/2010**	**10/1/2010**	**10/1/2010**
Analyte/Methods (Units)	**Screening Limits**				
Metals (mg/kg)					
Antimony	0.27	8.7 UB	5.0 UB	**4.6 J**	**5.8 J**
Arsenic	0.39	**4.37**	**4.99**	**3.47**	**4.23**
Boron	0.5	**10.3**	**10.1**	**4.8 J**	**5.5 J**
Cadmium	0.36	**1.37**	**2.31**	**0.57**	**0.729**
Chromium, Total	0.4	**23.7**	**23.2**	**16.9**	**14.6**
Cobalt	13	**8.08**	**7.88**	**7.85**	**7.38**
Copper	28	**16.8**	**18.1**	**10.5**	**11.9**
Manganese	220	**814**	**561**	**635**	**926**
Mercury	0.1	**0.029 J-**	**0.037 J-**	**0.012 J**	**0.022**
Molybdenum	2	0.6 UB	<0.5	1.3 UB	1.1 UB
Nickel	38	**27.2**	**37.7**	**11.9**	**10.5**
Selenium	0.52	**2.0**	**2.9**	**0.8 J**	**0.8 J**
Silver	4.2	**0.1**	**0.119**	**0.099**	**0.105**
Thallium	0.78	**0.249**	**0.319**	**0.223**	**0.163**
Uranium	5	**1.44**	**1.92**	**1.12**	**1.14**
Vanadium	2	**25.4**	**29.8**	**25**	**22.6**
Zinc	46	**131**	**195**	**49.7**	**54.3**
Chemistry Parameters (Percent)					
Total organic carbon	--	**4.77**	**5.68**	**2.37**	**5.89**
Total solids	--	**87.7**	**81.6**	--	--

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-1

SUMMARY OF 2010 RIPARIAN SOIL SAMPLE RESULTS
P4 RI/FS

Location Identification		**MST275**	**MST275**	**MST277**	**MST277**
Field Sample Identification		**1010-MST275B-RS-001**	**1010-MST275B-RS-002**	**1010-MST277A-RS-001**	**1010-MST277A-RS-002**
Date Collected		**10/1/2010**	**10/1/2010**	**10/3/2010**	**10/3/2010**
Analyte/Methods (Units)	**Screening Limits**				
Metals (mg/kg)					
Antimony	0.27	**4.5 J**	**5.3 J**	**4.6 J-**	**5.2 J-**
Arsenic	0.39	**2.69**	**4.99**	**2.9**	**3.0**
Boron	0.5	**5.9 J**	**5.1 J**	**6.1 J**	**5.6 J**
Cadmium	0.36	**0.542**	**0.812**	**2.02**	**1.73**
Chromium, Total	0.4	**14.4**	**15.1**	**18.6**	**18.5**
Cobalt	13	**6.11**	**8.73**	**6.32**	**5.64**
Copper	28	**10.6**	**10.9**	**21**	**18.8**
Manganese	220	**563**	**1080**	**124 J+**	**148 J+**
Mercury	0.1	**0.015 J**	**0.021**	**0.03**	**0.025**
Molybdenum	2	0.6 UB	<0.5	0.6 UB	<0.5
Nickel	38	**10.5**	**10.7**	**15.9**	**14.6**
Selenium	0.52	**0.7 J**	**0.8 J**	**1.4**	**1.1**
Silver	4.2	**0.098**	**0.1**	**0.163**	**0.154**
Thallium	0.78	**0.169**	**0.199**	**0.291**	**0.244**
Uranium	5	**0.878**	**1.4**	**1.83**	**1.6**
Vanadium	2	**21.4**	**23.1**	**26**	**25.5**
Zinc	46	**52.4**	**51.6**	**87.7**	**84.5**
Chemistry Parameters (Percent)					
Total organic carbon	--	**4.32**	**4.94**	**5.51**	**5.33**
Total solids	--	--	--	**88.4**	**86**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-1

SUMMARY OF 2010 RIPARIAN SOIL SAMPLE RESULTS
P4 RI/FS

Location Identification		**MST277**	**MST277**
Field Sample Identification		**1010-MST277B-RS-001**	**1010-MST277B-RS-002**
Date Collected		**10/3/2010**	**10/3/2010**
Analyte/Methods (Units)	**Screening Limits**		
Metals (mg/kg)			
Antimony	0.27	**5.5 J-**	**5.3 J-**
Arsenic	0.39	**5.44**	**5.19**
Boron	0.5	**6.7 J**	**6.6 J**
Cadmium	0.36	**3.24**	**3.43**
Chromium, Total	0.4	**29.3**	**29.2**
Cobalt	13	**10.1**	**9.63**
Copper	28	**30**	**29.3**
Manganese	220	**323 J+**	**159 J+**
Mercury	0.1	**0.042**	**0.042**
Molybdenum	2	1.3 UB	1.5 UB
Nickel	38	**24.4**	**24.5**
Selenium	0.52	**1.7**	**1.8**
Silver	4.2	**0.265**	**0.278**
Thallium	0.78	**0.428**	**0.418**
Uranium	5	**2.53**	**3.01**
Vanadium	2	**42**	**42.1**
Zinc	46	**144**	**142**
Chemistry Parameters (Percent)			
Total organic carbon	--	**6.11**	**4.01**
Total solids	--	**77.4**	**77.7**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

D-2 2010 Riparian Sediment Analytical Data

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification		**MSP014**	**MSP014 Dup**	**MSP014**	**MSP014**	**MSP014**
Field Sample Identification		**1010-MSP014-SD-001-1**	**1010-MSP014-SD-001-2**	**1010-MSP014-SD-002**	**1010-MSP014-SD-003**	**1010-MSP014-SD-004**
Date Collected		**9/29/2010**	**9/29/2010**	**9/29/2010**	**9/29/2010**	**9/29/2010**
Analyte/Methods (Units)						
Metals (mg/kg)	**Screening Limits**					
Antimony	2	**5.5 J-,B**	**3.1 J-,B**	**3.6 J-,B**	**8.5 J-,B**	**5.3 J-,B**
Arsenic	9.8	**8.73**	**8.66**	**4.66**	**6.69**	**6.83**
Boron	--	**7.9 J**	**8.8 J**	**5.8 J**	**12.2**	**9.8 J**
Cadmium	0.99	**21.2 J**	**24.6 J**	**2.63 J**	**19.5 J**	**16.2 J**
Chromium, Total	43	**75.9**	**80**	**23.1**	**144**	**92.3**
Cobalt	50	**8.66**	**8.17**	**9.02**	**3.91**	**4.49**
Copper	32	**42.4**	**50.7**	**28.1**	**35.4**	**27.5**
Manganese	460	**382**	**395**	**300**	**661**	**827**
Mercury	0.18	**0.099**	**0.119**	**0.025**	**0.13**	**0.12**
Molybdenum	--	**4.9**	**2.9 B**	**2.2 B**	**2.4 B**	**4.0 B**
Nickel	23	**75.1**	**72.5**	**27.5**	**75.2**	**96.1**
Selenium	2	**13.9 J-,B**	**14.5 J-,B**	**4.9 J-,B**	**12.8 J-,B**	**24 J-,B**
Silver	1	**0.886**	**1.01**	**0.184**	**0.938**	**0.872**
Thallium	--	**1.17**	**1.29**	**0.317**	**0.962**	**0.862**
Uranium	--	**15.5**	**17.8**	**2.87**	**22**	**17.3**
Vanadium	--	**102**	**109**	**35.4**	**156**	**113**
Zinc	121	**447**	**416**	**126**	**456**	**500**
Chemistry Parameters (Percent)						
Total organic carbon	--	**2.3**	**2.41**	**3.55**	**2.83**	**4.68**
Total solids	--	**67.9**	**67.1**	**62.8**	**78.1**	**53.4**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification		**MSP014**	**MSP015**	**MSP015**	**MSP015**	**MSP015**
Field Sample Identification		**1010-MSP014-SD-005**	**1010-MSP015-SD-001**	**1010-MSP015-SD-002**	**1010-MSP015-SD-003**	**1010-MSP015-SD-004**
Date Collected		**9/29/2010**	**9/30/2010**	**9/30/2010**	**9/30/2010**	**9/30/2010**
Analyte/Methods (Units)						
Metals (mg/kg)	**Screening Limits**					
Antimony	2	**8.4 J**	**5.5 J-,B**	**7.5 J-,B**	**7.0 J-,B**	**7.9 J-,B**
Arsenic	9.8	**8.8 J**	**8.82**	**6.7**	**7.7**	**8.4**
Boron	--	**13.1**	**7.2 J**	**6.0 J**	**5.4 J**	**6.9 J**
Cadmium	0.99	**28.1 J-,B**	**19.7 J**	**11.9 J**	**18.4 J**	**22.9 J**
Chromium, Total	43	**116**	**72.3**	**52.2**	**77.4**	**77.4**
Cobalt	50	**4.36 J**	**6.67**	**8.29**	**5.25**	**5.72**
Copper	32	**37.6**	**34.2**	**33.5**	**32.9**	**68.8**
Manganese	460	**788**	**2580**	**1350**	**1770**	**1810**
Mercury	0.18	**0.118**	**0.107**	**0.07**	**0.109**	**0.109**
Molybdenum	--	**10.8**	**5.3**	**3.0 B**	**5.2**	**5.2**
Nickel	23	**148**	**159**	**95.2**	**141**	**165**
Selenium	2	**46.2 J**	**43.4 J-,B**	**26.5 J-,B**	**35.6 J-,B**	**40.1 J-,B**
Silver	1	**0.887**	**0.711**	**0.535**	**0.645**	**0.736**
Thallium	--	**2.17**	**1.12**	**0.723**	**1.14**	**1.31**
Uranium	--	**30.2**	**10.1**	**7.22**	**9.72**	**12.6**
Vanadium	--	**174**	**98.7**	**65.4**	**96.5**	**101**
Zinc	121	**979**	**1210**	**663**	**1030**	**1380**
Chemistry Parameters (Percent)						
Total organic carbon	--	**7.79**	**2.6**	**2.36**	**2.6**	**2.68**
Total solids	--	**24.3**	**81.9**	**71.9**	**68.5**	**69.7**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification Field Sample Identification Date Collected Analyte/Methods (Units)	Screening Limits	MSP016 1010-MSP016-SD-001 9/30/2010	MSP016 1010-MSP016-SD-002 9/30/2010	MSP016 1010-MSP016-SD-003 9/30/2010	MSP016 1010-MSP016-SD-004-1 9/30/2010	MSP016 Dup 1010-MSP016-SD-004-2 9/30/2010
Metals (mg/kg)						
Antimony	2	7.4 UB	4.7 UB	9.5 UB	5.4 UB	4.7 UB
Arsenic	9.8	**7.36 J**	**5.6 J**	**10.6 J**	**6.48 J**	**5.83 J**
Boron	--	**6.6 J**	**16.2**	**17.4**	**7.7 J**	**8.0 J**
Cadmium	0.99	**5.18 J-,B**	**54.9 J-,B**	**39.7 J-,B**	**6.77 J-,B**	**6.47 J-,B**
Chromium, Total	43	**55**	**215**	**320**	**48.3**	**47**
Cobalt	50	**10**	**2.77**	**3.34**	**5.81**	**5.92**
Copper	32	**27.2**	**43.6**	**57.3**	**30.2**	**31.8**
Manganese	460	**506**	**335**	**119**	**208**	**187**
Mercury	0.18	**0.061**	**0.13**	**0.236**	**0.067**	**0.072**
Molybdenum	--	1.7 UB	**2.9 B**	**5.0 B**	1.6 UB	1.2 UB
Nickel	23	**41.4**	**48**	**88.8**	**54.2**	**51.8**
Selenium	2	**21.3 J**	**28.9 J**	**82.5 J**	**97.4 J**	**96.3 J**
Silver	1	**0.485 J**	**1.9 J**	**2.16 J**	**0.438 J**	**0.444 J**
Thallium	--	**0.452**	**1.55**	**1.49**	**0.669**	**0.624**
Uranium	--	**9.77 J+**	**90 J+**	**61.9 J+**	**5.89 J+**	**4.55 J+**
Vanadium	--	**75**	**386**	**440**	**61.3**	**58.1**
Zinc	121	**171**	**490**	**608**	**279**	**274**
Chemistry Parameters (Percent)						
Total organic carbon	--	**0.77**	**1.92**	**3.83**	**3.96**	**4.2**
Total solids	--	**71.5**	**74.3**	**59.4**	**61**	**61.8**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification		**MSP017**	**MSP017**	**MSP017**	**MSP017**
Field Sample Identification		**1010-MSP017-SD-001**	**1010-MSP017-SD-002**	**1010-MSP017-SD-003**	**1010-MSP017-SD-004**
Date Collected		**9/29/2010**	**9/29/2010**	**9/29/2010**	**9/29/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	2	**6.0 J-,B**	**6.0 J-,B**	**5.4 J-,B**	**8.6 J-,B**
Arsenic	9.8	**5.58**	**4.61**	**8.0**	**9.49**
Boron	--	**4.1 J**	**4.4 J**	**4.8 J**	**12.4**
Cadmium	0.99	**4.82 J**	**3.86 J**	**7.0 J**	**23.8 J**
Chromium, Total	43	**27.8**	**29.2**	**30.1**	**147**
Cobalt	50	**9.02**	**6.73**	**8.74**	**3.44**
Copper	32	**28.6**	**44.8**	**24.9**	**38.9**
Manganese	460	**408**	**571**	**646**	**355**
Mercury	0.18	**0.032**	**0.044**	**0.04**	**0.136**
Molybdenum	--	2.0 UB	**2.2 B**	**4.7**	**4.7**
Nickel	23	**49.1**	**38.3**	**75.4**	**190**
Selenium	2	**58.9 J-,B**	**21.2 J-,B**	**152 J-,B**	**68.8 J-,B**
Silver	1	**0.28**	**0.253**	**0.268**	**0.633**
Thallium	--	**0.43**	**0.307**	**0.485**	**1.65**
Uranium	--	**3.78**	**3.16**	**6.17**	**13.9**
Vanadium	--	**40.3**	**41**	**46.8**	**115**
Zinc	121	**225**	**183**	**365**	**1530**
Chemistry Parameters (Percent)					
Total organic carbon	--	**1.48**	**2.85**	**4.09**	**1.04**
Total solids	--	**70**	**59.8**	**55**	**76**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification		**MSP018**	**MSP018**	**MSP018**	**MSP020**	**MSP020**
Field Sample Identification		**1010-MSP018-SD-001**	**1010-MSP018-SD-002**	**1010-MSP018-SD-003**	**1010-MSP020-SD-001**	**1010-MSP020-SD-002**
Date Collected		**9/29/2010**	**9/29/2010**	**9/29/2010**	**10/2/2010**	**10/2/2010**
Analyte/Methods (Units)						
Metals (mg/kg)	**Screening Limits**					
Antimony	2	**7.6 J-,B**	**5.1 J-,B**	**6.9 J-,B**	**6.3 J-,B**	**7.9 J-,B**
Arsenic	9.8	**10.4**	**12**	**13.5**	**8.68 J**	**8.23 J**
Boron	--	**7.5 J**	**6.2 J**	**9.1 J**	**9.6 J**	**8.8 J**
Cadmium	0.99	**141 J**	**293 J**	**164 J**	**35.1 J-,B**	**34.6 J-,B**
Chromium, Total	43	**77.6**	**58.3**	**126**	**126 J-**	**111 J-**
Cobalt	50	**26.5**	**43.1**	**26.1**	**7.74**	**8.22**
Copper	32	**47.1**	**43.7**	**54.1**	**39.7**	**42.2**
Manganese	460	**429**	**393**	**369**	**177**	**189**
Mercury	0.18	**0.109**	**0.053**	**0.178**	**0.118**	**0.12**
Molybdenum	--	**11.2**	**13.9**	**20.3**	**4.5**	**3.9 B**
Nickel	23	**981**	**1280**	**1280**	**162**	**166**
Selenium	2	**129 J-,B**	**249 J-,B**	**201 J-,B**	**61.8 J**	**68.8 J**
Silver	1	**0.797**	**0.365**	**0.966**	**1.31 J**	**1.25 J**
Thallium	--	**3.1**	**3.56**	**3.24**	**1.14**	**1.02**
Uranium	--	**11.7**	**10**	**17.7**	**25.7**	**20.7**
Vanadium	--	**156**	**169**	**206**	**109**	**109**
Zinc	121	**6180**	**13000**	**8580**	**1260**	**1390**
Chemistry Parameters (Percent)						
Total organic carbon	--	**3.69**	**4.96**	**3.46**	**2.85**	**3.07**
Total solids	--	**68.3**	**50.1**	**59.7**	**72.9**	**63.9**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification		**MSP020**	**MSP020**	**MSP020**	**MSP021**
Field Sample Identification		**1010-MSP020-SD-003**	**1010-MSP020-SD-004**	**1010-MSP020-SD-005**	**1010-MSP021-SD-001**
Date Collected		**10/2/2010**	**10/2/2010**	**10/2/2010**	**10/2/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	2	**6.3 J-,B**	**4.2 J-,B**	**6.2 J-**	**5.7 J-**
Arsenic	9.8	**7.61 J**	**8.1 J**	**9.8 J**	**12.5 J**
Boron	--	**8.8 J**	**10.7**	**9.4 J**	**7.6 J**
Cadmium	0.99	**28.7 J-,B**	**35.4 J-,B**	**37.5 J-,B**	**22.9 J-,B**
Chromium, Total	43	**157 J-**	**142 J-**	**145 J-**	**78.4 J-**
Cobalt	50	**6.7**	**7.22**	**8.04**	**7.44**
Copper	32	**39.1**	**38.1**	**48.5**	**42.1**
Manganese	460	**161**	**167**	**221**	**402**
Mercury	0.18	**0.094**	**0.093**	**0.148**	**0.195**
Molybdenum	--	**5.3**	**4.9**	**7.1**	**4.2 B**
Nickel	23	**112**	**124**	**168**	**171**
Selenium	2	**37.6 J**	**59.9 J**	**59.2 J**	**73.5 J**
Silver	1	**1.61 J**	**1.5 J**	**1.49 J**	**0.543 J**
Thallium	--	**0.892**	**1.17**	**1.21**	**1.27**
Uranium	--	**27.6**	**24.6**	**24.2**	**9.62**
Vanadium	--	**132**	**149**	**141**	**97.4**
Zinc	121	**809**	**992**	**1420**	**1020**
Chemistry Parameters (Percent)					
Total organic carbon	--	**1.81**	**2.93**	**3.03**	**2.16**
Total solids	--	**75.6**	**61.7**	**49.8**	**76**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification		**MSP021**	**MSP021 Dup**	**MSP021**	**MSP021**
Field Sample Identification		**1010-MSP021-SD-002-1**	**1010-MSP021-SD-002-2**	**1010-MSP021-SD-003**	**1010-MSP021-SD-004**
Date Collected		**10/2/2010**	**10/2/2010**	**10/2/2010**	**10/2/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	2	**7.7 J-**	**6.4 J-,B**	**9.7 J-,B**	**9.7 J-,B**
Arsenic	9.8	**16.5 J**	**18.4 J**	**12.1 J**	**13.9 J**
Boron	--	**14.2**	**13.9**	**14.6**	**13.2**
Cadmium	0.99	**88.9 J-,B**	**92.6 J-,B**	**50.6 J-,B**	**38.1 J-,B**
Chromium, Total	43	**135 J-**	**133 J-**	**383 J-**	**329 J-**
Cobalt	50	**6.22**	**6.05**	**2.33**	**3.01**
Copper	32	**53**	**51.2**	**186**	**114**
Manganese	460	**131**	**128**	**181**	**195**
Mercury	0.18	**0.198**	**0.205**	**0.684**	**0.502**
Molybdenum	--	**2.6 B**	**3.0 B**	**5.5**	**6.6**
Nickel	23	**353**	**330**	**80.9**	**134**
Selenium	2	**515 J**	**543 J**	**58.2 J**	**73.6 J**
Silver	1	**1.19 J**	**1.2 J**	**4.14 J**	**2.17 J**
Thallium	--	**3.01**	**3.08**	**2.02**	**1.37**
Uranium	--	**13.4**	**13**	**51**	**36.9**
Vanadium	--	**233**	**220**	**177**	**201**
Zinc	121	**3150**	**2950**	**430**	**661**
Chemistry Parameters (Percent)					
Total organic carbon	--	**5.35**	**5.92**	**2.54**	**1.88**
Total solids	--	**64.4**	**65.7**	**78**	**78.5**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification		**MSP023**	**MSP023**	**MSP023**	**MSP023**
Field Sample Identification		**1010-MSP023-SD-001**	**1010-MSP023-SD-002**	**1010-MSP023-SD-003**	**1010-MSP023-SD-004**
Date Collected		**9/28/2010**	**9/28/2010**	**9/28/2010**	**9/28/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	2	**5.9 J**	**8.1 J**	**6.8 J**	**11**
Arsenic	9.8	**8.53 J**	**12.9 J**	**15 J**	**20.3 J**
Boron	--	**9.9**	**24.8**	**11.4**	**22**
Cadmium	0.99	**21.3 J-,B**	**45.3 J-,B**	**35.2 J-,B**	**56.9 J-,B**
Chromium, Total	43	**94.2**	**291**	**156**	**309**
Cobalt	50	**8.07 J**	**6.06 J**	**8.04 J**	**8.12 J**
Copper	32	**35.4**	**55.5**	**55.3**	**83**
Manganese	460	**859**	**982**	**1020**	**1250**
Mercury	0.18	**0.119**	**0.217**	**0.198**	**0.327**
Molybdenum	--	**5.4 B**	**10.1**	**8.0**	**14.8**
Nickel	23	**73.1**	**142**	**123**	**244**
Selenium	2	**10.9 J**	**26.4 J**	**18.2 J**	**45.1 J**
Silver	1	**1.13**	**2.88**	**1.77**	**3.73**
Thallium	--	**1.15**	**2.68**	**2.12**	**3.73**
Uranium	--	**19.7**	**48.8**	**26.3**	**38.9**
Vanadium	--	**187**	**545**	**334**	**670**
Zinc	121	**460**	**1020**	**790**	**1840**
Chemistry Parameters (Percent)					
Total organic carbon	--	**1.08**	**1.51**	**1.17**	**2.16**
Total solids	--	**96.6**	**95.5**	**97.8**	**94.8**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification		**MSP031**	**MSP031 Dup**	**MSP031**	**MSP031**
Field Sample Identification		**1010-MSP031-SD-001-1**	**1010-MSP031-SD-001-2**	**1010-MSP031-SD-002**	**1010-MSP031-SD-003**
Date Collected		**9/28/2010**	**9/28/2010**	**9/28/2010**	**9/28/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	2	**12 J-,B**	**11 J-,B**	**5.8 J-,B**	**8.2 J-,B**
Arsenic	9.8	**24.5**	**23.5**	**8.54**	**11.7**
Boron	--	**28.2**	**26.1**	**12.7**	**10.9**
Cadmium	0.99	**53.6 J**	**52 J**	**6.7 J**	**16.8 J**
Chromium, Total	43	**407**	**384**	**40.7**	**75.4**
Cobalt	50	**8.58**	**8.71**	**8.15**	**9.19**
Copper	32	**106**	**102**	**40.1**	**51.6**
Manganese	460	**887**	**926**	**436**	**861**
Mercury	0.18	**0.42**	**0.378**	**0.098**	**0.148**
Molybdenum	--	**15.6**	**14.5**	**4.8**	**4.4**
Nickel	23	**320**	**314**	**45.6**	**82.2**
Selenium	2	**91.4 J-,B**	**86 J-,B**	**4.8 J-,B**	**13.1 J-,B**
Silver	1	**3.3**	**3.3**	**0.321**	**0.777**
Thallium	--	**3.74**	**3.53**	**0.546**	**1.09**
Uranium	--	**29.9**	**28.8**	**9.23**	**9.92**
Vanadium	--	**640**	**617**	**73.3**	**156**
Zinc	121	**2240**	**2200**	**250**	**508**
Chemistry Parameters (Percent)					
Total organic carbon	--	**4.99**	**4.83**	**7.42**	**3.48**
Total solids	--	**86.8**	**87.1**	**77.2**	**78.1**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification		**MST053**	**MST053**	**MST066**	**MST066 Dup**
Field Sample Identification		**1010-MST053-SD-001**	**1010-MST053-SD-002**	**1010-MST066-SD-001-1**	**1010-MST066-SD-001-2**
Date Collected		**10/3/2010**	**10/3/2010**	**10/3/2010**	**10/3/2010**
Analyte/Methods (Units)					
Metals (mg/kg)	**Screening Limits**				
Antimony	2	4.2 UB	**4.7 J**	**4.8 J-**	**4.4 J-**
Arsenic	9.8	**1.53 J**	**1.99 J**	**3.65 J**	**3.59 J**
Boron	--	**4.4 J**	**4.4 J**	**5.3 J**	**5.1 J**
Cadmium	0.99	**1.27 J-,B**	**1.19 J-,B**	**1.97 J**	**1.72 J**
Chromium, Total	43	**17.5**	**17.7**	**19**	**17.4**
Cobalt	50	**5.55**	**5.36**	**5.02**	**4.6**
Copper	32	**10.6**	**12.8**	**15.1**	**14.4**
Manganese	460	**316**	**262**	**345 J+**	**338 J+**
Mercury	0.18	**0.02**	**0.02**	**0.02**	**0.021**
Molybdenum	--	<0.5	<0.5	<0.5	<0.5
Nickel	23	**11.5**	**12**	**13.9**	**13.9**
Selenium	2	**1.3 J**	**1.3 J**	**5.3**	**5.0**
Silver	1	**0.119 J**	**0.117 J**	**0.161**	**0.142**
Thallium	--	**0.122**	**0.121**	**0.169**	**0.152**
Uranium	--	**2.28 J+**	**1.65 J+**	**6.29**	**5.37**
Vanadium	--	**15.7**	**16.6**	**33.7**	**32.6**
Zinc	121	**59.9**	**68.3**	**65.6**	**71.7**
Chemistry Parameters (Percent)					
Total organic carbon	--	**2.88**	**3.05**	**5.36**	**5.56**
Total solids	--	**58.5**	**62.5**	**62.1**	**65.5**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification		**MST067**	**MST089**	**MST092**	**MST093**	**MST093 Dup**
Field Sample Identification		**1010-MST067-SD-001-1**	**1010-MST089-SD-001**	**1010-MST092-SD-001**	**1010-MST093A-SD-001-1**	**1010-MST093A-SD-001-2**
Date Collected		**10/3/2010**	**10/5/2010**	**10/4/2010**	**10/4/2010**	**10/4/2010**
Analyte/Methods (Units)	**Screening Limits**					
Metals (mg/kg)						
Antimony	2	**6.6 J-,B**	8.8 UB	5.8 UB	4.5 UB	4.8 UB
Arsenic	9.8	**13.4**	**3.36**	**4.19**	**2.58**	**2.89**
Boron	--	**16.3**	**9.0 J**	**10.9**	**8.3 J**	**8.5 J**
Cadmium	0.99	**34.7 J-,B**	**3.39**	**6.39**	**1.88**	**1.94**
Chromium, Total	43	**105**	**28.7**	**43.7**	**17.7**	**18.2**
Cobalt	50	**7.72**	**6.91**	**5.27**	**4.56**	**6.21**
Copper	32	**45.7 J**	**14.6**	**26.1**	**14.5**	**14.3**
Manganese	460	**257**	**860**	**296**	**401**	**400**
Mercury	0.18	**0.176 J-**	**0.044**	**0.087**	**0.025**	**0.029**
Molybdenum	--	**8.8**	<0.5	1.2 UB	<0.5	<0.5
Nickel	23	**134**	**19.8**	**32**	**15.2**	**16.2**
Selenium	2	**167 J-,B**	**4.6**	**20.6**	**1.0**	**0.9 J**
Silver	1	**2.27**	**0.308**	**0.746**	**0.161**	**0.16**
Thallium	--	**1.1**	**0.122**	**0.248**	**0.232**	**0.157**
Uranium	--	**12.8**	**4.25**	**3.41**	**2.3**	**2.38**
Vanadium	--	**198**	**30.9**	**44.4**	**21.3**	**20.3**
Zinc	121	**834**	**123**	**231**	**92**	**94.8**
Chemistry Parameters (Percent)						
Total organic carbon	--	**6.89**	**5.54**	**14.8**	**6.61**	**6.98**
Total solids	--	**88.7**	**65.6**	**46.7**	**86.4**	**88.9**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification		**MST093**	**MST095**	**MST131**	**MST131**	**MST272**
Field Sample Identification		**1010-MST093B-SD-001**	**1010-MST095-SD-001**	**1010-MST131-SD-001**	**1010-MST131-SD-002**	**1010-MST272-SD-001**
Date Collected		**10/4/2010**	**10/4/2010**	**10/2/2010**	**10/2/2010**	**10/5/2010**
Analyte/Methods (Units)	**Screening Limits**					
Metals (mg/kg)						
Antimony	2	3.2 UB	8.2 UB	**12 J-,B**	**6.1 J-,B**	**6.1 J-,B**
Arsenic	9.8	**2.1**	**10.9**	**14.7**	**9.24**	**3.59 J**
Boron	--	**8.0 J**	**18.8**	**16.3**	**10.7**	**10.1**
Cadmium	0.99	**2.21**	**44.9**	**3.67 J-,B**	**1.63 J-,B**	**5.35 J**
Chromium, Total	43	**19.8**	**269**	**35.6**	**24.6**	**35.4**
Cobalt	50	**4.56**	**3.43**	**21.4**	**17.3**	**7.35 J**
Copper	32	**14.9**	**70.6**	**16.7 J**	**16.2 J**	**18.1**
Manganese	460	**405**	**227**	**3580**	**4490**	**578**
Mercury	0.18	**0.026**	**0.289**	**0.016 J-**	**0.02 J-**	**0.046**
Molybdenum	--	<0.5	**12.8**	1.0 UB	<0.5	1.0 UB
Nickel	23	**17.2**	**198**	**34.2**	**29.4**	**33**
Selenium	2	**1.0 J**	**86.1**	**2.6 J-,B**	**1.5 J-,B**	**2.5**
Silver	1	**0.165**	**3.07**	**0.234**	**0.116**	**0.412**
Thallium	--	**0.171**	**1.63**	**0.174**	**0.163**	**0.345**
Uranium	--	**2.03**	**16.8**	**15.7**	**1.8**	**4.15**
Vanadium	--	**28.6**	**473**	**61.6**	**31.5**	**57.7**
Zinc	121	**107**	**1050**	**107**	**95.3**	**213**
Chemistry Parameters (Percent)						
Total organic carbon	--	**5.51**	**7.38**	**0.57**	**1.74**	**4.59**
Total solids	--	**86**	**86.7**	**83.7**	**68.9**	**84.5**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification Field Sample Identification Date Collected Analyte/Methods (Units)	Screening Limits	MST273 1010-MST273-SD-001 10/5/2010	MST274 1010-MST274A-SD-001 10/2/2010	MST274 1010-MST274B-SD-001 10/2/2010	MST275 1010-MST275A-SD-001 10/1/2010	MST275 1010-MST275B-SD-001 10/1/2010
Metals (mg/kg)						
Antimony	2	**6.2 J-,B**	**8.0 J-,B**	**7.9 J-,B**	**5.9 J**	**4.7 J**
Arsenic	9.8	**3.33 J**	**4.65**	**4.84**	**2.99 J**	**3.36 J**
Boron	--	**7.8 J**	**10.2**	**9.5 J**	**6.0 J**	**5.4 J**
Cadmium	0.99	**2.05 J**	**3.12 J-,B**	**2.21 J-,B**	**0.481 J-,B**	**0.488 J-,B**
Chromium, Total	43	**19.4**	**23.5**	**23.5**	**21.4**	**23**
Cobalt	50	**7.06 J**	**10.1**	**9.85**	**8.53**	**10.6**
Copper	32	**13.2**	**16.8 J**	**16.1 J**	**51.3**	**16.8**
Manganese	460	**1640**	**251**	**290**	**580**	**620**
Mercury	0.18	**0.022**	**0.036 J-**	**0.03 J-**	**0.021**	**0.023**
Molybdenum	--	<0.5	0.5 UB	0.5 UB	0.8 UB	0.5 UB
Nickel	23	**18.7**	**36.6**	**29.9**	**16.6**	**18.9**
Selenium	2	**1.5**	**4.5 J-,B**	**3.9 J-,B**	**1.1 J**	**1.4 J**
Silver	1	**0.177**	**0.115**	**0.109**	**0.161 J**	**0.16 J**
Thallium	--	**0.147**	**0.393**	**0.315**	**0.208**	**0.229**
Uranium	--	**2.82**	**2.0**	**1.57**	**1.88 J+**	**1.89 J+**
Vanadium	--	**25.9**	**29.6**	**30**	**29.9**	**30.8**
Zinc	121	**81.9**	**226**	**174**	**67.9**	**56.3**
Chemistry Parameters (Percent)						
Total organic carbon	--	**3.6**	**4.16**	**3.85**	**3**	**2.51**
Total solids	--	**84.4**	**69**	**73.3**	**57.5**	**51.1**

mg/kg milligrams per kilogram.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
J Data are estimated due to associated quality control data. Bias unknown.
J- Data are estimated due to associated quality control data. Potential low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-2

SUMMARY OF 2010 RIPARIAN SEDIMENT SAMPLE RESULTS
P4 RI/FS

Location Identification		**MST277**	**MST277**
Field Sample Identification		**1010-MST277A-SD-001**	**1010-MST277B-SD-001**
Date Collected		**10/3/2010**	**10/3/2010**
Analyte/Methods (Units)			
Metals (mg/kg)	**Screening Limits**		
Antimony	2	**5.0 J-**	**4.8 J-**
Arsenic	9.8	**3.23 J**	**4.55 J**
Boron	--	**7.6 J**	**6.2 J**
Cadmium	0.99	**1.92 J**	**2.95 J**
Chromium, Total	43	**16.7**	**25.3**
Cobalt	50	**6.22**	**8.62**
Copper	32	**20.6**	**25.5**
Manganese	460	**194 J+**	**200 J+**
Mercury	0.18	**0.038**	**0.037**
Molybdenum	--	1.5 UB	1.3 UB
Nickel	23	**13.1**	**20.7**
Selenium	2	**1.2**	**1.6**
Silver	1	**0.155**	**0.241**
Thallium	--	**0.241**	**0.378**
Uranium	--	**2.12**	**2.37**
Vanadium	--	**23.6**	**36.7**
Zinc	121	**89.9**	**125**
Chemistry Parameters (Percent)			
Total organic carbon	--	**6.86**	**4.58**
Total solids	--	**89.1**	**79.8**

mg/kg	milligrams per kilogram.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
J	Data are estimated due to associated quality control data. Bias unknown.
J-	Data are estimated due to associated quality control data. Potential low bias.
J+	Data are estimated due to associated quality control data. Potential high bias.
UB	Analyte considered not detected based on associated blank data.

D-3 2010 Riparian Surface Water Analytical Data

TABLE D-3

SUMMARY OF 2010 RIPARIAN SURFACE WATER SAMPLE RESULTS
P4 RI/FS
(Page 1 of 4)

	Location Identification	**MSP014**		**MSP015**		**MSP016**		**MSP017**		**MSP018**	
	Location Type	**Pond**		**Pond**		**Pond**		**Pond**		**Pond**	
	Date Collected	**9/29/2010**		**9/30/2010**		**9/30/2010**		**9/29/2010**		**9/29/2010**	
Analyte/Methods (Units)											
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	<0.003	--	<0.003	--	<0.003	--	<0.003	--	<0.003	--
Arsenic	0.01	**0.00248**	--	**0.00257**	--	**0.00253**	**0.0029**	**0.00246**	--	**0.00197**	--
Boron	0.0016	**0.028**	--	**0.0402**	--	0.0084 UB	--	<0.002	--	**0.0195**	--
Cadmium	0.0006	**0.000018 J**	--	**0.000077**	--	**0.000027**	**0.00128**	**0.000086**	--	**0.000316**	--
Calcium	--	**76.8**	--	**106**	--	**64.3**	--	**206**	--	**388**	--
Chromium, Total	0.000031	**0.00078**	--	**0.00051**	--	**0.00053**	**0.00414**	**0.00099**	--	**0.0008**	--
Cobalt	0.004	**0.00218**	--	**0.00271**	--	**0.00303**	**0.000372**	**0.00295**	--	**0.00484**	--
Copper	0.011	**0.00068**	--	**0.00177**	--	**0.0007**	**0.00303**	**0.00135**	--	**0.0017**	--
Iron	0.16	--	--	--	--	--	--	--	--	--	--
Magnesium	--	**62.6**	--	**57.1**	--	**39.5**	--	**74.1**	--	**124**	--
Manganese	0.05	**0.0204**	--	**2.44**	--	**0.106**	--	**0.268**	--	**0.334**	--
Mercury	0.0007	<0.00002	--	<0.00002	--	<0.00002	--	<0.00002	--	<0.00002	--
Molybdenum	0.078	**0.0037**	--	**0.0061**	--	**0.0042**	--	**0.0039**	--	**0.0161**	--
Nickel	0.052	**0.0048**	--	**0.0168**	--	**0.0062**	**0.0108**	**0.0128**	--	**0.511**	--
Selenium	0.005	**0.005**	**0.0053**	**0.0176**	**0.0225**	--	**0.0105**	**0.058**	**0.0593**	**0.0688**	**0.0493**
Silver	0.0034	<0.000008	--	<0.000008	--	0.000006 UB	**0.000062**	**0.000091**	--	<0.000008	--
Thallium	0.00024	0.000008 UB	--	**0.000064**	--	0.000002 UB	**0.000098**	**0.000095**	--	**0.000058**	--
Uranium	0.0026	**0.0022**	--	**0.0011**	--	**0.0014**	**0.00203**	**0.00463**	--	**0.0162**	--
Vanadium	0.02	**0.00185**	--	**0.00232**	--	**0.00862**	**0.0121**	**0.00156**	--	**0.0341**	--
Zinc	0.12	**0.0008 J**	--	**0.003**	--	**0.0012 J**	--	**0.0026**	--	**0.231**	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-3

SUMMARY OF 2010 RIPARIAN SURFACE WATER SAMPLE RESULTS
P4 RI/FS
(Page 2 of 4)

	Location Identification	**MSP020**		**MSP021**		**MSP021 Dup**		**MST053**		**MST066**	
	Location Type	**Pond**		**Pond**		**Pond**		**Stream**		**Stream**	
	Date Collected	**10/2/2010**		**10/2/2010**		**10/2/2010**		**10/3/2010**		**10/3/2010**	
Analyte/Methods (Units)											
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	<0.003	--	<0.003	--	<0.003	--	<0.003	--	<0.003	--
Arsenic	0.01	**0.0039**	--	**0.00337**	--	**0.00376**	--	**0.00075**	--	**0.0151**	--
Boron	0.0016	**0.0182**	--	**0.116**	--	**0.116**	--	**0.0146 B**	--	**0.0288**	--
Cadmium	0.0006	**0.00008**	--	**0.000139**	--	**0.000156**	--	**0.000012 J**	--	**0.000026 J**	--
Calcium	--	**43.1**	--	**214**	--	**213**	--	**56.5**	--	**105**	--
Chromium, Total	0.000031	**0.00085**	--	**0.00038**	--	**0.00099**	--	**0.00059**	--	**0.00097**	--
Cobalt	0.004	**0.00156**	--	**0.000436**	--	**0.000501**	--	**0.000964**	--	**0.0075**	--
Copper	0.011	**0.00212**	--	**0.00094**	--	**0.00114**	--	**0.00055**	--	**0.00064**	--
Iron	0.16	--	--	--	--	--	--	--	--	--	--
Magnesium	--	**9.56**	--	**68.2**	--	**67.3**	--	**11.7**	--	**27.8**	--
Manganese	0.05	**0.0042**	--	**0.0421**	--	**0.0414**	--	**0.0087**	--	**2.64**	--
Mercury	0.0007	<0.00002	--	<0.00002	--	<0.00002	--	<0.00002	--	<0.00002	--
Molybdenum	0.078	**0.0073**	--	**0.0071**	--	**0.0077**	--	<0.0006	--	**0.0011 J**	--
Nickel	0.052	**0.0107**	--	**0.0156**	--	**0.019**	--	**0.00198**	--	**0.00845**	--
Selenium	0.005	**0.0278 J+**	**0.0282**	**0.0785 J+**	**0.0844**	**0.0821 J+**	**0.0839**	--	**0.0007 J**	--	**0.0077 J+**
Silver	0.0034	0.000006 UB	--	<0.000004	--	0.00001 UB	--	<0.000004	--	<0.000008	--
Thallium	0.00024	0.000011 UB	--	**0.000041**	--	**0.000039**	--	0.000002 UB	--	<0.000004	--
Uranium	0.0026	**0.00559**	--	**0.00437**	--	**0.00429**	--	**0.000938**	--	**0.00427**	--
Vanadium	0.02	**0.0192**	--	**0.0121**	--	**0.0125**	--	**0.00115**	--	**0.00353**	--
Zinc	0.12	**0.0019 J**	--	**0.0023**	--	**0.0014 J**	--	**0.0008 J**	--	**0.0014 J**	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-3

SUMMARY OF 2010 RIPARIAN SURFACE WATER SAMPLE RESULTS
P4 RI/FS
(Page 3 of 4)

	Location Identification	**MST066 Dup**		**MST131**		**MST274A**		**MST274B**		**MST275A**	
	Location Type	**Stream**		**Stream**		**Stream**		**Stream**		**Stream**	
	Date Collected	**10/3/2010**		**10/2/2010**		**10/1/2010**		**10/1/2010**		**10/1/2010**	**10/1/2010**
Analyte/Methods (Units)											
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Antimony	0.0056	<0.003	--	<0.003	--	<0.003	--	<0.003	--	<0.003	--
Arsenic	0.01	**0.0148**	--	**0.00061**	--	**0.00057**	--	**0.00054**	--	**0.0194**	--
Boron	0.0016	**0.0284**	--	**0.0225 B**	--	**0.016 B**	--	**0.0153 B**	--	**0.121**	--
Cadmium	0.0006	**0.000044**	--	**0.000024**	--	**0.000012 J**	--	**0.000011 J**	--	**0.000126**	--
Calcium	--	**103**	--	**66.3**	--	**75**	--	**75.5**	--	**72.4**	--
Chromium, Total	0.000031	**0.00131**	--	**0.00046**	--	**0.00043**	--	**0.00039 B**	--	**0.00272**	--
Cobalt	0.004	**0.00376**	--	**0.00103**	--	**0.000462**	--	**0.00101**	--	**0.0132**	--
Copper	0.011	**0.00077**	--	**0.00051**	--	**0.00034**	--	**0.00037**	--	**0.00274**	--
Iron	0.16	--	--	--	--	--	--	--	--	--	--
Magnesium	--	**27.5**	--	**13.6**	--	**10.1**	--	**10.2**	--	**23.2**	--
Manganese	0.05	**2.62**	--	**0.0387**	--	**0.0099**	--	**0.0109**	--	**1.74**	--
Mercury	0.0007	<0.00002	--	<0.00002	--	<0.00002	--	<0.00002	--	<0.00002	--
Molybdenum	0.078	**0.0007 J**	--	**0.0012 J**	--	**0.0009 J**	--	<0.0006	--	**0.0192**	--
Nickel	0.052	**0.00806**	--	**0.00216 J**	--	**0.00207 J**	--	**0.00197 J**	--	**0.0244**	--
Selenium	0.005	--	**0.0065 J+**	--	**0.0008 J**	--	**0.0041**	--	**0.0041**	--	**0.006**
Silver	0.0034	<0.000008	--	<0.000004	--	<0.000004	--	<0.000004	--	0.00001 UB	--
Thallium	0.00024	**0.000039 J**	--	0.000005 UB	--	0.000004 UB	--	0.000004 UB	--	**0.000348**	--
Uranium	0.0026	**0.0043**	--	**0.000556**	--	**0.00073**	--	**0.000731**	--	**0.00173**	--
Vanadium	0.02	**0.00447**	--	**0.00097**	--	**0.00089**	--	**0.00088**	--	**0.00612**	--
Zinc	0.12	**0.0029**	--	**0.0036**	--	<0.0007	--	**0.0011 J**	--	**0.0068**	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
B Analyte detected in an associated blank.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data. Bias unknown.
J+ Data are estimated due to associated quality control data. Potential high bias.
UB Analyte considered not detected based on associated blank data.

TABLE D-3

SUMMARY OF 2010 RIPARIAN SURFACE WATER SAMPLE RESULTS
P4 RI/FS
(Page 4 of 4)

	Location Identification	**MST275B**	
	Location Type	**Stream**	
	Date Collected		
Analyte/Methods (Units)			
Metals (mg/l)	**Screening Limits**	**Dissolved**	**Total**
Antimony	0.0056	<0.003	--
Arsenic	0.01	**0.0224**	--
Boron	0.0016	**0.116**	--
Cadmium	0.0006	**0.000166**	--
Calcium	--	**73.3**	--
Chromium, Total	0.000031	**0.00343**	--
Cobalt	0.004	**0.0141**	--
Copper	0.011	**0.00379**	--
Iron	0.16	--	--
Magnesium	--	**23.1**	--
Manganese	0.05	**2.33**	--
Mercury	0.0007	<0.00002	--
Molybdenum	0.078	**0.0191**	--
Nickel	0.052	**0.0265**	--
Selenium	0.005	--	**0.0047**
Silver	0.0034	0.00002 UB	--
Thallium	0.00024	**0.000059**	--
Uranium	0.0026	**0.00208**	--
Vanadium	0.02	**0.0096**	--
Zinc	0.12	**0.0113**	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
B	Analyte detected in an associated blank.
D	Sample dilution required for analysis; reported values reflect the dilution.
F	Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J	Data are estimated due to associated quality control data. Bias unknown.
J+	Data are estimated due to associated quality control data. Potential high bias.
UB	Analyte considered not detected based on associated blank data.

APPENDIX E - LABORATORY DATA CONSULTANTS (LDC) THIRD PARTY VALIDATION REPORTS

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

MWH Americas, Inc.
2121 N. California Blvd. Suite 600
Walnut Creek, CA 94596
ATTN: Ms. Ruth Siegmund

July 13, 2010

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. Siegmund,

Enclosed are the final verification reports for the fractions listed below. These SDGs were received on June 16, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 23411:

SDG #	Fraction
L10050524, L10050565, L10050566	Metals, Wet Chemistry

The data verification was performed under Stage 2B guidelines. The analyses were validated using the following documents, as applicable to each method:

- QAPP Addendum, MWH 2009, to the project SAP, MWH 2004
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004

Please feel free to contact us if you have any questions.

Sincerely,

ERauto

Erlinda T. Rauto
Operations Manager/Senior Chemist

EDD

LDC #23411 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Cd,Se (6020A)		Se (6020A)		V (6010B)		Diss. Cd (6020A)		(4)Diss. Metals (6010B)		Diss. Ca,Mg (6010B)		Cl (300.0)		SO_4 (300.0)		Hard. (2340B)		TDS (160.1)															
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	L10050524	06/16/10	07/08/10	-	-	12	0	-	-	12	0	12	0	-	-	12	0	12	0	12	0	12	0														
B	L10050565	06/16/10	07/08/10	10	0	-	-	-	-	-	-	-	-	-	-	-	-	10	0	-	-	10	0														
C	L10050566	06/16/10	07/08/10	12	0	-	-	12	0	12	0	-	-	12	0	12	0	12	0	-	-	12	0														
Total	T/LR			22	0	12	0	12	0	24	0	12	0	12	0	24	0	34	0	11	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	197

Shaded cells indicate Level III validation (all other cells are ADR review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

Monsanto, P4 Production LLC
Data Verification Reports
LDC #23411

Metals

LDC

Report# 23411A4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 28, 2010

Matrix: Water

Parameters: Dissolved Metals by ICP SW-846 Method 6010B

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050524

Sample Identification	Collection Date	Laboratory Sample Identification
1005SWMST089-F	05/13/2010	L10050524-02
1005SWMST090-F	05/13/2010	L10050524-04
1005SWMST092-F	05/13/2010	L10050524-06
1005SWMST093-F	05/13/2010	L10050524-08
1005SWMST094-F	05/13/2010	L10050524-10
1005SWMST095-F	05/13/2010	L10050524-12
1005SWMST128-F	05/16/2010	L10050524-14
1005SWMST131-F	05/16/2010	L10050524-20
1005SWMST132-1-F	05/16/2010	L10050524-26
1005SWMST132-2-F	05/16/2010	L10050524-28
1005SWMST132-3-F	05/16/2010	L10050524-30
1005SWMST133-F	05/15/2010	L10050524-32
1005SWMST128-FMS	05/16/2010	L10050524-16MS
1005SWMST128-FMSD	05/16/2010	L10050524-18MSD
1005SWMST131-FMS	05/16/2010	L10050524-22MS
1005SWMST131-FMSD	05/16/2010	L10050524-24MSD

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium, Iron, Magnesium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1005ER-SW-04-F and 1005ER-SW-05-F (from SDG L10050525) were identified as equipment rinsates. No metal contaminants were found in these blanks.

Sample 1005B-SW-06F (from SDG L10050525) was identified as a source blank. No metal contaminants were found in this blank.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium results were outside the QC limits; results were not qualified since the original samples (1005SWMST128 and 1005SWMST131) were greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in Pthe SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable. A method detection limit (MDL) study was specified in the laboratory's SOP for validation of this method for vegetation samples. However, the MDL study could not be completed for vegetation matrix because the media contained target analytes at levels significantly greater than the sensitivity of the instrument, so the MDLs reported for the vegetation data are based on the laboratory's previously-generated MDLs established using Teflon® beads. Because the MDL study could not be completed, the A/T request analysis of a low-level LCS with each preparation batch of vegetation samples. However, the samples for this laboratory SDG were already prepared and analyzed, so the low-level LCS request could not be accommodated.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Dissolved Metals - Data Qualification Summary - SDG L10050524

No Sample Data Qualified in this SDG

Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG L10050524

No Sample Data Qualified in this SDG

Dissolved Metals - Field Blank Data Qualification Summary - SDG L10050524

No Sample Data Qualified in this SDG

LDC #: 23411A4a

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6-25-10

SDG #: L10050524

Page: 1 of 1

Laboratory: Microbac Laboratories, Inc.

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: ~~Metals~~ PFAS (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/13-16/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	SB = 1005B-SW-06-F (L10050525), ~~1005B-SW-06-F~~ (L10050525)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; SB = Source blk; D = Duplicate; TB = Trip blank; EB = Equipment blank

ER = 1005ER-SW-04-F, 1005ER-SW-05-F (SDG# L10050525)

Validated Samples: water

1	1005SWMST089-F	11	1005SWMST132-3-F	21	PBW	31	
2	1005SWMST090-F	12	1005SWMST133-F	22		32	
3	1005SWMST092-F	13	1005SWMST128-FMS	23		33	
4	1005SWMST093-F	14	1005SWMST128-FMSD	24		34	
5	1005SWMST094-F	15	1005SWMST131-FMS	25		35	
6	1005SWMST095-F	16	1005SWMST131-FMSD	26		36	
7	1005SWMST128-F	17		27		37	
8	1005SWMST131-F	18		28		38	
9	1005SWMST132-1-F	19		29		39	
10	1005SWMST132-2-F	20		30		40	

Notes:

LDC #: 23411A4a
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-12		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
QC-13-16		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___

Comments: Mercury by CVAA if performed

LDC #: 23411A4a
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: L

METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125?~~ ~~80-120~~ 75-125 If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	13/14	water	Ca	177	191		All	No Qual (>4x spike)
	15/16	water	Ca	177	177		All	No Qual (>4x spike)

Comments:

MSD.4SW

Report# 23411C4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 28, 2010

Matrix: Water

Parameters: Metals by ICP SW-846 Method 6010B

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050566

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMSG004-1U	05/17/2010	L10050566-01
1005GWMSG004-2U	05/17/2010	L10050566-03
1005GWMSG005-U	05/17/2010	L10050566-05
1005GWMSG006-U	05/17/2010	L10050566-07
1005GWMDS025-U	05/16/2010	L10050566-09
1005GWMDS026-U	05/16/2010	L10050566-11
1005GWMDS030-U	05/17/2010	L10050566-13
1005GWMDS034-U	05/16/2010	L10050566-15
1005GWMST069-U	05/17/2010	L10050566-17
1005GWMST144-U	05/16/2010	L10050566-19
1005B-GW-01-U	05/17/2010	L10050566-21
1005ER-GW-01-U	05/17/2010	L10050566-23
1005GWMSG004-1F	05/17/2010	L10050566-02
1005GWMSG004-2F	05/17/2010	L10050566-04
1005GWMSG005-F	05/17/2010	L10050566-06
1005GWMSG006-F	05/17/2010	L10050566-08
1005GWMDS025-F	05/16/2010	L10050566-10
1005GWMDS026-F	05/16/2010	L10050566-12
1005GWMDS030-F	05/17/2010	L10050566-14
1005GWMDS034-F	05/16/2010	L10050566-16
1005GWMST069-F	05/17/2010	L10050566-18
1005GWMST144-F	05/16/2010	L10050566-20
1005B-GW-01-F	05/17/2010	L10050566-22
1005ER-GW-01-F	05/17/2010	L10050566-24
1005GWMDS026-FMS	05/17/2010	L10050566-18MS

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMDS026-FMSD	05/17/2010	L10050566-18MSD

Samples appended with "F" were analyzed for dissolved Calcium and Magnesium

Introduction

This data review covers 26 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium, Magnesium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1005ER-GW-01-U and 1005ER-GW-01-F were identified as equipment rinsates. No metal contaminants were found in these blanks.

Samples 1005B-GW-01-U and 1005B-GW-01-F were identified as source blanks. No metal contaminants were found these blanks.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium and Magnesium results were outside the QC limits; results were not qualified since the original sample (1005GWMDS026) was greater than 4X the spike amount.

Calcium results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L10050586-4) is representative of client's sample matrix.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable. A method detection limit (MDL) study was specified in the laboratory's SOP for validation of this method for vegetation samples. However, the MDL study could not be completed for vegetation matrix because the media contained target analytes at levels significantly greater than the sensitivity of the instrument, so the MDLs reported for the vegetation data are based on the laboratory's previously-generated MDLs established using Teflon® beads. Because the MDL study could not be completed, the A/T request analysis of a low-level LCS with each preparation batch of vegetation samples. However, the samples for this laboratory SDG were already prepared and analyzed, so the low-level LCS request could not be accommodated.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050566

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10050566

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050566

No Sample Data Qualified in this SDG

LDC #: 23411C4a

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6-24-10

SDG #: L10050566

Page: 1 of 1

Laboratory: Microbac Laboratories, Inc.

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: ~~5/16~~ 5/16-17/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	EB= 12, 24, Source Blank = 11, 23 see below

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMSG004-1U	11	1005B-GW-01-U	21	1005GWMST069-F	31	PBW1
2	1005GWMSG004-2U	12	1005ER-GW-01-U	22	1005GWMST144-F	32	PBW2
3	1005GWMSG005-U	13	1005GWMSG004-1F	23	1005B-GW-01-F	33	
4	1005GWMSG006-U	14	1005GWMSG004-2F	24	1005ER-GW-01-F	34	
5	1005GWMDS025-U	15	1005GWMSG005-F	25	1005GWMDS026-FMS	35	
6	1005GWMDS026-U	16	1005GWMSG006-F	26	1005GWMDS026-FMSD	36	
7	1005GWMDS030-U	17	1005GWMDS025-F	27		37	
8	1005GWMDS034-U	18	1005GWMDS026-F	28		38	
9	1005GWMST069-U	19	1005GWMDS030-F	29		39	
10	1005GWMST144-U	20	1005GWMDS034-F	30		40	

Notes: Samples appended with "F" were analyzed for dissolved Ca & Mg

~~EB= 1005ER-SW-05-U, 1005ER-SW-05-F~~ > SDG# L10050525 CR

~~Source Blk= 1005B-SW-06-U, 1005B-SW-06-F~~

LDC #: 23411C4a
SDG #: SEQ0002

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: h

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-12		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
13-24		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
GC:25,26		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___

Comments: Mercury by CVAA if performed

LDC #: 23411C4a
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1	~~3/4~~ 25/26	water	Mg		259		17-24	No Qual (>4x spike)
			Ca	696	483		↓	
2	L1005058864	W.	Ca	233	238		13-16	No Qual (non-client)

Comments:

MSD.4SW

Report# 23411A4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 28, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050524

Sample Identification	Collection Date	Laboratory Sample Identification
1005SWMST089-U	05/13/2010	L10050524-01
1005SWMST090-U	05/13/2010	L10050524-03
1005SWMST092-U	05/13/2010	L10050524-05
1005SWMST093-U	05/13/2010	L10050524-07
1005SWMST094-U	05/13/2010	L10050524-09
1005SWMST095-U	05/13/2010	L10050524-11
1005SWMST128-U	05/16/2010	L10050524-13
1005SWMST131-U	05/16/2010	L10050524-19
1005SWMST132-1-U	05/16/2010	L10050524-25
1005SWMST132-2-U	05/16/2010	L10050524-27
1005SWMST132-3-U	05/16/2010	L10050524-29
1005SWMST133-U	05/15/2010	L10050524-31
1005SWMST089-F	05/13/2010	L10050524-02
1005SWMST090-F	05/13/2010	L10050524-04
1005SWMST092-F	05/13/2010	L10050524-06
1005SWMST093-F	05/13/2010	L10050524-08
1005SWMST094-F	05/13/2010	L10050524-10
1005SWMST095-F	05/13/2010	L10050524-12
1005SWMST128-F	05/16/2010	L10050524-14
1005SWMST132-1-F	05/16/2010	L10050524-26
1005SWMST132-2-F	05/16/2010	L10050524-28
1005SWMST132-3-F	05/16/2010	L10050524-30
1005SWMST133-F	05/15/2010	L10050524-32
1005SWMST128-UMS	05/16/2010	L10050524-15MS
1005SWMST128-UMSD	05/16/2010	L10050524-17MSD
1005SWMST131-UMS	05/16/2010	L10050524-21MS

Sample Identification	Collection Date	Laboratory Sample Identification
1005SWMST131-UMSD	05/16/2010	L10050524-23MSD
1005SWMST128-FMS	05/16/2010	L10050524-16MS
1005SWMST128-FMSD	05/16/2010	L10050524-18MSD
1005SWMST131-FMS	05/16/2010	L10050524-22MS
1005SWMST131-FMSD	05/16/2010	L10050524-24MSD
1005SWMST131-F	05/16/2010	L10050524-20

Samples appended with “F” were analyzed for dissolved cadmium

Introduction

This data review covers 32 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1005ER-SW-04-U, 1005ER-SW-04F, 1005ER-SW-05-U, and 1005ER-SW-05-F (from SDG L10050525) were identified as equipment rinsates. No metal contaminants were found in these blanks.

Samples 1005B-SW-03-U, 1005B-SW-03-F, 1005B-SW-06-U and 1005B-SW-06-F (from SDG L10050525) were identified as source blanks. No metal contaminants were found in these blanks.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Selenium results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L10050601-01) is representative of client's sample matrix.

Cadmium results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L10050601-02) is representative of client's sample matrix.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Selenium results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L10050601-01) is representative of client's sample matrix.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries with the following exceptions:

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050524

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10050524

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050524

No Sample Data Qualified in this SDG

LDC #: 23411A4b

SDG #: L10050524

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6/25/10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

METHOD: Metals (EPA SW846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/13-16/10
II.	Calibration / ICPMS Tune	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	see below

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Water

1 1	1005SWMST089-U	11 3	1005SWMST132-3-U	21	1005SWMST132-2-F	31	1005SWMST131-FMSD
2 1	1005SWMST090-U	12 4	1005SWMST133-U	22 3	1005SWMST132-3-F	32 3	1005SWMST131-F
3 2	1005SWMST092-U	13 1	1005SWMST089-F	23 4	1005SWMST133-F	33	
4 2	1005SWMST093-U	14 2	1005SWMST090-F	24	1005SWMST128-UMS	34	PBW1
5 3	1005SWMST094-U	15	1005SWMST092-F	25	1005SWMST128-UMSD	35	2
6	1005SWMST095-U	16 2	1005SWMST093-F	26	1005SWMST131-UMS	36	3
7	1005SWMST128-U	17 3	1005SWMST094-F	27	1005SWMST131-UMSD	37	4
8	1005SWMST131-U	18	1005SWMST095-F	28	1005SWMST128-FMS	38	
9	1005SWMST132-1-U	19	1005SWMST128-F	29	1005SWMST128-FMSD	39	
10	1005SWMST132-2-U	20	1005SWMST132-1-F	30	1005SWMST131-FMS	40	

Notes: Samples appended with "F" were analyzed for dissolved cadmium

Source Blk = 1005B-SW-03-U, 1005B-SW-03-F, 1005B-SW-06-U, 1005B-SW-06-F
ER = 1005ER-SW-04-U, 1005ER-SW-04-F, 1005ER-SW-05-U, 1005ER-SW-05-F
(SDG# L10050525)

LDC #: 23411A46
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-12		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
13-23, 32		Al, Sb, As, Ba, Be, (Cd), Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
QC: 24-27		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
↓ 28-31		Al, Sb, As, Ba, Be, (Cd), Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, (Cd), Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,

Comments: Mercury by CVAA if performed

LDC #: 23411A4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1	L1005060101	water	Se		59.4		12	NO Qual (nonclient)
2	L1005060102	↓	Cd	133			23	↓

Comments:

MSD.4SW

LDC #: 23411A4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:
Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	L1005060l-01	water	Se	49.2	12	No Qual (non client)

Comments:

SDIL.4S2

Report# 23411B4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 28, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050565

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW006-U	05/17/2010	L10050565-01
1005GWMMW018-1-U	05/15/2010	L10050565-03
1005GWMMW018-2-U	05/15/2010	L10050565-05
1005GWMMW020-U	05/17/2010	L10050565-07
1005GWMMW027-U	05/17/2010	L10050565-09
1005GWMMW011-U	05/16/2010	L10050565-11
1005GWMMW017-U	05/16/2010	L10050565-13
1005GWMMW028-U	05/16/2010	L10050565-15
1005GWMMW029-U	05/15/2010	L10050565-23
1005GWMMW031-U	05/17/2010	L10050565-25
1005GWMMW020-UMS	05/17/2010	L10050565-17
1005GWMMW020-UMSD	05/17/2010	L10050565-19
1005GWMMW028-UMS	05/16/2010	L10050565-21

Introduction

This data review covers 13 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Sample 1005ER-GW-01-U (from SDG L10050566) was identified as an equipment rinsate. No metal contaminants were found in this blank.

Sample 1005B-GW-01-U (from SDG L10050566) was identified as a source blank. No metal contaminants were found in this blank.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050565

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10050565

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050565

No Sample Data Qualified in this SDG

LDC #: 23411B4b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6-24-10

SDG #: L10050565

Page: 1 of 1

Laboratory: Microbac Laboratories, Inc.

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Cd & Se (EPA SW846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/15-17/10
II.	Calibration / ICPMS Tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	~~SW/ND~~ ND	ER=1005ER-GW-01-U, ~~Source Blk=1005B-GW-01-U~~ CR Source Blk=1005B-GW-01-U (SDG# L10050566) *See below

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW006-U	11	1005GWMMW020-U/MS	21	PBW	31	
2	1005GWMMW018-1-U	12	1005GWMMW020-U/MSD	22		32	
3	1005GWMMW018-2-U	13	1005GWMMW028-U/MS	23		33	
4	1005GWMMW020-U	14		24		34	
5	1005GWMMW027-U	15		25		35	
6	1005GWMMW011-U	16		26		36	
7	1005GWMMW017-U	17		27		37	
8	1005GWMMW028-U	18		28		38	
9	1005GWMMW029-U	19		29		39	
10	1005GWMMW031-U	20		30		40	

Notes: * ~~ER=1005ER-SW-04-U, 1005ER-SW-05-U~~ ~~Source Blk=1005B-SW-03-U, 1005B-SW-06-U~~ > SDG# L10050525 CR

LDC #: 23411B4b
SDG #: SEQ002

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10		Al, Sb, As, Ba, Be, (Cd), Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
QC11-13		Al, Sb, As, Ba, Be, (Cd), Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, (Cd), Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,

Comments: Mercury by CVAA if performed

Report# 23411C4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 28, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050566

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMSG004-1U	05/17/2010	1005GWMSG004-1U
1005GWMSG004-2U	05/17/2010	1005GWMSG004-2U
1005GWMSG005-U	05/17/2010	1005GWMSG005-U
1005GWMSG006-U	05/17/2010	1005GWMSG006-U
1005GWMDS025-U	05/16/2010	1005GWMDS025-U
1005GWMDS026-U	05/16/2010	1005GWMDS026-U
1005GWMDS030-U	05/17/2010	1005GWMDS030-U
1005GWMDS034-U	05/16/2010	1005GWMDS034-U
1005GWMST069-U	05/17/2010	1005GWMST069-U
1005GWMST144-U	05/16/2010	1005GWMST144-U
1005B-GW-01-U	05/17/2010	1005B-GW-01-U
1005ER-GW-01-U	05/17/2010	1005ER-GW-01-U
1005GWMSG007-1F	05/17/2010	1005GWMSG007-1F
1005GWMSG004-2F	05/17/2010	1005GWMSG004-2F
1005GWMSG005-F	05/17/2010	1005GWMSG005-F
1005GWMSG006-F	05/17/2010	1005GWMSG006-F
1005GWMDS025-F	05/16/2010	1005GWMDS025-F
1005GWMDS026-F	05/16/2010	1005GWMDS026-F
1005GWMDS030-F	05/17/2010	1005GWMDS030-F
1005GWMDS034-F	05/16/2010	1005GWMDS034-F
1005GWMST069-F	05/17/2010	1005GWMST069-F
1005GWMST144-F	05/16/2010	1005GWMST144-F
1005B-GW-01-F	05/17/2010	1005B-GW-01-F
1005ER-GW-01-F	05/17/2010	1005ER-GW-01-F
1005GWMSG004-1FMS	05/17/2010	L10050566-02MS
1005GWMSG004-1FMSD	05/17/2010	L10050566-02MSD

Sample Identification	Collection Date	Laboratory Sample Identification
1005B-GW-01-FMS	05/17/2010	L10050566-22MS
1005B-GW-01-FMSD	05/17/2010	L10050566-22MSD

Samples appended with “F” were analyzed for dissolved cadmium

Introduction

This data review covers 28 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1005ER-GW-01-U and 1005ER-GW-01-F were identified as equipment rinsates. No metal contaminants were found in these blanks.

Samples 1005B-GW-01-U and 1005B-GW-01-F were identified as source blanks. No metal contaminants were found in these blanks.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq$ 20% for water or $\leq$ 35% for soil. For low level results, <5 x RL, a difference of $\pm$ 1 x RL is allowed for water and $\pm$ 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of $\pm$10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Cadmium results were outside the QC limits; results were not qualified since the original sample (1005GWMDS025-U) was less than 50 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050566

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10050566

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050566

No Sample Data Qualified in this SDG

LDC #: 23411C4b

SDG #: L10050566

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6-24-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Cd & Se (EPA SW846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/16-17/10
II.	Calibration / ICP/MS tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	ER=12, 24 Source Blank=11, 23 ~~see below~~

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMSG004-1U	11	1005B-GW-01-U	21	1005GWMST069-F	31	PBW
2	1005GWMSG004-2U	12	1005ER-GW-01-U	22	1005GWMST144-F	32	PBW
3	1005GWMSG005-U	13	1005GWMSG007-1F	23	1005B-GW-01-F	33	
4	1005GWMSG006-U	14	1005GWMSG004-2F	24	1005ER-GW-01-F	34	
5	1005GWMDS025-U	15	1005GWMSG005-F	25	1005GWMSG004-1FMS	35	
6	1005GWMDS026-U	16	1005GWMSG006-F	26	1005GWMSG004-1FMSD	36	
7	1005GWMDS030-U	17	1005GWMDS025-F	27	1005B-GW-01-FMS	37	
8	1005GWMDS034-U	18	1005GWMDS026-F	28	1005B-GW-01-FMSD	38	
9	1005GWMST069-U	19	1005GWMDS030-F	29		39	
10	1005GWMST144-U	20	1005GWMDS034-F	30		40	

Notes: Samples appended with "F" were analyzed for dissolved cadmium

~~ER= 1005ER-SW-05-U, 1005ER-SW-05-F > SDG# L10050525)~~

~~Source Blk: 1005B-SW-06-U, 1005B-SW-06-F~~

LDC #: 23411C4b
SDG #: S0C0002

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-12		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se) Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
13-24		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
QC-25,26		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se) Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
27,28		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se) Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, ~~(Cd)~~ Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, ~~(Se)~~ Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se) Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___

Comments: Mercury by CVAA if performed

LDC #: 23411C4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA CLP SOW ILM02.1)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A — If analyte concentrations were > 50X the IDL, was ~~an ICP~~ serial dilution analyzed?

Y (N) N/A — Were ICP serial dilution percent differences (%D) ≤10%?

Y (N) N/A — Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N (N/A) — Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		5	water	Cd	14.2	5-12, 17-24	No Qual (<50x MDL)

Comments:

SDIL.4C

Monsanto, P4 Production LLC
Data Verification Reports
LDC #23411

Wet Chemistry

LDC

Report# 23411A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 30, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050524

Sample Identification	Collection Date	Laboratory Sample Identification
1005SWMST089-U	05/13/2010	L10050524-01
1005SWMST089-F	05/13/2010	L10050524-02
1005SWMST090-U	05/13/2010	L10050524-03
1005SWMST090-F	05/13/2010	L10050524-04
1005SWMST092-U	05/13/2010	L10050524-05
1005SWMST092-F	05/13/2010	L10050524-06
1005SWMST093-U	05/13/2010	L10050524-07
1005SWMST093-F	05/13/2010	L10050524-08
1005SWMST094-U	05/13/2010	L10050524-09
1005SWMST094-F	05/13/2010	L10050524-10
1005SWMST095-U	05/13/2010	L10050524-11
1005SWMST095-F	05/13/2010	L10050524-12
1005SWMST128-U	05/16/2010	L10050524-13
1005SWMST128-F	05/16/2010	L10050524-14
1005SWMST131-U	05/16/2010	L10050524-19
1005SWMST131-F	05/16/2010	L10050524-20
1005SWMST132-1-U	05/16/2010	L10050524-25
1005SWMST132-1-F	05/16/2010	L10050524-26
1005SWMST132-2-U	05/16/2010	L10050524-27
1005SWMST132-2-F	05/16/2010	L10050524-28
1005SWMST132-3-U	05/16/2010	L10050524-29
1005SWMST132-3-F	05/16/2010	L10050524-30
1005SWMST133-U	05/15/2010	L10050524-31
1005SWMST133-F	05/15/2010	L10050524-32
1005SWMST128-UMS	05/16/2010	L10050524-15

1005SWMST128-UMSD	05/16/2010	L10050524-17
1005SWMST128-FMS	05/16/2010	L10050524-16
1005SWMST128-FMSD	05/16/2010	L10050524-18
1005SWMST131-UMS	05/16/2010	L10050524-21
1005SWMST131-UMSD	05/16/2010	L10050524-23
1005SWMST131-FMS	05/16/2010	L10050524-22
1005SWMST131-FMSD	05/16/2010	L10050524-24
1005SWMST090-FDUP	05/13/2010	L10050524-04DUP

Introduction

This data review covers 33 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Chloride and Sulfate, Standard Method 2340B for Hardness , and EPA 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 7 days for method 160.1, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1005ER-SW-04-U, 1005ER-SW-04-F, 1005ER-SW-05-U, and 1005ER-SW-05-F (all from SDG L10050525) were identified as equipment rinsates. No contaminant concentration were found in these blanks with the following exceptions:

Equipment Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
1005ER-GW-04-U	5/15/10	Total dissolved solids	28 mg/L	1005SWMST133-U

Samples 1005B-SW-03-U, 1005B-SW-03-F, 1005B-SW-06-U, and 1005B-SW-06-F (all from SDG L10050525) were identified as equipment rinsates. No contaminant concentration were found in these blanks.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>1X blank contaminants) than the concentrations found in the associated field blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10050524

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10050524

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10050524

No Sample Data Qualified in this SDG

LDC #: 23411A6

SDG #: L10050524

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6-25-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

METHOD: (Analyte) Chloride, Sulfate (EPA Method 300.0), Hardness (SM2340B), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/13-16/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	Dup
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	SW	Source Blk = 1005B-SW-03-U, 1005B-SW-03-F, 1005B-SW-06-U, 1005B-SW-06-F (SDG # L10050525)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

*See below for ER

Validated Samples: water

1	1005SWMST089-U	11	1005SWMST132-3-U	21	1005SWMST132-1-F	31	1005SWMST131-FMS
2	1005SWMST090-U	12	1005SWMST133-U	22	1005SWMST132-2-F	32	1005SWMST131-FMSD
3	1005SWMST092-U	13	1005SWMST089-F	23	1005SWMST132-3-F	33	1005SWMST090-FDUP
4	1005SWMST093-U	14	1005SWMST090-F	24	1005SWMST133-F	34	
5	1005SWMST094-U	15	1005SWMST092-F	25	1005SWMST128-UMS	35	
6	1005SWMST095-U	16	1005SWMST093-F	26	1005SWMST128-UMSD	36	
7	1005SWMST128-U	17	1005SWMST094-F	27	1005SWMST131-UMS	37	
8	1005SWMST131-U	18	1005SWMST095-F	28	1005SWMST131-UMSD	38	
9	1005SWMST132-1-U	19	1005SWMST128-F	29	1005SWMST128-FMS	39	
10	1005SWMST132-2-U	20	1005SWMST131-F	30	1005SWMST128-FMSD	40	

Notes: ER= 1005ER-SW-04-U, 1005ER-SW-04-F, 1005ER-SW-05-U, 1005ER-SW-05-F (SDG # L10050525)

LDC #: 23411A6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: W

All circled methods are applicable to each sample.

Sample ID	Parameter
1-12	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
13-23	pH TDS (Cl) F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} (Hardness) ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
629-32	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
QC: ~~25-28~~	pH TDS (Cl) F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} (Hardness) ____ ____
33	pH TDS (Cl) F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
QC: 25-28	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}

Comments:

LDC #: 23452A6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 5/15/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Source Blk Associated Samples: 12

Analyte	Blank ID	Action Limit	Sample Identification							
	1005B-SW-03-U (SDG#: L10050525)		~~NoQual~~							
TDS	CR ~~1330~~ ND	~~1330~~ CR								

Sampling date: 5/15/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: ER Associated Samples: 12

Analyte	Blank ID	Action Limit	Sample Identification							
	1005ER-SW-04-U (SDG#: L10050525)		NoQual							
TDS	28	28								

+ sample was reran ND.

Report# 23411B6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 30, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050565

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW006-U	05/17/2010	L10050565-01
1005GWMMW018-1-U	05/15/2010	L10050565-03
1005GWMMW018-2-U	05/15/2010	L10050565-05
1005GWMMW020-U	05/17/2010	L10050565-07
1005GWMMW027-U	05/17/2010	L10050565-09
1005GWMMW011-U	05/16/2010	L10050565-11
1005GWMMW017-U	05/16/2010	L10050565-13
1005GWMMW028-U	05/16/2010	L10050565-15
1005GWMMW029-U	05/15/2010	L10050565-23
1005GWMMW031-U	05/17/2010	L10050565-25
1005GWMMW006-F	05/15/2010	L10050565-02
1005GWMMW018-1-F	05/15/2010	L10050565-04
1005GWMMW018-2-F	05/17/2010	L10050565-06
1005GWMMW020-F	05/17/2010	L10050565-08
1005GWMMW027-F	05/17/2010	L10050565-10
1005GWMMW011-F	05/16/2010	L10050565-12
1005GWMMW017-F	05/16/2010	L10050565-14
1005GWMMW028-F	05/16/2010	L10050565-16
1005GWMMW029-F	05/15/2010	L10050565-24
1005GWMMW031-F	05/17/2010	L10050565-26
1005GWMMW020-U-MS	05/17/2010	L10050565-17
1005GWMMW020-U-MSD	05/17/2010	L10050565-19
1005GWMMW028-U-MS	05/16/2010	L10050565-21
1005GWMMW020-F-MS	05/17/2010	L10050565-18
1005GWMMW020-F-MSD	05/17/2010	L10050565-20

1005GWMMW028-F-MS	05/16/2010	L10050565-22
1005GWMMW020-FDUP	05/17/2010	L10050565-08DUP
1005GWMMW028-FDUP	05/16/2010	L10050565-16DUP
1005GWMMW018-2-UDUP	05/15/2010	L10050565-05DUP
1005GWMMW027-UDUP	05/17/2010	L10050565-09DUP

Introduction

This data review covers 30 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Chloride and Sulfate and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 160.1) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1005ER-GW-01-U and 1005ER-GW-01-F (both from SDG L10050566) were identified as equipment rinsates. No contaminate concentrations were found in these blanks.

Samples 1005B-GW-01-U and 1005B-GW-01-F (both from SDG L10050566) were identified as source blanks. No contaminant concentrations were found in these blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1005GWMMW020-UMS/MSD (1005GWMMW020-U 1005GWMMW027-U)	Total dissolved solids	45.6 (80-120)	139 (80-120)	57.9 (≤20)	J (all detects) UJ (all non-detects)	A

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10050565

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L10050565	1005GWMMW020-U 1005GWMMW027-U	Total dissolved solids	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (RPD)	16, 17

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10050565

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10050565

No Sample Data Qualified in this SDG

LDC #: 23411B6

SDG #: L10050565

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6-25-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/15-17/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
V	Duplicates	A	Dup
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	ND ~~A~~	ER = 1005ER-GW-01-U, 1005ER-GW-01-F (SDG ~~#~~ L10050566) Source Blk = 1005B-GW-01-U, 1005B-GW-01-F

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

See below

1	1005GWMMW006-U	11	1005GWMMW006-F	21	1005GWMMW020-U/MS	31	
2	1005GWMMW018-1-U	12	1005GWMMW018-1-F	22	1005GWMMW020-U/MSD	32	
3	1005GWMMW018-2-U	13	1005GWMMW018-2-F	23	1005GWMMW028-U/MS	33	
4	1005GWMMW020-U	14	1005GWMMW020-F	24	1005GWMMW020-F/MS	34	
5	1005GWMMW027-U	15	1005GWMMW027-F	25	1005GWMMW020-F/MSD	35	
6	1005GWMMW011-U	16	1005GWMMW011-F	26	1005GWMMW028-F/MS	36	
7	1005GWMMW017-U	17	1005GWMMW017-F	27	1005GWMMW020-F DUP	37	
8	1005GWMMW028-U	18	1005GWMMW028-F	28	1005GWMMW028-F DUP	38	
9	1005GWMMW029-U	19	1005GWMMW029-F	29	1005GWMMW018-2-U DUP	39	
10	1005GWMMW031-U	20	1005GWMMW031-F	30	1005GWMMW027-U DUP	40	

Notes: ~~Source Blk = 1005B-SW-03-U, 1005B-SW-03-F, 1005B-SW-06-U, 1005B-SW-06-F~~
~~ER = 1005ER-SW-04-U, 1005ER-SW-04-F, 1005ER-SW-05-U, 1005ER-SW-05-F~~

CR

~~SDG # L10050525~~

LDC #: 23411B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
11-20	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
1-10	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
QC: 24-28	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
QC: 21-23,29,30	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}

Comments:

LDC #: 23411B6

SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: CR

2nd Reviewer: L

METHOD: Inorganics, EPA Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y (N) N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	21/22	Water	TDS	45.6 (80-120)	139 (80-120)	57.9 (≤10)	4, 5	J / UJ / A (16, 17)

Comments:

MSD.6

Report# 23411C6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 30, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050566

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMSG004-1U	05/17/2010	L10050566-01
1005GWMSG004-2U	05/17/2010	L10050566-03
1005GWMSG005-U	05/17/2010	L10050566-05
1005GWMSG006-U	05/17/2010	L10050566-07
1005GWMDS025-U	05/16/2010	L10050566-09
1005GWMDS026-U	05/16/2010	L10050566-11
1005GWMDS030-U	05/17/2010	L10050566-13
1005GWMDS034-U	05/16/2010	L10050566-15
1005GWMST069-U	05/17/2010	L10050566-17
1005GWMST144-U	05/16/2010	L10050566-19
1005B-GW-01-U	05/17/2010	L10050566-21
1005ER-GW-01-U	05/17/2010	L10050566-23
1005GWMSG004-1F	05/17/2010	L10050566-02
1005GWMSG004-2F	05/17/2010	L10050566-04
1005GWMSG005-F	05/17/2010	L10050566-06
1005GWMSG006-F	05/17/2010	L10050566-08
1005GWMDS025-F	05/16/2010	L10050566-10
1005GWMDS026-F	05/16/2010	L10050566-12
1005GWMDS030-F	05/17/2010	L10050566-14
1005GWMDS034-F	05/16/2010	L10050566-16
1005GWMST069-F	05/17/2010	L10050566-18
1005GWMST144-F	05/16/2010	L10050566-20
1005B-GW-01-F	05/17/2010	L10050566-22
1005ER-GW-01-F	05/17/2010	L10050566-24
1005GWMST144-FDUP	05/16/2010	L10050566-20DUP

1005GWMST144-FMS	05/16/2010	L10050566-20MS
1005GWMST144-FMSD	05/16/2010	L10050566-20MSD
1005GWMSG004-1UDUP	05/17/2010	L10050566-01DUP

Introduction

This data review covers 28 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Chloride and Sulfate, and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 160.1) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1005ER-GW-01-U and 1005ER-GW-01-F were identified as equipment rinsates. No contaminate concentrations were found in these blanks with the following exceptions:

Equipment Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
1005ER-GW-01-F	5/17/10	Chloride	0.128 mg/L	1005GWMSG004-1F 1005GWMSG004-2F 1005GWMSG005-F 1005GWMSG006-F 1005GWMDS030-F 1005GWMST069-F

Samples 1005B-GW-01-U and 1005B-GW-01-F were identified as source blanks. No contaminant concentrations were found in these blanks.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>1X blank contaminants) than the concentrations found in the associated field blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) limits.

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10050566

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10050566

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10050566

No Sample Data Qualified in this SDG

LDC #: 23411C6

SDG #: L10050566

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6/24/10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: (Analyte) Chloride, Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/16-17/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	Dup
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	SW	ER=12*, 24 Source Blk=11*, 23* see below

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; * ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMSG004-1U	11	1005B-GW-01-U	21	1005GWMST069-F	31	PBW
2	1005GWMSG004-2U	12	1005ER-GW-01-U	22	1005GWMST144-F	32	
3	1005GWMSG005-U	13	1005GWMSG00~~3~~4-1F	23	1005B-GW-01-F	33	
4	1005GWMSG006-U	14	1005GWMSG004-2F	24	1005ER-GW-01-F	34	
5	1005GWMDS025-U	15	1005GWMSG005-F	25	1005GWMST144-F Dup	35	
6	1005GWMDS026-U	16	1005GWMSG006-F	26	MS	36	
7	1005GWMDS030-U	17	1005GWMDS025-F	27	MSD	37	
8	1005GWMDS034-U	18	1005GWMDS026-F	28	1005GWMSG004-1U Dup	38	
9	1005GWMST069-U	19	1005GWMDS030-F	29		39	
10	1005GWMST144-U	20	1005GWMDS034-F	30		40	

Notes: ~~ER=1005ER-SW-05-U, 1005ER-SW-05-F~~ ~~SDG# L10050525~~ ~~Source Blk=1005B-SW-06-U, 1005B-SW-06-F~~

LDC #: 23411C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
13-24	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
1-12	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
QC 25-27	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
28	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____

Comments:

LDC #: 23411C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 5/17/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other:_____ Associated Samples: ~~13-22~~ 13-16, 19, 21 (all >1x)

Analyte	Blank ID	Action Limit	Sample Identification							
	24		No Qualifiers							
Cl	0.128	0.128								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

MWH Americas, Inc.
2121 N. California Blvd. Suite 600
Walnut Creek, CA 94596
ATTN: Ms. Ruth Siegmund

July 26, 2010

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. Siegmund,

Enclosed are the final verification reports for the fractions listed below. These SDGs were received on June 23, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 23452:

SDG #	Fraction
L10050525, L10050653, L10050667 L10050670, L10050740, L10050741 L10050742, L10050784, 253507 253677	Metals, Wet Chemistry, Gross Alpha & Gross Beta

The data verification was performed under Stage 2B/4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- QAPP Addendum, MWH 2009, to the project SAP, MWH 2004
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

EDD

LDC #23452 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Cd,Se (6020A)		Se (6020A)		Cd,Pb Se (6020A)		(14) Metals (6020A)		(6) Metals (6010B)		Hg (7000)		Diss. Cd (6020A)		Diss. Cd,Se (6020A)		(4)Diss. Metals (6010B)		(5)Diss. Metals (6010B)		Alk. (310.2)		Cl (300.0)		SO_4 (300.0)		Hard. (2340B)		NO3/ NO2-N (353.2)		TDS (160.1)		TSS (160.2)	
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	L10050525	06/23/10	07/15/10	-	-	20	0	-	-	-	-	-	-	-	-	20	0	-	-	20	0	-	-	-	-	23	0	23	0	20	0	-	-	20	0	-	-
B	L10050653	06/23/10	07/15/10	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	-	-	-	-	1	0	-	-
C	L10050667	06/23/10	07/15/10	5	0	-	-	1	0	-	-	-	-	-	-	-	-	4	0	-	-	-	-	-	-	-	-	7	0	-	-	-	-	7	0	-	-
D	L10050670	06/23/10	07/15/10	-	-	-	-	-	-	2	0	2	0	2	0	-	-	-	-	-	-	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0
E	L10050740	06/23/10	07/15/10	6	0	-	-	-	-	-	-	-	-	-	-	-	-	5	0	-	-	-	-	-	-	-	-	6	0	-	-	-	-	6	0	-	-
F	L10050741	06/23/10	07/15/10	1	0	-	-	-	-	4	0	4	0	4	0	-	-	-	-	-	-	4	0	4	0	4	0	6	0	4	0	4	0	5	0	4	0
G	L10050742	06/23/10	07/15/10	10	0	-	-	-	-	-	-	-	-	-	-	-	-	4	0	-	-	-	-	-	-	-	-	11	0	-	-	-	-	11	0	-	-
H	L10050784	06/23/10	07/15/10	2	0	-	-	-	-	-	-	-	-	-	-	-	-	1	0	-	-	-	-	-	-	-	-	2	0	-	-	-	-	2	0	-	-
Total	T/LR			25	0	20	0	1	0	6	0	6	0	6	0	20	0	14	0	20	0	6	0	6	0	29	0	58	0	26	0	6	0	54	0	6	309

LDC #23452 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Gross α&β (900.0)																																	
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
I	253507	06/23/10	07/15/10	3	0																																
I	253507	06/23/10	07/15/10	1	0																																
J	253677	06/23/10	07/15/10	4	0																																
Total	T/LR			8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8

Shaded cells indicate Level III validation (all other cells are ADR review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

Monsanto, P4 Production LLC
Data Verification Reports
LDC #23452

Metals

LDC

Report# 23452A4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2010

Matrix: Water

Parameters: Dissolved Metals by ICP SW-846 Method 6010B

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050525

Sample Identification	Collection Date	Laboratory Sample Identification
1005B-SW-01-F	05/14/2010	L10050525-02
1005ER-SW-02-F	05/14/2010	L10050525-04
1005B-SW-03-F	05/15/2010	L10050525-06
1005ER-SW-04-F	05/16/2010	L10050525-08
1005ER-SW-05-F	05/16/2010	L10050525-10
1005B-SW-06-F	05/16/2010	L10050525-12
1005SWMST019-F	05/15/2010	L10050525-14
1005SWMST020-F	05/14/2010	L10050525-20
1005SWMST044-F	05/14/2010	L10050525-22
1005SWMST045-1-F	05/14/2010	L10050525-24
1005SWMST045-2-F	05/14/2010	L10050525-26
1005SWMST045-3-F	05/14/2010	L10050525-28
1005SWMDS025-F	05/15/2010	L10050525-30
1005SWMST050-F	05/14/2010	L10050525-32
1005SWMST057-F	05/14/2010	L10050525-34
1005SWMST063-F	05/15/2010	L10050525-36
1005SWMST066-F	05/14/2010	L10050525-38
1005SWMST067-F	05/14/2010	L10050525-40
1005SWMST069-F	05/13/2010	L10050525-42
1005SWMST143-F	05/15/2010	L10050525-44
1005SWMST019-FMS	05/15/2010	L10050525-16
1005SWMST019-FMSD	05/15/2010	L10050525-18

Introduction

This data review covers 22 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium, Iron, Magnesium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met with the exception of calcium. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

The calcium %R was 161%, however the associated sample results were greater than 2X the RL, therefore no data required qualification.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1005ER-SW-02-F, 1005ER-SW-04-F, and 1005ER-SW-05-F were identified as equipment rinsates. No metal contaminants were found in these blanks.

Samples 1005B-SW-01-F, 1005B-SW-03-F, and 1005B-SW-06-F were identified as source blanks. No metal contaminants were found in these blanks with the following exceptions:

Source Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1005B-SW-06-F	5/16/10	Iron	0.0280 mg/L	No associated samples in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium results were outside the QC limits; results were not qualified since the original samples (1005SWMST019-F), (1005SWMST128-F and 1005SWMST131-F from SDG L10050524), were greater than 4X the spike amount.

Calcium results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L10050586-4) is representative of client's sample matrix.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050525

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10050525

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050525

No Sample Data Qualified in this SDG

LDC #: 23452A4a

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 6-29-10

SDG #: L10050525

Page: 1 of 1

Laboratory: Microbac Laboratories, Inc.

Reviewer: ar

2nd Reviewer: ✓

METHOD: Dissolved Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/13-16/10
II.	Calibration	SW	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	Source Blk = 1*, 3*, 6, EB = 2*, 4*, 5*

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND* = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1 1	1005B-SW-01-F	11	1005SWMST045-2-F	21	1005SWMST019-FMS	31	PBW1 (5/26)
2	1005ER-SW-02-F	12	1005SWMST045-3-F	22	1005SWMST019-FMSD	32	PBW2 (5/21)
3	1005B-SW-03-F	13	1005SWM~~ST~~DS025-F	23		33	PBW3 (5/23)
4	1005ER-SW-04-F	14	1005SWMST050-F	24		34	
5	1005ER-SW-05-F	15	1005SWMST057-F	25		35	
6 1	1005B-SW-06-F	16	1005SWMST063-F	26		36	
7 2	1005SWMST019-F	17	1005SWMST066-F	27		37	
8	1005SWMST020-F	18 2	1005SWMST067-F	28		38	
9	1005SWMST044-F	19 3	1005SWMST069-F	29		39	
10	1005SWMST045-1-F	20 3	1005SWMST143-F	30		40	

Notes:

LDC #: 23452A49
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: CR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 23452A4a
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: SR
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 23452449
SDG #: SEQ0002

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-20		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
QC: 21,22		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___

Comments: Mercury by CVAA if performed

LDC #: 23452A4g
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?
Y N N/A Are all correlation coefficients ≥0.995?
Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	5/24/10	CRDL (16:08)	Ca	161 (70-130)	14 - 18	No Qual (>2x RL)

Comments:

CAL4SW

LDC #: 23452A4a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/L
Reason Code: 26
Sampling date: 5/16/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Source Blank
Associated Samples: ~~4-5 (ND)~~ none

Analyte	Blank ID	Sample Identification											
	6	Action Level	No Qualifiers										
Fe	0.0280	0.0280											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 23452A4a
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	21,22	W	Ca	141	177		7-8	No Qual (>4x spike)
	L10050586-4	W	Ca	233	238		19,20	No Qual (non-client)
	10055 WM ST128-F (SDG# L10050524)	W	Ca	177	191		1-6	No Qual (>4x spike)
	10055 WM ST131-F (SDG# L10050524)	W	Ca	177	177		1-6	No Qual (>4x spike)

Comments:

MSD.4SW

LDC #: 23452A4g
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: GR
2nd Reviewer: L

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (~~ug/L~~ mg/L)	True (~~ug/L~~ mg/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Ca	10.6	10.0	106	106	Y
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
CCV 5/12/10 (20:00)	ICP (Continuing calibration)	V	1.09	1.00	109	109	Y
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
	ICP/MS (Initial calibration)						
	ICP/MS (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 23452 4g
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ mg/L	True / D / SDR ~~(units)~~ mg/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	V	0.241	0.250	96.4	96.4	Y
LCS	Laboratory control sample	Mg	5.00	5.00	100	100	
21	Matrix spike	Fe	(SSR-SR) 2.08	2.00	104	104	
21/22	Duplicate	Ca	64.0	65.8	2.77	2.76	
9	ICP serial dilution	Mg	22.3	23	3.14	3.14	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 23452A4a
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Fe / Ca were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)(%S)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:
19: Fe Raw Data = 0.0989 mg/L
20: Ca Raw Data = 46.4 mg/L

Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
19	Fe	0.0989	0.0989	Y
	Mg	92.9	92.9	
	Ca	496	496	
20	Ca	46.4	46.4	Y
	Fe	0.0401	0.0401	
	Mg	7.96	7.96	

RECALC.4S2

Report# 23452D4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2010

Matrix: Water

Parameters: Dissolved Metals by ICP SW-846 Method 6010B

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050670

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW032-U	05/20/2010	L10050670-01
1005GWMMW033-U	05/20/2010	L10050670-03
1005GWMMW032-F	05/20/2010	L10050670-02
1005GWMMW033-F	05/20/2010	L10050670-04

Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Aluminum, Barium, Beryllium, Calcium, Iron, Magnesium, Molybdenum, Potassium, Sodium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1005GWMMW032-UL	Iron	21.40 (≤10)	1005GWMMW032-U 1005GWMMW033-U	J (all detects) UJ (all non-detects)	A

Barium results were outside the QC limits; results were not qualified since the original sample (1005GWMMW032-U) was less than 50 times the MDLs.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050670

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L10050670	1005GWMMW032-U 1005GWMMW033-U	Iron	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG L10050670

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050670

No Sample Data Qualified in this SDG

LDC #: 23452A4a

SDG #: L10050~~525~~670

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 6-30-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: ✓

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/20/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	N	Client specified
VI.	Duplicate Sample Analysis	N	↓
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW032-U	11	PBW	21		31	
2	1005GWMMW033-U	12		22		32	
3	1005GWMMW032-F	13		23		33	
4	1005GWMMW033-F	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 23452A4G
SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Reviewer: QR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.			✓	
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 23452A4a
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: SR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 23452A4a
SDG #: S0C0002

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: W

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
3,4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___

Comments: Mercury by CVAA if performed

LDC #: 23452D49
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: SR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA CLP SOW ILM02.1)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		1	W	Ba	17.90	1,2	No Qual (<50x MDL)
				Fe	21.40	↓	J/UJ/A (18)

Comments:

SDIL.4C

LDC #: 23452D4/9
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	K	50.0	50.0	100	100	Y
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
CCV(21:31)	ICP (Continuing calibration)	Ba	0.948	1	94.8	94.8	Y
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
	ICP/MS (Initial calibration)						
	ICP/MS (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 23452B4

SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units) mg/L	True / D / SDR (units) mg/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Fe	94.1	100	94.1	94.1	Y
LCS	Laboratory control sample	Be	0.0235	0.0250	94	93.89	Y
N	Matrix spike		(SSR-SR)				
N	Duplicate						
3	ICP serial dilution	Na	8.67 mg/L	8.75 mg/L		0.92	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 23452A1a
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Al were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

Raw Data = 0.196 mg/L

Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	Al	0.196	0.196	Y
	Be	0.0509	0.0509	↓
	Fe	0.136	0.136	↓

RECALC.4S2

Report# 23452F4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2010

Matrix: Water

Parameters: Metals by ICP SW-846 Method 6010B

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050741

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW035-U	05/21/2010	L10050741-01
1005GWMMW034-1-U	05/21/2010	L10050741-07
1005GWMMW034-2-U	05/21/2010	L10050741-09
1005GWMMW036-U	05/21/2010	L10050741-11
1005GWMMW035-F	05/21/2010	L10050741-02
1005GWMMW034-1-F	05/21/2010	L10050741-08
1005GWMMW034-2-F	05/21/2010	L10050741-10
1005GWMMW036-F	05/21/2010	L10050741-12
1005GWMMW035-U-MS	05/21/2010	L10050741-03
1005GWMMW035-U-MSD	05/21/2010	L10050741-05
1005GWMMW035-F-MS	05/21/2010	L10050741-04
1005GWMMW035-F-MSD	05/21/2010	L10050741-06

Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Aluminum, Barium, Beryllium, Calcium, Iron, Magnesium, Molybdenum, Potassium, Sodium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Iron results were outside the QC limits; results were not qualified since the original sample (1005GWMMW035-U) was greater than 4X the spike amount.

Calcium and Magnesium results were outside the QC limits; results were not qualified since the original sample (1005GWMMW035-F) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Barium results were outside the QC limits; results were not qualified since the original sample (1005GWMMW034-1-F) was less than 50 times the MDLs.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable. A method detection limit (MDL) study was specified in the laboratory's SOP for validation of this method for vegetation samples. However, the MDL study could not be completed for vegetation matrix because the media contained target analytes at levels significantly greater than the sensitivity of the instrument, so the MDLs reported for the vegetation data are based on the laboratory's previously-generated MDLs established using Teflon® beads. Because the MDL study could not be completed, the A/T request analysis of a low-level LCS with each preparation batch of vegetation samples. However, the samples for this laboratory SDG were already prepared and analyzed, so the low-level LCS request could not be accommodated.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050741

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10050741

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050741

No Sample Data Qualified in this SDG

LDC #: 23452F4a

SDG #: L10050741

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-1-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/21/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW035-U	11	1005GWMMW035-F-MS	21	PBW	31	
2	1005GWMMW034-1-U	12	1005GWMMW035-F-MSD	22		32	
3	1005GWMMW034-2-U	13		23		33	
4	1005GWMMW036-U	14		24		34	
5	1005GWMMW035-F	15		25		35	
6	1005GWMMW034-1-F	16		26		36	
7	1005GWMMW034-2-F	17		27		37	
8	1005GWMMW036-F	18		28		38	
9	1005GWMMW035-U-MS	19		29		39	
10	1005GWMMW035-U-MSD	20		30		40	

Notes:

LDC #: 23452F4a
SDG #: SE0002

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
5-8		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
9,10		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
11,12		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___

Comments: Mercury by CVAA if performed

LDC #: 23452F4a
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A — Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A — Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

(Y) N N/A — Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N (N/A) — Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	9/10	W	Fe	-974	-973		1-4	No Qual (>4x spike)
	11/12	W	Ca	419	535		5-8	No Qual (>4x spike)
			Mg		170		↓	↓

Comments:

MSD.4SW

LDC #: 23452F4a
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CB
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA CLP SOW ILM02.1)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		6	W	Ba	19.30	1-4	No Qual (<50 X sample)

Comments:

SDIL.4C

Report# 23452A4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050525

Sample Identification	Collection Date	Laboratory Sample Identification
1005B-SW-01-U	05/14/2010	L10050525-01
1005ER-SW-02-U	05/14/2010	L10050525-03
1005B-SW-03-U	05/15/2010	L10050525-05
1005ER-SW-04-U	05/15/2010	L10050525-07
1005ER-SW-05-U	05/16/2010	L10050525-09
1005B-SW-06-U	05/16/2010	L10050525-11
1005SWMST019-U	05/15/2010	L10050525-13
1005SWMST020-U	05/14/2010	L10050525-19
1005SWMST044-U	05/14/2010	L10050525-21
1005SWMST045-1-U	05/14/2010	L10050525-23
1005SWMST045-2-U	05/14/2010	L10050525-25
1005SWMST045-3-U	05/14/2010	L10050525-27
1005SWMDS025-U	05/15/2010	L10050525-29
1005SWMST050-U	05/14/2010	L10050525-31
1005SWMST057-U	05/14/2010	L10050525-33
1005SWMST063-U	05/15/2010	L10050525-35
1005SWMST066-U	05/14/2010	L10050525-37
1005SWMST067-U	05/14/2010	L10050525-39
1005SWMST069-U	05/13/2010	L10050525-41
1005SWMST143-U	05/15/2010	L10050525-43
1005B-SW-01-F	05/14/2010	L10050525-02
1005ER-SW-02-F	05/14/2010	L10050525-04
1005B-SW-03-F	05/15/2010	L10050525-06
1005ER-SW-04-F	05/16/2010	L10050525-08
1005ER-SW-05-F	05/16/2010	L10050525-10

1005B-SW-06-F	05/16/2010	L10050525-12
1005SWMST019-F	05/15/2010	L10050525-14
1005SWMST020-F	05/14/2010	L10050525-20
1005SWMST044-F	05/14/2010	L10050525-22
1005SWMST045-1-F	05/14/2010	L10050525-24
1005SWMST045-2-F	05/14/2010	L10050525-26
1005SWMST045-3-F	05/14/2010	L10050525-28
1005SWMDS025-F	05/15/2010	L10050525-30
1005SWMST050-F	05/14/2010	L10050525-32
1005SWMST057-F	05/14/2010	L10050525-34
1005SWMST063-F	05/15/2010	L10050525-36
1005SWMST066-F	05/14/2010	L10050525-38
1005SWMST067-F	05/14/2010	L10050525-40
1005SWMST069-F	05/13/2010	L10050525-42
1005SWMST143-F	05/15/2010	L10050525-44
1005SWMST019-UMS	05/15/2010	L10050525-15
1005SWMST019-UMSD	05/15/2010	L10050525-17
1005SWMST019-FMS	05/15/2010	L10050525-16
1005SWMST019-FMSD	05/15/2010	L10050525-18

Samples appended with “F” were analyzed for dissolved cadmium

Introduction

This data review covers 44 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1005ER-SW-02-U, 1005ER-SW-04-U, 1005ER-SW-05-U, 1005ER-SW-02-F, 1005ER-SW-04-F, and 1005ER-SW-05-F were identified as equipment rinsates. No metal contaminants were found in these blanks.

Samples 1005B-SW-01-U, 1005B-SW-03-U, 1005B-SW-06-U, 1005B-SW-01-F, 1005B-SW-03-F, and 1005B-SW-06-F were identified as source blanks. No metal contaminants were found in these blanks.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Cadmium results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client samples (L10050601-47 and L10050654-3) were representative of client's sample matrix.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]).

Selenium results were outside the QC limits; results were not qualified since the original sample (1005SWMDS025-U) was less than 50 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050525

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10050525

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050525

No Sample Data Qualified in this SDG

LDC #: 23452A4b

SDG #: L10050525

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 6-30-10

Page: 1 of 2

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6020) A

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/13-16/10
II.	Calibration / ICPMS Tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	Source Blk = 1, 3, 6, 21, 23, 26. EB = 2, 4, 5, 22, 24, 25

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1 1	1005B-SW-01-U	11	1005SWMST045-2-U	21 1	1005B-SW-01-F	31 2	1005SWMST045-2-F
2	1005ER-SW-02-U	12 2	1005SWMST045-3-U	22 1	1005ER-SW-02-F	32 3	1005SWMST045-3-F
3 1	1005B-SW-03-U	13 3	1005SWM~~ST~~025-U DS	23 2	1005B-SW-03-F	33	1005SWM~~ST~~025-F DS
4 2	1005ER-SW-04-U	14	1005SWMST050-U	24	1005ER-SW-04-F	34	1005SWMST050-F
5	1005ER-SW-05-U	15	1005SWMST057-U	25	1005ER-SW-05-F	35	1005SWMST057-F
6	1005B-SW-06-U	16	1005SWMST063-U	26	1005B-SW-06-F	36	1005SWMST063-F
7	1005SWMST019-U	17	1005SWMST066-U	27	1005SWMST019-F	37	1005SWMST066-F
8	1005SWMST020-U	18	1005SWMST067-U	28	1005SWMST020-F	38	1005SWMST067-F
9	1005SWMST044-U	19	1005SWMST069-U	29	1005SWMST044-F	39	1005SWMST069-F
10	1005SWMST045-1-U	20 3	1005SWMST143-U	30	1005SWMST045-1-F	40 3	1005SWMST143-F

Notes: Samples appended with "F" were analyzed for dissolved cadmium

LDC #: 23452A4b

SDG #: L10050525

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 6-30-10

Page: 2 of 2

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times		Sampling dates:
II.	Calibration		
III.	Blanks		
IV.	ICP Interference Check Sample (ICS) Analysis		
V.	Matrix Spike Analysis		
VI.	Duplicate Sample Analysis		
VII.	Laboratory Control Samples (LCS)		
VIII.	Internal Standard (ICP-MS)		
IX.	Furnace Atomic Absorption QC		
X.	ICP Serial Dilution		
XI.	Sample Result Verification		
XII.	Overall Assessment of Data		
XIII.	Field Duplicates		
XIV.	Field Blanks		

See Previous Sheet

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

41	1005SWMST019-UMS	51	PBW1	61		71	
42	1005SWMST019-UMSD	52	2	62		72	
43	1005SWMST019-FMS	53	3	63		73	
44	1005SWMST019-FMSD	54		64		74	
45		55		65		75	
46		56		66		76	
47		57		67		77	
48		58		68		78	
49		59		69		79	
50		60		70		80	

Notes: Samples appended with "F" were analyzed for dissolved cadmium

LDC #: 23452A4b
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: CR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 23452A4b
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: SR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 23452A4b
SDG #: S0C0002

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: W

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-20		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
21-40		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
QC: 41,42		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
43,44		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,

Comments: Mercury by CVAA if performed

LDC #: 23452A4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	L10050601-47	water	Cd		146		1-3, 21, 22	No Qual (non-client)
	L10050654-3	water	Cd		74.2		13-20, 32-40	No Qual (nonclient)

Comments:

MSD.4SW

LDC #: 23452A4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA CLP SOW ILM02.1)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		13	W	Se	19.80	13-20	No Qual (Source <50xMDL)

Comments:

SDIL.4C

LDC #: 23552A46
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICV	ICP/MS (Initial calibration)	Cd	50.0	50	100	100	Y
CCV 5/27/10 (20:22)	ICP/MS (Continuing calibation)	Se	46.4	50.0	92.8	92.8	Y

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 23452A46
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ mg/L	True / D / SDR ~~(units)~~ mg/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Se	96.0 ug/L	100 ug/L	96	96	Y
LCS	Laboratory control sample	Cd	0.0633	0.0625	101	101	
41	Matrix spike	Se	(SSR-SR) 0.051	0.0625	81.6	81.6	
43/44	Duplicate	Cd	0.0612	0.0609	0.491	0.525	
13	ICP serial dilution	Se	1.74 ug/L	2.085 ug/L	19.80	19.80	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 23452A4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Se/Cd were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)(%S)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:
7: Se = (1.4000 ug/L (2.5))/1000 = 0.00350 mg/L
8: Se = (1.4014 ug/L (2.5))/1000 = 0.00350 mg/L
33: Cd = (0.1389 ug/L (2.5))/1000 = 0.000347 mg/L
38: Cd = (0.1597 ug/L (2.5))/1000 = 0.000399 mg/L

Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
7	Se	0.00350	0.00350	Y
8	Se	0.00350	0.00350	Y
33	Cd	0.000347	0.000347	Y
38	Cd	0.000399	0.000399	Y

RECALC.4S2

Report# 23452B4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050653

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW021-U	05/18/2010	L10050653-01

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050653

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10050653

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050653

No Sample Data Qualified in this SDG

LDC #: 23452B4b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6-30-10

SDG #: L10050653

Page: 1 of 1

Laboratory: Microbac Laboratories, Inc.

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Cd & Se (EPA SW846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/18/10
II.	Calibration / ICPMS Tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D (SDG# L10050565)
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	(SDG# L10050565)
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW021-U	11	PB w	21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 23452B4b
SDG #: S0C0002

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: W

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se) Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K (Se) Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___

Comments: Mercury by CVAA if performed

Report# 23452C4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050667

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW030-U	05/19/2010	L10050667-01
1005GWMMW009-U	05/19/2010	L10050667-03
1005GWMBW130-U	05/18/2010	L10050667-09
1005GWMBW085-U	05/19/2010	L10050667-11
1005GWMBW087-U	05/19/2010	L10050667-13
1005GWMBW028-U	05/19/2010	L10050667-15
1005GWMBW085-F	05/19/2010	L10050667-12
1005GWMBW087-F	05/19/2010	L10050667-14
1005GWMBW028-F	05/19/2010	L10050667-16
1005GWMBW011-F	05/18/2010	L10050667-18
1005GWMMW009-U-MS	05/19/2010	L10050667-05
1005GWMMW009-U-MSD	05/19/2010	L10050667-07

Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Lead, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]).

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050667

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10050667

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050667

No Sample Data Qualified in this SDG

LDC #: 23452C4b

SDG #: L10050667

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 6-30-10

Page: 1 of 1

Reviewer: a2

2nd Reviewer: [illegible]

METHOD: Cd, Pb & Se (EPA SW846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/18-19/10
II.	Calibration / ICPMSTune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW030-U	11	1005GWMMW009-U-MS	21	PBW	31	
2	1005GWMMW009-U	12	1005GWMMW009-U-MSD	22		32	
3	1005GWMBW130-U	13		23		33	
4	1005GWMBW085-U	14		24		34	
5	1005GWMBW087-U	15		25		35	
6	1005GWMBW028-U	16		26		36	
7	1005GWMBW085-F	17		27		37	
8	1005GWMBW087-F	18		28		38	
9	1005GWMBW028-F	19		29		39	
10	1005GWMBW011-F	20		30		40	

Notes:

LDC #: 23452C4b
SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: QR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 23452C4b
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: AR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysis have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 23452C4b
SDG #: SEOCA02

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,3-10		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
2		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
QC-11,12		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___

Comments: Mercury by CVAA if performed

LDC #: 23552C46
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICV	ICP/MS (Initial calibration)	Se	50.7	50	101	101	Y
CCV (21:35)	ICP/MS (Continuing calibation)	Cd	49.9	500	99.8	99.8	↓

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 23452C46
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ mg/L	True / D / SDR ~~(units)~~ mg/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Se	97.4 ug/L	100 ug/L	97.4	97.4	Y
LCS	Laboratory control sample	Pb	0.0616	0.0625	98.6	98.5	
11	Matrix spike	Cd	(SSR-SR) 0.0589	0.0625	94.2	94.3	
11/12	Duplicate	Se	0.0532	0.0550	3.33	3.26	
2	ICP serial dilution	Cd	ND	ND	NA	NA	✓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 23452C4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Cd were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

$$\frac{\left(\frac{0.2053}{1000}\right)(100mL)}{40mL} = 0.000513 mg/L$$

Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
9	Se	0.891	0.891	Y
	Cd	0.000513	0.000513	Y

RECALC.4S2

Report# 23452D4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050670

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW032-U	05/20/2010	L10050670-01
1005GWMMW033-U	05/20/2010	L10050670-03

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Antimony, Arsenic, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Nickel, Selenium, Silver, Thallium, Uranium, and Zinc.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1005B-GW-01-F (1005GWMMW032-U 1005GWMMW033-U)	Zinc	127 (75-125)	-	22.3 (≤20)	J (all detects) UJ (all non-detects)	A

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]).

Cadmium and Zinc results were outside the QC limits; results were not qualified since the original sample (1005GWMDS025-U) was less than 50 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050670

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L10050670	1005GWMMW032-U 1005GWMMW033-U	Zinc	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (RPD)	16, 17

Metals - Laboratory Blank Data Qualification Summary - SDG L10050670

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050670

No Sample Data Qualified in this SDG

LDC #: 23452D4b

SDG #: L10050670

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 6-30-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/20/10
II.	Calibration / ICPMS Tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D (SDG# L10050566)
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	(SDG# L10050566)
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW032-U	11	FBW	21		31	
2	1005GWMMW033-U	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 23452D4b
SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: QR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.		✓		
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 23452041b
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: SR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 23452D4D
SDG #: S0C0002

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, U ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, U ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___

Comments: Mercury by CVAA if performed

LDC #: 23452D4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: L

METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A — Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A — Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y (N) N/A — Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

(Y) N N/A — Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	1005B-GW-01-F	W	Zn	127		22.3	All	J/UJ/A (16,17)

Comments:

LDC #: 23452D4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: ✓

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	100560wmDS0250	W	Cd	14.20	All	No Qual (<50xMDL)
			Zn	39.20	↓	↓

Comments:

SDIL4S2

LDC #: 23452D46
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICV	ICP/MS (Initial calibration)	Sb	49.8	50	99.6	99.6	Y
CCV(14:15)	ICP/MS (Continuing calibation)	U	52.5	50	105	105	Y

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 23452046
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ mg/L	True / D / SDR ~~(units)~~ mg/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICS AB	ICP interference check	Sb	102 ug/L	100 ug/L	102	102	Y
LCS	Laboratory control sample	Cd	0.0616	0.0625	98.6	98.6	↓
100SB-GW01-F	Matrix spike	Ag	(SSR-SR) 0.0604	0.0625	96.6	96.6	↓
↓	Duplicate	Mn	0.0653	0.0679	3.90	3.97	↓
100SGWMS025	ICP serial dilution	As	1.6	1.625	1.56	1.56	↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 23452D4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for As were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)(%S)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

$$\frac{0.3258\ \mu g/L\ (100\ mL)}{1000\ (40\ mL)} = 0.000815\ mg/L$$

Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	As	0.000815	0.000815	Y
	Cd	0.000315	0.000315	
	Cr	0.00474	0.00474	
	Pb	0.000544	0.000544	
	Mn	0.0216	0.0216	
	Ni	0.00299	0.00299	
	Se	0.00133	0.00133	
	Ag	0.0165	0.0165	
	U	0.00270	0.00270	✓

RECALC.4S2

Report# 23452E4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050740

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW013-U	05/20/2010	L10050740-01
1005GWMBW032-1-U	05/20/2010	L10050740-07
1005GWMBW032-2-U	05/20/2010	L10050740-09
1005GWMBW131-U	05/20/2010	L10050740-11
1005GWMBW009-U	05/20/2010	L10050740-13
1005GWMBW048-U	05/20/2010	L10050740-15
1005GWMBW032-1-F	05/20/2010	L10050740-08
1005GWMBW032-2-F	05/20/2010	L10050740-10
1005GWMBW131-F	05/20/2010	L10050740-12
1005GWMBW009-F	05/20/2010	L10050740-14
1005GWMBW048-F	05/20/2010	L10050740-16
1005GWMMW013-U-MS	05/20/2010	L10050740-03
1005GWMMW013-U-MSD	05/20/2010	L10050740-05

Samples appended with "F" were analyzed for dissolved cadmium

Introduction

This data review covers 13 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Selenium results were outside the QC limits; results were not qualified since the original sample (1005GWMMW035-U) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Selenium results were outside the QC limits; results were not qualified since the original sample (1005GWMBW048-U) was less than 50 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050740

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10050740

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050740

No Sample Data Qualified in this SDG

LDC #: 23452E4b

SDG #: L10050740

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6-30-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/20/10
II.	Calibration / ICP MS Tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	~~A~~
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW013-U	11	1005GWMBW048-F	21	PBW	31	
2	1005GWMBW032-1-U	12	1005GWMMW013-U-MS	22		32	
3	1005GWMBW032-2-U	13	1005GWMMW013-U-MSD	23		33	
4	1005GWMBW131-U	14		24		34	
5	1005GWMBW009-U	15		25		35	
6	1005GWMBW048-U	16		26		36	
7	1005GWMBW032-1-F	17		27		37	
8	1005GWMBW032-2-F	18		28		38	
9	1005GWMBW131-F	19		29		39	
10	1005GWMBW009-F	20		30		40	

Notes: Samples appended with "F" were analyzed for dissolved cadmium

LDC #: 23452E4b
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-11		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
QC-12,13		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___

Comments: Mercury by CVAA if performed

LDC #: 23452E4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [initials]

METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A — Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A — Were matrix spike percent recoveries (%R) within the control limits of (75-125)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

(Y) N N/A — Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N (N/A) — Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	1005GWMMW0350	W	Se	198	253		2-6	~~J/det/A (16)~~
	(~~SDG# 283677~~)							No Qual (74x spike)
	w							

Comments:

MSD.4SW

LDC #: 234152E4b
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA CLP SOW ILM02.1)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A — If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y (N) N/A — Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A — Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL ~~IV~~ ONLY:
Y N (N/A) — Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		7	W	Se	~~77.60~~	~~[illegible]~~ All	~~J/UJ/A (18)~~
					11.80		No Qual (<50x MDL)

Comments:

Report# 23452F4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050741

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW035-U	05/21/2010	L10050741-01
1005GWMMW034-1-U	05/21/2010	L10050741-07
1005GWMMW034-2-U	05/21/2010	L10050741-09
1005GWMMW036-U	05/21/2010	L10050741-11
1005GWMMW023-U	05/21/2010	L10050741-13
1005GWMMW035-U-MS	05/21/2010	L10050741-03
1005GWMMW035-U-MSD	05/21/2010	L10050741-05

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Antimony, Arsenic, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Nickel, Selenium, Silver, Thallium, Uranium, and Zinc.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1005GWMMW035-U-MS/MSD (1005GWMMW035-U 1005GWMMW034-1-U 1005GWMMW034-2-U 1005GWMMW036-U)	Manganese	-6.41 (75-125)	-15.6 (75-125)	-	J- (all detects) R (all non-detects)	A
1005GWMMW035-U-MS/MSD (1005GWMMW035-U 1005GWMMW034-1-U 1005GWMMW034-2-U 1005GWMMW036-U)	Nickel	71.1 (75-125)	67.5 (75-125)	-	J- (all detects) UJ (all non-detects)	A
1005GWMMW035-U-MS/MSD (1005GWMMW035-U 1005GWMMW034-1-U 1005GWMMW034-2-U 1005GWMMW036-U)	Zinc	134 (75-125)	-	30.7 (≤20)	J (all detects) UJ (all non-detects)	A

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Arsenic and Selenium results were outside the QC limits; results were not qualified since the original sample (1005GWMBW032-1-F) was less than 50 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050741

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L10050741	1005GWMMW035-U 1005GWMMW034-1-U 1005GWMMW034-2-U 1005GWMMW036-U	Manganese	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
L10050741	1005GWMMW035-U 1005GWMMW034-1-U 1005GWMMW034-2-U 1005GWMMW036-U	Nickel	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
L10050741	1005GWMMW035-U 1005GWMMW034-1-U 1005GWMMW034-2-U 1005GWMMW036-U	Zinc	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (RPD)	16, 17

Metals - Laboratory Blank Data Qualification Summary - SDG L10050741

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050741

No Sample Data Qualified in this SDG

LDC #: 23452F4b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-1-10

SDG #: L10050741

Page: 1 of 1

Laboratory: Microbac Laboratories, Inc.

Reviewer: OR

2nd Reviewer: W

METHOD: Metals (EPA SW846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/21/10
II.	Calibration / ICPMSTune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	(SDG# L10050740)
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW035-U	11		21	PBW	31	
2	1005GWMMW034-1-U	12		22		32	
3	1005GWMMW034-2-U	13		23		33	
4	1005GWMMW036-U	14		24		34	
5	1005GWMMW023-U	15		25		35	
6	1005GWMMW035-U-MS	16		26		36	
7	1005GWMMW035-U-MSD	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 23452F4b
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, U
5		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
QC:6,7		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, U
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,

Comments: Mercury by CVAA if performed

LDC #: 23452F4b
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	6/7	W	Mn*	-6.41	-15.6		1-4	J-/R/A (16)
			Ni	71.1	67.5		↓	J-/UJ/A ↓
			Zn	134		30.7	↓	J/UJ/A (16,17)
			Se	198	235		All	No Qual (>4xspike)

Comments: * No Post spike on sample

MSD.4SW

LDC #: 23432F4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA CLP SOW ILM02.1)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the IDL, was ~~an ICP~~ serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) <10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		1005GWMB4032	1-F W	As	241.00	1-4	No Qual (<50x MDL)
		(SDGYAL10050740)		Se	~~77.60~~	All	~~J+UJ/A (18)~~
					11.80		

Comments:

SDIL.4C

Report# 23452G4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050742

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMBW135-U	05/21/2010	L10050742-01
1005GWMBW006-U	05/21/2010	L10050742-03
1005GWMBW027-U	05/21/2010	L10050742-05
1005GWMW-16A-U	05/21/2010	L10050742-09
1005GWMMW022-U	05/22/2010	L10050742-11
1005GWMW-15A-U	05/22/2010	L10050742-17
1005B-GW-01-U	05/23/2010	L10050742-19
1005ER-GW-01-U	05/23/2010	L10050742-21
1005ER-GW-02-U	05/23/2010	L10050742-23
1005GWMMW010-U	05/23/2010	L10050742-25
1005GWMBW135-F	05/21/2010	L10050742-02
1005GWMBW006-F	05/21/2010	L10050742-04
1005GWMBW027-F	05/21/2010	L10050742-06
1005GWMBW099-F	05/23/2010	L10050742-08
1005GWMMW022-U-MS	05/22/2010	L10050742-13
1005GWMMW022-U-MSD	05/22/2010	L10050742-15
1005GWMMW010-U-MS	05/23/2010	L10050742-27
1005GWMMW010-U-MSD	05/23/2010	L10050742-29

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1005ER-GW-01-U and 1005ER-GW-02-U were identified as equipment rinsates. No metal contaminants were found in these blanks.

Sample 1005B-GW-01-U was identified as a source blank. No metal contaminants were found in this blank.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050742

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10050742

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050742

No Sample Data Qualified in this SDG

LDC #: 23452G4b

SDG #: L10050742

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-1-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: M

METHOD: Cd & Se (EPA SW846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/21-23/10
II.	Calibration / ICPMS Tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	~~S~~ A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	Source Blk = 7, ER = 8, 9

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GW~~B~~MBW135-U	11	1005GWMBW135-F	21	PBW	31	
2	1005GWMBW006-U	12	1005GWMBW006-F	22		32	
3	1005GWMBW027-U	13	1005GWMBW027-F	23		33	
4	1005GWMW-16A-U	14	1005GWMBW099-F	24		34	
5	1005GWMMW022-U	15	1005GWMMW022-U-MS	25		35	
6	1005GWMW-15A-U	16	1005GWMMW022-U-MSD	26		36	
7	1005B-GW-01-U	17	1005GWMMW010-U-MS	27		37	
8	1005ER-GW-01-U	18	1005GWMMW010-U-MSD	28		38	
9	1005ER-GW-02-U	19		29		39	
10	1005GW~~M~~MW010-U	20		30		40	

Notes:

LDC #: 23452G4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-14		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
QC:15-16		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,

Comments: Mercury by CVAA if performed

Report# 23452H4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050784

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMBW152-U	05/24/2010	L10050784-01
1005GWMMW007-U	05/25/2010	L10050784-03
1005GWMBW152-F	05/24/2010	L10050784-02
1005GWMBW007-U-MS	05/25/2010	L10050784-05
1005GWMBW007-U-MSD	05/25/2010	L10050784-07

Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10050784

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10050784

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050784

No Sample Data Qualified in this SDG

LDC #: 23452H4b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-1-10

SDG #: L10050784

Page: 1 of 1

Laboratory: Microbac Laboratories, Inc.

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Cd & Se (EPA SW846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/24-25/10
II.	Calibration / ICPMS Tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMBW152-U	11	PBW	21		31	
2	1005GWMMW007-U	12		22		32	
3	1005GWMBW152-F	13		23		33	
4	1005GWMBW007-U-MS	14		24		34	
5	1005GWMBW007-U-MSD	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 23452H4b
SDG #: SE0002

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: W

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se) Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
QC:4S		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se) Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se) Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___

Comments: Mercury by CVAA if performed

Report# 23452D4e

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Mercury by CVAA EPA Method 7470A

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050670

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW032-U	05/20/2010	L10050670-01
1005GWMMW033-U	05/20/2010	L10050670-03

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 7470A: Mercury.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG L10050670

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG L10050670

No Sample Data Qualified in this SDG

Mercury - Field Blank Data Qualification Summary - SDG L10050670

No Sample Data Qualified in this SDG

LDC #: 23452D4e

SDG #: L10050670

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 6-30-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Mercury (EPA SW846 Method 7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/20/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	
V.	Matrix Spike Analysis	~~A~~ A	~~client specified~~ or MS/D * see below
VI.	Duplicate Sample Analysis	N	↓
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW032-U	11	PBW	21		31	
2	1005GWMMW033-U	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: MS/D: (L10050687 - non client)

LDC #: 23452D4k
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: SR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?			✓	
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.			✓	
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 23452D4e
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: SR
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?		✓		
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 23452D4e
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: QR
2nd Reviewer: W

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	2.12	2	106	106	Y
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
CCV(0.001)	CVAA (Continuing calibration)	Hg(mg/L)	0.00189	0.002	94.5	94.5	Y
	ICP/MS (Initial calibration)						
	ICP/MS (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 23452D4c
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ mg/L	True / D / SDR ~~(units)~~ mg/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
N	ICP interference check						
LCS	Laboratory control sample	Hg	0.00430	0.00400	108	108	Y
N	Matrix spike		(SSR-SR)				
N	Duplicate						
N	ICP serial dilution						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 23452D4e
SDG #: seeover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for _____ were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

Recalculation:

Non Detect

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)

RECALC.4S2

Report# 23452F4e

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Mercury by CVAA EPA Method 7470A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050741

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW035-U	05/21/2010	L10050741-01
1005GWMMW034-1-U	05/21/2010	L10050741-07
1005GWMMW034-2-U	05/21/2010	L10050741-09
1005GWMMW036-U	05/21/2010	L10050741-11
1005GWMMW035-U-MS	05/21/2010	L10050741-03
1005GWMMW035-U-MSD	05/21/2010	L10050741-05

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 7470A: Mercury.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG L10050741

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG L10050741

No Sample Data Qualified in this SDG

Mercury - Field Blank Data Qualification Summary - SDG L10050741

No Sample Data Qualified in this SDG

LDC #: 23452F4e

SDG #: L10050741

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-1-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Mercury (EPA SW846 Method 7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/21/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

water

1	1005GWMMW035-U	11	PDSW	21		31	
2	1005GWMMW034-1-U	12		22		32	
3	1005GWMMW034-2-U	13		23		33	
4	1005GWMMW036-U	14		24		34	
5	1005GWMMW035-U-MS	15		25		35	
6	1005GWMMW035-U-MSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

Monsanto, P4 Production LLC
Data Verification Reports
LDC #23452

Wet Chemistry

LDC

Report# 23452A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050525

Sample Identification	Collection Date	Laboratory Sample Identification
1005B-SW-01-U	05/14/2010	L10050525-01
1005ER-SW-02-U	05/14/2010	L10050525-03
1005B-SW-03-U	05/15/2010	L10050525-05
1005ER-SW-04-U	05/15/2010	L10050525-07
1005ER-SW-05-U	05/16/2010	L10050525-09
1005B-SW-06-U	05/16/2010	L10050525-11
1005SWMST019-U	05/15/2010	L10050525-13
1005SWMST020-U	05/14/2010	L10050525-19
1005SWMST044-U	05/14/2010	L10050525-21
1005SWMST045-1-U	05/14/2010	L10050525-23
1005SWMST045-2-U	05/14/2010	L10050525-25
1005SWMST045-3-U	05/14/2010	L10050525-27
1005SWMDS025-U	05/15/2010	L10050525-29
1005SWMST050-U	05/14/2010	L10050525-31
1005SWMST057-U	05/14/2010	L10050525-33
1005SWMST063-U	05/15/2010	L10050525-35
1005SWMST066-U	05/14/2010	L10050525-37
1005SWMST067-U	05/14/2010	L10050525-39
1005SWMST069-U	05/13/2010	L10050525-41
1005SWMST143-U	05/15/2010	L10050525-43
1005B-SW-01-F	05/14/2010	L10050525-02
1005ER-SW-02-F	05/14/2010	L10050525-04
1005B-SW-03-F	05/15/2010	L10050525-06
1005ER-SW-04-F	05/16/2010	L10050525-08
1005ER-SW-05-F	05/16/2010	L10050525-10

1005B-SW-06-F	05/16/2010	L10050525-12
1005SWMST019-F	05/15/2010	L10050525-14
1005SWMST020-F	05/14/2010	L10050525-20
1005SWMST044-F	05/14/2010	L10050525-22
1005SWMST045-1-F	05/14/2010	L10050525-24
1005SWMST045-1-FDL	05/14/2010	L10050525-24DL
1005SWMST045-2-F	05/14/2010	L10050525-26
1005SWMST045-2-FDL	05/14/2010	L10050525-26DL
1005SWMST045-3-F	05/14/2010	L10050525-28
1005SWMST045-3-FDL	05/14/2010	L10050525-28DL
1005SWMDS025-F	05/15/2010	L10050525-30
1005SWMST050-F	05/14/2010	L10050525-32
1005SWMST057-F	05/14/2010	L10050525-34
1005SWMST063-F	05/15/2010	L10050525-36
1005SWMST066-F	05/14/2010	L10050525-38
1005SWMST067-F	05/14/2010	L10050525-40
1005SWMST069-F	05/13/2010	L10050525-42
1005SWMST143-F	05/15/2010	L10050525-44
1005SWMST019-UMS	05/15/2010	L10050525-15
1005SWMST019-UMSD	05/15/2010	L10050525-17
1005SWMST019-FMS	05/15/2010	L10050525-16
1005SWMST019-FMSD	05/15/2010	L10050525-18
1005SWMST019-FDUP	05/15/2010	L10050525-14DUP
1005SWMST067-FDUP	05/14/2010	L10050525-40DUP
1005SWMST063-UDUP	05/15/2010	L10050525-35DUP
1005B-SW-03-URE	05/15/2010	L10050525-05RE

Introduction

This data review covers 51 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Chloride and Sulfate, Standard Method 2340B for Hardness, and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 7 days for method 160.1, and 6 months for method 2340B) were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
1005B-SW-03-URE	Total dissolved solids	54 days	7 days	J- (all detects) UJ (all non-detects)	A

Based on professional judgment, total dissolved solids for sample 1005B-SW-01-URE was not rejected because the concentration should not decrease due to the nature of the analyte.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1005ER-SW-02-U, 1005ER-SW-04-U, 1005ER-SW-05-U, 1005ER-SW-02-F, 1005ER-SW-04-F, and 1005ER-SW-05-F were identified as equipment rinsates. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
1005ER-SW-04-U	5/15/10	Total dissolved solids	28 mg/L	1005SWMST019-U 1005SWMST025-U 1005SWMST063-U 1005SWMST143-U

Samples 1005B-SW-01-U, 1005B-SW-03-U, 1005B-SW-06-U, 1005B-SW-01-F, 1005B-SW-03-F, and 1005B-SW-06-F were identified as source blanks. No contaminant concentrations were found in this blank with the following exceptions:

Source Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1005B-SW-01-U	5/14/10	Total dissolved solids	28 mg/L	1005SWMST020-U 1005SWMST044-U 1005SWMST045-1-U 1005SWMST045-2-U 1005SWMST045-3-U 1005SWMST050-U 1005SWMST057-U 1005SWMST066-U 1005SWMST067-U

Sample 1005B-SW-03-U was re-analyzed for total dissolved solids (1005B-SW-03-URE) because the original result was uncharacteristically high for a source blank, indicating a laboratory error. The re-analysis was non-detect and no data was qualified by the source blank.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>1X blank contaminants) than the concentrations found in the associated field blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
1005SWMST045-1-F 1005SWMST045-2-F 1005SWMST045-3-F	Chloride	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
1005SWMST045-1-F 1005SWMST045-2-F 1005SWMST045-3-F	Chloride	R	A
1005SWMST045-1-FDL 1005SWMST045-2-FDL 1005SWMST045-3-FDL	Sulfate	R	A
1005B-SW-03-U	Total dissolved solids	R	A

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10050525

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L10050525	1005B-SW-03-URE	Total dissolved solids	J- (all detects) UJ (all non-detects)	A	Technical holding times	1
L10050525	1005SWMST045-1-F 1005SWMST045-2-F 1005SWMST045-3-F	Chloride	J (all detects)	A	Sample result verification	22
L10050525	1005SWMST045-1-F 1005SWMST045-2-F 1005SWMST045-3-F	Chloride	R	A	Overall assessment of data	23
L10050525	1005SWMST045-1-FDL 1005SWMST045-2-FDL 1005SWMST045-3-FDL	Sulfate	R	A	Overall assessment of data	23
L10050525	1005B-SW-03-U	Total dissolved solids	R	A	Overall assessment of data	23

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10050525

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10050525

No Sample Data Qualified in this SDG

LDC #: 23452A6
SDG #: L10050525
Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 6-30-10
Page: 1 of 2
Reviewer: CR
2nd Reviewer: W

METHOD: (Analyte) Chloride, Sulfate (EPA Method 300.0), Hardness (SM2340B), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 5/13-16/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	N	
X.	Field blanks	SW	Source Blk= 1,3,6,21,23,26. ER=2,4,5,22,24,25

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water

1	1005B-SW-01-U	11	1005SWMST045-2-U	21	1005B-SW-01-F	31	1005SWMST045-1-FDL
2	1005ER-SW-02-U	12	1005SWMST045-3-U	22	1005ER-SW-02-F	32	1005SWMST045-2-F
3	1005B-SW-03-U	13	1005SWMST025-U	23	1005B-SW-03-F	33	1005SWMST045-2-FDL
4	1005ER-SW-04-U	14	1005SWMST050-U	24	1005ER-SW-04-F	34	1005SWMST045-3-F
5	1005ER-SW-05-U	15	1005SWMST057-U	25	1005ER-SW-05-F	35	1005SWMST045-3-FDL
6	1005B-SW-06-U	16	1005SWMST063-U	26	1005B-SW-06-F	36	1005SWMST025-F
7	1005SWMST019-U	17	1005SWMST066-U	27	1005SWMST019-F	37	1005SWMST050-F
8	1005SWMST020-U	18	1005SWMST067-U	28	1005SWMST020-F	38	1005SWMST057-F
9	1005SWMST044-U	19	1005SWMST069-U	29	1005SWMST044-F	39	1005SWMST063-F
10	1005SWMST045-1-U	20	1005SWMST143-U	30	1005SWMST045-1-F	40	1005SWMST066-F

Notes:

LDC #: 23452A6

SDG #: L10050525

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 6-30-10

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) Chloride, Sulfate (EPA Method 300.0), Hardness (SM2340B), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times		Sampling dates:
IIa.	Initial calibration		
IIb.	Calibration verification		
III.	Blanks		
IV	Matrix Spike/Matrix Spike Duplicates		
V	Duplicates		
VI.	Laboratory control samples		
VII.	Sample result verification		
VIII.	Overall assessment of data		
IX.	Field duplicates		
X.	Field blanks		

See Previous Page

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

41	1005SWMST067-F	51	(#3) RE	61		71	
42	1005SWMST069-F	52		62		72	
43	1005SWMST143-F	53		63		73	
44	1005SWMST019-UMS	54		64		74	
45	1005SWMST019-UMSD	55		65		75	
46	1005SWMST019-FMS	56		66		76	
47	1005SWMST019-FMSD	57		67		77	
(#27) 48	1005SWMST019-F DUP	58		68		78	
49	(#41) Dup	59		69		79	
50	(#16) Dup	60		70		80	

Notes:

LDC #: 23452A6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter				
1-20	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
21-~~40~~43	pH TDS (Cl) F NO_3 NO_2 (SO4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}	~~Hardness~~			
1-20, 21-43	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}	Hardness			
QC: 44,45	pH (TDS) ~~Cl~~ F NO_3 NO_2 ~~SO4~~ PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
46,47	pH TDS (Cl) F NO_3 NO_2 (SO4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}	(Hardness)			
48,49	pH TDS (Cl) F NO_3 NO_2 (SO4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
50	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				

Comments:

LDC #: 23452A6
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)	✓			
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 23452A6
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: R
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 23482A6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: QR
2nd reviewer: W

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:		160.1					
Parameters:		TDS					
Technical holding time:		7days					
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
51	5/15/10	7/8/10	(54 days)				J-/UJ/A * (1)(~~1A~~)

HT.6

* Based on professional judgement, TDS was not rejected because the ~~value~~ concentration should not decrease due to the nature of the analyte.

LDC #: 23452A6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 5/14/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Source Blk Associated Samples: 8-12, 14, 15, 17, 18

Analyte	Blank ID	Action Limit	Sample Identification							
	1		No Quals (al >1x)							
TDS	28	28								

Sampling date: 5/15/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: ER Associated Samples: 7, 13, 16, 20

Analyte	Blank ID	Action Limit	Sample Identification							
	4		No Quals (all >1x)							
TDS	28	28								

Sampling date: 5/15/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Source Blk Associated Samples: 7, 13, 16, 20

Analyte	Blank ID	Action Limit	Sample Identification							
	3		No Quals (sample rejected*)							
TDS	1300	1300								

* #3 was re-analyzed for TDS (#51) because the original result was uncharacteristically high for a source blank, indicating a laboratory error. The re-analysis was non-detect and no data was qualified by the source blank.

(Text)

LDC #: 23452A6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method see cover

#	Sample ID	Analyte	Lab Reporting Limit (units)	RDL (units)	Finding	Qualifications
	30,32,34	Cl			>Calibration Range	J/A (22)(All Det)

Comments:

ABVCRDL.6

LDC #: 2345246
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: SR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		30, 32, 34	Cl (>calibration range)		R/A (23) (All Det)
		31, 33, 35	SO_4 (dilution not necessary)		R/A (23) (All Det)
		3	TDS (laboratory error)		R/A (23) (Det)

Comments:

OVR.6

LDC #: 23452A6
SDG #: See cover

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cl was recalculated.Calibration date: 10-8-09

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. ~~(ug/l)~~ mg/L	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	Cl	s1	0.2	0.032	0.997	0.997	Y
		s2	1	0.16			
		s3	4	0.668			
		s4	8	1.38			
		s5	12	2.145			
		s6	24	4.695			
		s7	36	7.47			
Calibration verification	SO_4	ICV	40.0	Found (mg/L) 40.2	101	—	
Calibration verification	Cl	CCV	8.00	8.24	103	—	
Calibration verification	SO_4	↓	40.0	41.1	103	—	↓

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23452A6
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method Seecover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (~~units~~) mg/L	True / D (~~units~~) mg/L	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Cl	8.21	8	103	103	Y
4/6	Matrix spike sample	SO4	(SSR-SR) 41.2	40	103	103	↓
44/45	Duplicate sample	TDS	788	702	11.5	11.5	↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 23452A6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 2 of 2
Reviewer: ER
2nd reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for Cl/SO4 reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$Cl = 0.0012x^2 + 0.1643x - 0.0021$

$SO_4 = 0.0002x^2 + \cancel{0.1643}\ 0.1306x - 0.0221$

Recalculation:

27: $Cl = \frac{\sqrt{4(0.0012)(0.562+0.002)+(0.1643)^2} - 0.1643}{2(0.0012)} = 3.35$ mg/L

28: $SO_4 = \frac{\sqrt{4(0.0002)(1.500+0.0221)+(0.1306)^2} - 0.1306}{2(0.0002)} = 11.5$ mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	27	Cl	3.35	3.35	Y
		SO4	11.8	11.8	↓
		Hardness	188	188	↓
	28	Cl	3.34	3.33	Y
		SO4	11.4	11.5	↓
		Hardness	184	183	↓

Note:

RECALC.6

LDC #: 23452A6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 2 of 2
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for Hardness / TDS reported with a positive detect were recalculated and verified using the following equation:

Concentration =

Hardness = [Ca](2.497) + [Mg](4.118)

Recalculation:

42: Hardness = 496 mg/L (2.497) + 92.9 (4.118) = 1620 mg/L

TDS = $\frac{\text{Final Wt} - \text{Initial Wt}}{\text{Vol}}$

7: TDS = $\frac{(67.2635\text{ mg/L} - 67.2519\text{ mg/L})1000000}{50\text{ mL}}$ = 232 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	42	Cl	11.5	11.5	Y
		SO_4	1230	1240	↓
		Hardness	1650	1620	↓
	7	TDS	232	232	Y

Note:

RECALC.6

Report# 23452B6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050653

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW021-U	05/18/2010	L10050653-01
1005GWMMW021-F	05/18/2010	L10050653-02

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 160.1) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) limits.

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10050653

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10050653

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10050653

No Sample Data Qualified in this SDG

LDC #: 23452B6

SDG #: L10050653

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6-30-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/18/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	Client specified
V	Duplicates	N	↓
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Water

1	1005GWMMW021-U	11	QBW	21		31	
2	1005GWMMW021-F	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 23452B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: W

All circled methods are applicable to each sample.

Sample ID	Parameter
1	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
2	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____

Comments:

Report# 23452C6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050667

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW030-U	05/19/2010	L10050667-01
1005GWMMW009-U	05/19/2010	L10050667-03
1005GWMBW130-U	05/18/2010	L10050667-09
1005GWMBW085-U	05/19/2010	L10050667-11
1005GWMBW087-U	05/19/2010	L10050667-13
1005GWMBW028-U	05/19/2010	L10050667-15
1005GWMBW011-U	05/18/2010	L10050667-17
1005GWMMW030-F	05/19/2010	L10050667-02
1005GWMMW009-F	05/19/2010	L10050667-04
1005GWMBW130-F	05/18/2010	L10050667-10
1005GWMBW085-F	05/19/2010	L10050667-12
1005GWMBW087-F	05/19/2010	L10050667-14
1005GWMBW028-F	05/19/2010	L10050667-16
1005GWMBW011-F	05/18/2010	L10050667-18
1005GWMMW009-U-MS	05/19/2010	L10050667-05
1005GWMMW009-U-MSD	05/19/2010	L10050667-07
1005GWMMW009-F-MS	05/19/2010	L10050667-06
1005GWMMW009-F-MSD	05/19/2010	L10050667-08
1005GWMMW009-FDUP	05/19/2010	L10050667-04DUP

Introduction

This data review covers 19 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 160.1) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field duplicates were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) limits.

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10050667

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10050667

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10050667

No Sample Data Qualified in this SDG

LDC #: 23452C6

SDG #: L10050667

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 6-30-10

Page: 1 of 1

Reviewer: PR

2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/18-19/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	A	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW030-U	11	1005GWMBW085-F	21		31	
2	1005GWMMW009-U	12	1005GWMBW087-F	22		32	
3	1005GWMBW130-U	13	1005GWMBW028-F	23		33	
4	1005GWMBW085-U	14	1005GWMBW011-F	24		34	
5	1005GWMBW087-U	15	1005GWMMW009-U-MS	25		35	
6	1005GWMBW028-U	16	1005GWMMW009-U-MSD	26		36	
7	1005GWMBW011-U	17	1005GWMMW009-F-MS	27		37	
8	1005GWMMW030-F	18	1005GWMMW009-F-MSD	28		38	
9	1005GWMMW009-F	19	(#9) Dup	29		39	
10	1005GWMBW130-F	20		30		40	

Notes:

LDC #: 23452C6
SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: CR
2nd Reviewer: W

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 234526
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: R
2nd Reviewer: ✓

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 23452G6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: W

All circled methods are applicable to each sample.

Sample ID	Parameter
1-7	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
8-14	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
QC: 15, 16	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
17, 18, 19	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____

Comments: _____

LDC #: 23452C6
SDG #: see cover

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics, Method see cover

The correlation coefficient (r) for the calibration of SO_4 was recalculated.Calibration date: 10-14-09

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial Calibration Verification	SO_4	0	1	0.097	*0.999903*	0.997206	Y
		s1	5	0.521			
		s2	20	2.146			
		s3	40	4.531			
		s4	60	7.044			
		s5	120	15.561			
		s6	180	24.705			
Calibration verification		ICV	40.0	Found (mg/L) 40.4	101	—	
Calibration verification		CCV		39.4	98.5	—	
Calibration verification				39.5	98.8	—	

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23452C6
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method Seecover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	SO4	39.5	40	98.8	98.6	Y
17	Matrix spike sample	SO4	(SSR-SR) 36.2	40	90.5	90.5	↓
15/16	Duplicate sample	TDS	912	916	0.438	0.438	↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 234526
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of
Reviewer: CR
2nd reviewer:

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for SO_4 / TDS reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$SO_4 = 0.0002x^2 + 0.1075x - 0.0145$

$TDS = \frac{\text{Final Wt} - \text{Initial Wt}}{\text{Vol}}$

Recalculation:

SO_4: 8: $\frac{\sqrt{4(0.0002)(1.881+0.0145)+(0.1075)^2} - 0.1075}{2(0.0002)} = 17.1$ mg/L

TDS: 1: $\frac{(55.0881 - 55.0765)1000000}{50\text{ mL}} = 232$ mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	8	SO_4	17.2	17.1	Y
	1	TDS	232	232	Y

Note:

RECALC.6

Report# 23452D6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050670

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW032-U	05/20/10	L10050670-01
1005GWMMW033-U	05/20/10	L10050670-03
1005GWMMW032-F	05/20/10	L10050670-02
1005GWMMW033-F	05/20/10	L10050670-04
1005GWMMW033-FDUP	05/20/10	L10050670-04DUP

Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 310.2 for Alkalinity, EPA Method 300.0 for Chloride and Sulfate, Standard Method 2340B for Hardness, EPA Method 353.2 for Nitrate/Nitrite as Nitrogen, EPA Method 160.1 for Total Dissolved Solids, and EPA Method 160.2 for Total Suspended Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for methods 300.0 and 353.2, 14 days for method 310.2, 7 days for methods 160.1 and 160.2, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

The absolute value of Alkalinity found in the initial, continuing and preparation blanks were not qualified since the results were greater than 10X the reporting limit (RL).

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10050670

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10050670

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10050670

No Sample Data Qualified in this SDG

LDC #: 23452D6

SDG #: L10050670

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 6-30-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

METHOD: (Analyte) Alkalinity (EPA Method 310.2), Chloride, Sulfate (EPA Method 300.0), Hardness (SM2340B), Nitrate/Nitrite-N (EPA Method 353.2), TDS (EPA Method 160.1), TSS (EPA Method 160.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/20/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV	Matrix Spike/Matrix Spike Duplicates	N	Client specified
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	A	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW032-U	11	PBW	21		31	
2	1005GWMMW033-U	12		22		32	
3	1005GWMMW032-F	13		23		33	
4	1005GWMMW033-F	14		24		34	
5	(~~X~~4) DUP	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 23452D6
SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Reviewer: OR
2nd Reviewer: ✓

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)	✓			
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 23452B6
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 23452D6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter				
1, 2	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}	TS			
3, 4	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}	Hardness			
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
QC: 5	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}				

Comments:

LDC #: 23452D6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Negative Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method see cover
The absolute value of the negative blank conentrations listed below exceeded the RL

#	Blank ID	Analyte	Negative Blank Concentration	RL	Associated Samples	Qualifications
1	MB	Alk	-19.53 mg/L	10 mg/L	3, 4	No Qual (>10x RL)
2	CCB	Alk	-13.54 ↓	↓	↓	

Comments:

LDC #: 23457D6
SDG #: See cover

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

Method: Inorganics, Method See cover

The correlation coefficient (r) for the calibration of NO_3/NO_2 was recalculated. Calibration date: 5/24/10

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	NO_3/NO_2	s1	0	0.0055	0.9997	0.9997	Y
		s2	0.04	0.0135			
		s3	0.1	0.0353			
		s4	0.5	0.1531			
		s5	1	0.2988			
		s6	2	0.6117			
Calibration verification	↓	CCV	1	1.070	107.0	108.95	↓
Calibration verification	Cl	↓	8	7.83	97.9	—	↓
Calibration verification	SO_4	↓	40	39.3	98.3	—	↓

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23452D5
SDG #: Seecover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method Seecover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units) mg/L	True / D (units) mg/L	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Alk	204	200	102	102	Y
1	Matrix spike sample		(SSR-SR)				
5	Duplicate sample	Cl	5.10	5.19		1.79	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 23452D6
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of
Reviewer: CP
2nd reviewer:

METHOD: Inorganics, Method seecover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for NO_3/NO_2 reported with a positive detect were recalculated and verified using the following equation:

Concentration =

3.3014(Abs) - 0.0083

Recalculation:

(0.1493)(3.3014) - 0.0083
= 0.485 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	3	Cl	3.93	3.92	
		SO_4	5.16	5.15	
		Alk	204	204	
		~~TSS~~ Hardness	188	189	
		NO_3/NO_2-N	0.485	0.485	

Note:

RECALC.6

Report# 23452E6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050740

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW013-U	05/20/2010	L10050740-01
1005GWMBW032-1-U	05/20/2010	L10050740-07
1005GWMBW032-2-U	05/20/2010	L10050740-09
1005GWMBW131-U	05/20/2010	L10050740-11
1005GWMBW009-U	05/20/2010	L10050740-13
1005GWMBW048-U	05/20/2010	L10050740-15
1005GWMMW013-F	05/20/2010	L10050740-02
1005GWMBW032-1-F	05/20/2010	L10050740-08
1005GWMBW032-2-F	05/20/2010	L10050740-10
1005GWMBW131-F	05/20/2010	L10050740-12
1005GWMBW009-F	05/20/2010	L10050740-14
1005GWMBW048-F	05/20/2010	L10050740-16
1005GWMMW013-U-MS	05/20/2010	L10050740-03
1005GWMMW013-U-MSD	05/20/2010	L10050740-05
1005GWMMW013-F-MS	05/20/2010	L10050740-04
1005GWMMW013-F-MSD	05/20/2010	L10050740-06
1005GWMMW013-FDUP	05/20/2010	L10050740-02DUP

Introduction

This data review covers 17 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 160.1) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) limits.

Sulfate results were outside the QC limits; results were not qualified since the original sample (1005GWMMW013-F) was greater than 4X the spike amount.

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10050740

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10050740

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10050740

No Sample Data Qualified in this SDG

LDC #: 23~~411~~452E6

SDG #: L10050740

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6-30-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/20/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW013-U	11	1005GWMBW009-F	21		31	
2	1005GWMBW032-1-U	12	1005GWMBW048-F	22		32	
3	1005GWMBW032-2-U	13	1005GWMMW013-U-MS	23		33	
4	1005GWMBW131-U	14	1005GWMMW013-U-MSD	24		34	
5	1005GWMBW009-U	15	1005GWMMW013-F-MS	25		35	
6	1005GWMBW048-U	16	1005GWMMW013-F-MSD	26		36	
7	1005GWMMW013-F	17	(~~1~~7) DUP	27		37	
8	1005GWMBW032-1-F	18		28		38	
9	1005GWMBW032-2-F	19		29		39	
10	1005GWMBW131-F	20		30		40	

Notes:

LDC #: 23411E6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: V

All circled methods are applicable to each sample.

Sample ID	Parameter
1-6	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
7-12	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
QC: 13,14	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
15,16	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
17	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____

Comments:

LDC #: 23411E6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method 300.0, 160.1

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125?~~ 90-110 If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	15/16	W	SO4	69	70.5		7-12	~~J-/UJ/AC~~ No qual (>4x spike)

Comments:

Report# 23452F6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050741

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW035-U	05/21/2010	L10050741-01
1005GWMMW034-1-U	05/21/2010	L10050741-07
1005GWMMW034-2-U	05/21/2010	L10050741-09
1005GWMMW036-U	05/21/2010	L10050741-11
1005GWMMW023-U	05/21/2010	L10050741-13
1005GWMMW035-F	05/21/2010	L10050741-02
1005GWMMW034-1-F	05/21/2010	L10050741-08
1005GWMMW034-2-F	05/21/2010	L10050741-10
1005GWMMW036-F	05/21/2010	L10050741-12
1005GWMMW023-F	05/21/2010	L10050741-14
1005GWMMW023-FDL	05/21/2010	L10050741-14DL
1005GWMMW035-U-MS	05/21/2010	L10050741-03
1005GWMMW035-U-MSD	05/21/2010	L10050741-05
1005GWMMW035-F-MS	05/21/2010	L10050741-04
1005GWMMW035-F-MSD	05/21/2010	L10050741-06
1005GWMMW035-FDUP	05/21/2010	L10050741-02DUP

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 310.2 for Alkalinity, EPA Method 300.0 for Chloride and Sulfate, Standard Method 2340B for Hardness, EPA Method 353.2 for Nitrate/Nitrite as Nitrogen, EPA Method 160.1 for Total Dissolved Solids, and EPA Method 160.2 for Total Suspended Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for methods 300.0 and 353.2, 14 days for method 310.2, 7 days for methods 160.1 and 160.2, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

The absolute value of Alkalinity found in the initial, continuing and preparation blanks were not qualified since the results were greater than 10X the reporting limit (RL).

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1005GWMMW035-F-MS/MSD (1005GWMMW035-F 1005GWMMW034-1-F 1005GWMMW034-2-F 1005GWMMW036-F)	Chloride	80.1 (90-110)	80.8 (90-110)	-	J- (all detects) UJ (all non-detects)	A

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
1005GWMMW023-F	Sulfate	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
1005GWMMW023-F	Sulfate	R	A

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10050741

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L10050741	1005GWMMW035-F 1005GWMMW034-1-F 1005GWMMW034-2-F 1005GWMMW036-F	Chloride	J- (all detects) UJ (all non-detects)	A	Matrix spike\Matrix spike duplicates (%R)	16
L10050741	1005GWMMW023-F	Sulfate	J (all detects)	A	Sample result verification	22
L10050741	1005GWMMW023-F	Sulfate	R	A	Overall assessment of data	23

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10050741

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10050741

No Sample Data Qualified in this SDG

LDC #: 23452F6

SDG #: L10050741

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-1-10

Page: 1 of 1

Reviewer: OR

2nd Reviewer: [illegible]

METHOD: (Analyte) Alkalinity (EPA Method 310.2), Chloride, Sulfate (EPA Method 300.0), Hardness (SM2340B), Nitrate/Nitrite-N (EPA Method 353.2), TDS (EPA Method 160.1), TSS (EPA Method 160.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/21/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW035-U	11	1005GWMMW023-FDL	21	PB3W	31	
2	1005GWMMW034-1-U	12	1005GWMMW035-U-MS	22		32	
3	1005GWMMW034-2-U	13	1005GWMMW035-U-MSD	23		33	
4	1005GWMMW036-U	14	1005GWMMW035-F-MS	24		34	
5	1005GWMMW023-U	15	1005GWMMW035-F-MSD	25		35	
6	1005GWMMW035-F	16	(#6) DUP	26		36	
7	1005GWMMW034-1-F	17		27		37	
8	1005GWMMW034-2-F	18		28		38	
9	1005GWMMW036-F	19		29		39	
10	1005GWMMW023-F	20		30		40	

Notes:

LDC #: 23452F6 ~~23436H6~~
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter																		
1-~~8~~4	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}	TSS				
6-9~~10~~	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}	Hardness				
10,11	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
5	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
QC: 12,13	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}	TSS				
14,15	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
16	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					
	pH	TDS	Cl	F	NO_3	NO_2	SO_4	PO_4	ALK	CN^-	NH_3	TKN	TOC	CR^{6+}					

Comments:

LDC #: 23452F6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Negative Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover
The absolute value of the negative blank conentrations listed below exceeded the RL

#	Blank ID	Analyte	Negative Blank Concentration	RL	Associated Samples	Qualifications
1	MB	Alk	-16.85 mg/L	10 mg/L	6-9	No Qual (>10x RL)
2	CCB		-10.61		7-9	
3	CCB		-10.06		~~6-9~~ 7-9	
4	CCB		-11.79		6	

Comments:

LDC #: 23452F6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: CR
2nd Reviewer: L

METHOD: Inorganics, EPA Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A	Was a matrix spike analyzed for each matrix in this SDG?
Y (N) N/A	Were matrix spike percent recoveries (%R) within the control limits of ~~75-125~~ (90-110)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.
Y (N) N/A	Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N (N/A)	Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	14/15	W	Cl	80.1	80.8		6-9	J-/UJ/A (16)
			SO_4	15.2	16.7		6-11	No Qual (>4x spike)

Comments:

LDC #: 23452F6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method _____

#	Sample ID	Analyte	Lab Reporting Limit (units)	RDL (units)	Finding	Qualifications
	10	SO_4			>Calibration Range	J / A (22)

Comments: _____

ABVCRDL.6

LDC #: 23452F6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		10	SO4		R/A (Z3)

Comments:

OVR.6

Report# 23452G6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050742

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMBW135-U	05/21/2010	L10050742-01
1005GWMBW006-U	05/21/2010	L10050742-03
1005GWMBW027-U	05/21/2010	L10050742-05
1005GWMBW099-U	05/23/2010	L10050742-07
1005GWMW-16A-U	05/21/2010	L10050742-09
1005GWMMW022-U	05/22/2010	L10050742-11
1005GWMW-15A-U	05/22/2010	L10050742-17
1005B-GW-01-U	05/23/2010	L10050742-19
1005ER-GW-01-U	05/23/2010	L10050742-21
1005ER-GW-02-U	05/23/2010	L10050742-23
1005GWMMW010-U	05/23/2010	L10050742-25
1005GWMBW135-F	05/21/2010	L10050742-02
1005GWMBW006-F	05/21/2010	L10050742-04
1005GWMBW027-F	05/21/2010	L10050742-06
1005GWMBW099-F	05/23/2010	L10050742-08
1005GWMW16A-F	05/21/2010	L10050742-10
1005GWMMW022-F	05/22/2010	L10050742-12
1005GWMW-15A-F	05/22/2010	L10050742-18
1005B-GW-01-F	06/23/2010	L10050742-20
1005ER-GW-01-F	05/23/2010	L10050742-22
1005ER-GW-02-F	05/23/2010	L10050742-24
1005GWMMW010-F	05/23/2010	L10050742-26
1005GWMMW010-F-MS	05/23/2010	L10050742-28
1005GWMMW010-F-MSD	05/23/2010	L10050742-30
1005GWMMW022-U-MS	05/22/2010	L10050742-13

1005GWMMW022-U-MSD	05/22/2010	L10050742-15
1005GWMMW010-U-MS	05/23/2010	L10050742-27
1005GWMMW010-U-MSD	05/23/2010	L10050742-29
1005GWMMW022-F-MS	05/22/2010	L10050742-14
1005GWMMW022-F-MSD	05/22/2010	L10050742-16
1005GWMMW022-FDUP	05/22/2010	L10050742-12DUP
1005GWMMW010-FDUP	05/23/2010	L10050742-26DUP
1005GWMW-16A-UDUP	05/21/2010	L10050742-09DUP

Introduction

This data review covers 33 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 160.1) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1005ER-GW-01-U, 1005ER-GW-02-U, 1005ER-GW-01-F, and 1005ER-GW-02-F were identified as equipment rinsates. No contaminant concentrations were found in these blanks.

Samples 1005B-GW-01-U and 1005B-GW-01-F were identified as source blanks. No contaminant concentrations were found in these blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) limits.

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10050742

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10050742

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10050742

No Sample Data Qualified in this SDG

LDC #: 23452G6

SDG #: L10050742

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-1-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/21-23/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	Dup
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	source Blk = 8, 19, ER = 9, 10, 20, 21

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMBW135-U (MB)	11	1005GWMW010-U (M)	21	1005ER-GW-02-F	31	(#17) DUP
2	1005GWMBW006-U	12	1005GWMBW135-F	22	1005GWMMW010-F	32	(#22) DUP
3	1005GWMBW027-U	13	1005GWMBW006-F	23	1005GWMMW010-F-MS	33	(#5) DUP
4	1005GWMBW099-U	14	1005GWMBW027-F	24	1005GWMMW010-F-MSD	34	
5	1005GWMW-16A-U	15	1005GWMBW099-F	25	1005GWMMW022-U-MS	35	
6	1005GWMMW022-U	16	1005GWMW16A-F	26	1005GWMMW022-U-MSD	36	
7	1005GWMW-15A-U	17	1005GWMMW022-F	27	1005GWMMW010-U-MS	37	
8	1005B-GW-01-U	18	1005GWMW-15A-F	28	1005GWMMW010-U-MSD	38	
9	1005ER-GW-01-U	19	1005B-GW-01-F	29	1005GWMMW022-F-MS	39	
10	1005ER-GW-02-U	20	1005ER-GW-01-F	30	1005GWMMW022-F-MSD	40	PBW

Notes:

LDC #: 23452G6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: W

All circled methods are applicable to each sample.

Sample ID	Parameter
1-11	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
12-22	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
QC: 23,24	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
29,30	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
31,32	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
25-28	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
33	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____

Comments:

Report# 23452H6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 7, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050784

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMBW152-U	05/24/2010	L10050784-01
1005GWMMW007-U	05/25/2010	L10050784-03
1005GWMBW152-F	05/24/2010	L10050784-02
1005GWMBW007-F	05/25/2010	L10050784-04
1005GWMBW007-U-MS	05/25/2010	L10050784-05
1005GWMBW007-U-MSD	05/25/2010	L10050784-07
1005GWMBW007-F-MS	05/25/2010	L10050784-06
1005GWMBW007-F-MSD	05/25/2010	L10050784-08
1005GWMBW007-FDUP	05/25/2010	L10050784-04DUP

Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 160.1) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field duplicates were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) limits.

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10050784

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10050784

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10050784

No Sample Data Qualified in this SDG

LDC #: 23452H6

SDG #: L10050784

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-1-10

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/21-23/10 5/24/10, 5/25/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: WATER

1	1005GWMBW152-U	11	PBW	21		31	
2	1005GWMMW007-U	12		22		32	
3	1005GWMBW152-F	13		23		33	
4	1005GWMBW007-F	14		24		34	
5	1005GWMBW007-U-MS	15		25		35	
6	1005GWMBW007-U-MSD	16		26		36	
7	1005GWMBW007-F-MS	17		27		37	
8	1005GWMBW007-F-MSD	18		28		38	
9	(X4) DUP	19		29		39	
10		20		30		40	

Notes:

LDC #: 23452H6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter
1,2	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
3,4	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
QC:5,6	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
7,8	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
9	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}

Comments:

Monsanto, P4 Production LLC
Data Verification Reports
LDC #23452

Gross Alpha & Gross Beta

LDC

Report# 23452I22

Data Validation Company Name
Data Validation Report

Project/Site Name: Southeast Idaho Mine Sites

Report Date: July 6, 2010

Matrix: Water

Parameters: Gross Alpha and Gross Beta by Method 900.0
Gas Flow Proportional Counting System (GFPC)

Validation Level: Stage 2B & 4

Laboratory: GEL Laboratories, LLC

Sample Delivery Group (SDG): 253507

Field Sample Identification	Date Collected	Laboratory Sample Identification
1005GWMMW032-U**	05/20/10	253507001
1005GWMMW033-U	05/20/10	253507003
1005GWMMW032-F	05/20/10	253507002
1005GWMMW033-F	05/20/10	253507004
1005GWMMW032-UMS	05/20/10	253507001MS
1005GWMMW032-UMSD	05/20/10	253507001MSD
1005GWMMW032-UDUP	05/20/10	253507001DUP

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA Method noted below:

- Method 900.0: Gross Alpha and Gross Beta.

This review follows the specific guidance in the Data Validation Technical Memorandum (MWH, 2009) to the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 - not applicable to this method -
6 Initial Calibration
7 -not applicable to this method-
8 Continuing Calibration Verification
9 - not applicable to this method -
10 - not applicable to this method -
11 Laboratory or Preparation Blank
12 - not applicable to this method -
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 - not applicable to this method –
19 - not applicable to this method -
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
24 Result is less than the MDC
25 Result is less than two times the error

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

_X__ Signatures on chain(s) and all samples accounted for
_X__ Gross alpha and beta: preserved with nitric acid to pH < 2; 6-month holding time (if preserved)

A total of four groundwater samples were collected on May 20, 2010 in preserved containers. Samples were shipped and arrived at the laboratory on May 25, 2010. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on June 12, 2010, 23 days from collection to analysis.

II. Instrument Calibration

_X___ Confirm dates of calibration, detectors IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards
_X___ Confirm matrix used in geometry standard
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Calibration points including efficiencies for each detector
_NA__ Background checks performed at the time of initial calibration
_NA__ Self absorption curves for each detector, covering an appropriate range of residue masses
_X___ Alpha-beta cross talk values and voltage plateaus (if needed)
_X___ Certificates for NBS- or NIST-traceable standards
_X___ Review standard preparation and dilution logs for accuracy

Initial calibration data were within all required criteria.

III. Calibration Verification

_NA__ Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits
_X___ Routine (daily, weekly, monthly) background checks for each detector
_X___ Daily efficiency checks for each detector
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Confirm detector IDs and geometries used in analysis
_NA__ Check if sample residues are within the range of the self absorption curve

Calibration verification data were within all required criteria.

IV. Target Compound Identification and Quantitation

_X___ Confirm all samples less than MDC are qualified not detected (U)
_X___ Less than two times the uncertainty (2 sigma error) were reported by the laboratory as not detected

Sample results that were reported as values less than the MDC were qualified as not detected at the MDC (flagged U). Sample results that were less than two times the error were qualified as not detected at the MDC (flagged U) or qualified as not detected at the reported concentration (flagged U). The following results were qualified:

Field Sample Identification	Laboratory Sample ID	Parameter	Result (pCi/L)	MDC (pCi/L)	2*Error	Data Validation Result	Reason Code
1005GWMMW032-U**	253507001	Gross Alpha	5.85	2.78	6.16	5.85U	25
1005GWMMW032-U**	253507001	Gross Beta	5.76	4.69	6.22	5.76U	25
1005GWMMW032-F	253507001	Gross Alpha	4.08	3.56	5.84	4.08U	25

V. Blanks

_X___ Confirm method blank results < MDC
If method blank result is ≥ MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤ 5X the concentration of the method blank, then U at detected value.

No Gross Alpha or Gross Beta was detected in the method blanks.

VI. Laboratory Duplicates

_X___ Confirm laboratory duplicate analyzed for each batch or for every 20 samples
_X___ Confirm that the DER ≤ 1.42 or RPD ≤ 20
Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2 \text{ sigma error}^2_{\text{Sample}}] + [2 \text{ sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

__NA_ If DER > 1.42, qualify sample J
__NA_ If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

All DERs are less than 1.42 (or RPDs less than 20) for Gross Alpha and Gross Beta.

VII. Laboratory Control Samples

_X___ Must be analyzed for each batch or for every 20 samples
_X___ Compare %R for Gross Alpha with lab control limits (75-125%)
_X___ Compare %R for Gross Beta with lab control limits (75-125%)

Recoveries for Gross Alpha and Gross Beta in each laboratory control sample were within control limits.

VIII. Matrix Spike Samples

_X___ Must be analyzed for each batch or for every 20 samples
_X___ Compare %R for Gross Alpha with lab control limits (65-135%)
_X___ Compare %R for Gross Beta with lab control limits (65-135%)

Recoveries for Gross Alpha and Gross Beta in each matrix spike sample were within control limits.

IX. Equipment and Water Blank Samples

No field blanks were identified in this SDG.

X. Overall Assessment of Data

With the following exceptions, all quality control data associated with the field samples were within control limits. All other field results are usable as reported by the laboratory.

Summary of Qualified Data:

Field Sample Identification	Laboratory Sample ID	Parameter	Result (pCi/L)	Data Validation Result/Flag	A or P	Reason Code
1005GWMMW032-U**	253507001	Gross Alpha	5.85	5.85U	-	25
1005GWMMW032-U**	253507001	Gross Beta	5.76	5.76U	-	25
1005GWMMW032-F	253507001	Gross Alpha	4.08	4.08U	-	25

LDC #: 23452I22
SDG #: 253507
Laboratory: GEL Laboratories LLC

VALIDATION COMPLETENESS WORKSHEET

Level III /IV

Date: 7-1-10
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Gross Alpha & Beta (EPA SW 846 Method 900.0)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/20/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	MS/D, Dup
IVb.	Laboratory control samples	A	LCS
V.	Minimum dectectable activity (MDA)	A	
VI.	Sample result verification	SW	Not reviewed for level III
VII.	Overall assessment of data	A	
VIII.	Field duplicates	N	
IX.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water ** Level 4

1	1005GWMMW032-U**	11		21	PBW	31	
2	1005GWMMW033-U	12		22		32	
3	1005GWMMW032-F	13		23		33	
4	1005GWMMW033-F	14		24		34	
5	1005GWMMW032-UMS	15		25		35	
6	1005GWMMW032-UMSD	16		26		36	
7	1005GWMMW032-UDUP	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 23452I22
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: OMH

Method: Radiochemistry (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
II. Calibration				
Were all instruments and detectors calibration as required?	✓			
Were NIST traceable standards used for all calibrations?	✓			
Was the check source identified by activity and radionuclide?	✓			
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?	✓			
III. Blanks				
Were blank analyses performed as required?	✓			
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spikes and Duplicates				
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Was a duplicate sample anaylzed at the required frequency of 5% in this SDG?	✓			
Were all duplicate sample duplicate error rations (DER) ≤1.42?.	✓			
V. Laboratory control samples				
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%	✓			
VI. Sample Chemical/Carrier Recovery				
Was a tracer/carrier added to each sample?			✓	
Were tracer/carrier recoveries within the QC limits?			✓	
VII. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
VIII. Sample Result Verification				
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were the Minimum Detectable Activities (MDA) < RL?	✓			

LDC #: 23452I22
SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: MA

Validation Area	Yes	No	NA	Findings/Comments
IX. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
X. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XI. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

X Signatures on chain(s) and all samples accounted for

X Gross alpha and beta: preserved with nitric acid to ph < 2; 6-month holding time (if preserved)

A total of 4 groundwater samples were collected on 5/20/10 in preserved containers. Samples were shipped and arrived at the laboratory on 5/25/10. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on 6/12/10, 23 days from collection to analysis.

II. Instrument Calibration

X Confirm dates of calibration, detector Ids, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards

X Confirm matrix used in geometry standard

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

X Calibration points including efficiencies fo reach detector

NA Background checks performed at the time of initial calibration

NA Self absorption curves for each detector, covering an appropriate range of residue masses

X Alpha-beta cross talk values and voltage plateaus (if needed)

X Certificates for NBS- or NIST-traceable standards

X Review standard preparation and dilution logs for accuracy

III. Calibration Verification

NA Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) ~~and~~ ± 3 sigma error (failure) limits

X Routine (daily, weekly, monthly) background checks for each detector

X Daily efficiency checks for each detector

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

X Confirm defector IDs and geometries used in analysis

NA Check if sample residues are within the range of the self absorption curve

LDC #: 23452I22
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: CR
2nd Reviewer: MY

METHOD: Radiochemistry, Method See Cover

#	Sample ID	Parameter	Result (~~unit~~) pCi/L	MDC (~~unit~~) pCi/L	2x Error (~~Unit~~) pCi/L	Findings	Qualifications
	1	α	5.85	2.78	6.16	~~Rejected~~ result < 2x 2σ	5.85 U(25)
		β	5.76	4.69	6.22	↓	5.76 U(25)
	3	α	4.08	~~3~~.3.56	5.84	↓	4.08 U(25)

Comments: α = Gross alpha
β = Gross Beta
2σ = 2 sigma error

LDC #: 23452I22
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CVR
2nd Reviewer: [illegible]

METHOD: Radiochemistry (Method: See cover)

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

$$\%R = \frac{Found}{True} \times 100$$

Where, Found = activity of each analyte measured in the analysis of the sample.
True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where, S = Original sample activity
D = Duplicate sample activity

Sample ID	Type of Analysis	Analyte	Found/S ~~(units)~~ pCi/L	True/D ~~(units)~~ pCi/L	Recalculated %R or RPD	Reported %R or RPD	Acceptable (Y/N)
LCS	Laboratory control sample	α	144	126	114	114	Y
5	Matrix spike sample	β	975.24	883	110	111	
7	Duplicate RPD	α	5.85	4.20	32.8	32.7	
N	Chemical recovery						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23452F22
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: am

METHOD: Radiochemistry (Method: See cover)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?

Analyte results for α reported with a positive detect were recalculated and verified using the following equation:

Activity =

$$\frac{(\text{cpm} - \text{bckgrd cpm})}{(2.22)(E)(\text{Vol})(CF)}$$

E = Efficiency
Vol = Volume
CF = %R, Self-absorbance, abundance, ect.

Recalculation:

$$\frac{(0.2199 - (115\text{cts}/10\text{min})0.00003)}{2.22(0.1L)(0.1693)} = 5.85\text{pCi/L}$$

#	Sample ID	Analyte	Reported Concentration (pCi/L)	Calculated Concentration (pCi/L)	Acceptable (Y/N)
	1	α	5.85	5.85	Y
		β	5.76	5.76	↓

Note:

Report# 23452J22

Data Validation Company Name
Data Validation Report

Project/Site Name: Southeast Idaho Mine Sites

Report Date: July 6, 2010

Matrix: Water

Parameters: Gross Alpha and Gross Beta by Method 900.0
Gas Flow Proportional Counting System (GFPC)

Validation Level: Stage 2B

Laboratory: GEL Laboratories, LLC

Sample Delivery Group (SDG): 253677

Field Sample Identification	Date Collected	Laboratory Sample Identification
1005GWMMW035-U	05/21/10	253677001
1005GWMMW034-1-U	05/21/10	253677003
1005GWMMW034-2-U	05/21/10	253677005
1005GWMMW036-U	05/21/10	253677007
1005GWMMW035-UMS	05/21/10	253677001MS
1005GWMMW035-UMSD	05/21/10	253677001MSD
1005GWMMW035-UDUP	05/21/10	253677001DUP

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA Method noted below:

- Method 900.0: Gross Alpha and Gross Beta.

This review follows the specific guidance in the Data Validation Technical Memorandum (MWH, 2009) to the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 - not applicable to this method -
6 Initial Calibration
7 -not applicable to this method-
8 Continuing Calibration Verification
9 - not applicable to this method -
10 - not applicable to this method -
11 Laboratory or Preparation Blank
12 - not applicable to this method -
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 - not applicable to this method –
19 - not applicable to this method -
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
24 Result is less than the MDC
25 Result is less than two times the error

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

_X__ Signatures on chain(s) and all samples accounted for
_X__ Gross alpha and beta: preserved with nitric acid to pH < 2; 6-month holding time (if preserved)

A total of four groundwater samples were collected on May 21, 2010 in preserved containers. Samples were shipped and arrived at the laboratory on May 27, 2010. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on June 9, 2010, 19 days from collection to analysis.

II. Instrument Calibration

_X___ Confirm dates of calibration, detectors IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards
_X___ Confirm matrix used in geometry standard
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Calibration points including efficiencies for each detector
_NA__ Background checks performed at the time of initial calibration
_NA__ Self absorption curves for each detector, covering an appropriate range of residue masses
_X___ Alpha-beta cross talk values and voltage plateaus (if needed)
_X___ Certificates for NBS- or NIST-traceable standards
_X___ Review standard preparation and dilution logs for accuracy

Initial calibration data were within all required criteria.

III. Calibration Verification

_NA__ Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits
_X___ Routine (daily, weekly, monthly) background checks for each detector
_X___ Daily efficiency checks for each detector
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Confirm detector IDs and geometries used in analysis
_NA__ Check if sample residues are within the range of the self absorption curve

Calibration verification data were within all required criteria.

IV. Target Compound Identification and Quantitation

_X___ Confirm all samples less than MDC are qualified not detected (U)
_X___ Less than two times the uncertainty (2 sigma error) were reported by the laboratory as not detected

No Gross Alpha or Gross Beta results were reported below the MDC.

V. Blanks

_X___ Confirm method blank results < MDC
If method blank result is ≥ MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤ 5X the concentration of the method blank, then U at detected value.

No Gross Alpha or Gross Beta was detected in the method blanks.

VI. Laboratory Duplicates

_X___ Confirm laboratory duplicate analyzed for each batch or for every 20 samples

_X___ Confirm that the DER ≤ 1.42 or RPD ≤ 20

Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2 \text{ sigma error}^2_{\text{Sample}}] + [2 \text{ sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

__NA_ If DER > 1.42, qualify sample J

__NA_ If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

All DERs are less than 1.42 (or RPDs less than 20) for Gross Alpha and Gross Beta.

VII. Laboratory Control Samples

_X___ Must be analyzed for each batch or for every 20 samples

_X___ Compare %R for Gross Alpha with lab control limits (75-125%)

_X___ Compare %R for Gross Beta with lab control limits (75-125%)

Recoveries for Gross Alpha and Gross Beta in each laboratory control sample were within control limits.

VIII. Matrix Spike Samples

_X___ Must be analyzed for each batch or for every 20 samples

_X___ Compare %R for Gross Alpha with lab control limits (65-135%)

_X___ Compare %R for Gross Beta with lab control limits (65-135%)

Recoveries for Gross Alpha and Gross Beta in each matrix spike sample were within control limits.

IX. Equipment and Water Blank Samples

No field blanks were identified in this SDG.

X. Overall Assessment of Data

With the following exceptions, all quality control data associated with the field samples were within control limits. All other field results are usable as reported by the laboratory.

Summary of Qualified Data:

No Gross Alpha or Gross Beta results required qualification in this SDG.

LDC #: 23452J22

SDG #: 253677

Laboratory: GEL Laboratories LLC

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: MJ

METHOD: Gross Alpha & Beta (EPA SW 846 Method 900.0)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/21/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	MS/D, Dup
IVb.	Laboratory control samples	A	LCS
V.	Minimum dectectable activity (MDA)	A	
VI.	Sample result verification	N	
VII.	Overall assessment of data	A	
VIII.	Field duplicates	N	
IX.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW035-U	11	PBW	21		31	
2	1005GWMMW034-1-U	12		22		32	
3	1005GWMMW034-2-U	13		23		33	
4	1005GWMMW036-U	14		24		34	
5	1005GWMMW035-UMS	15		25		35	
6	1005GWMMW035-UMSD	16		26		36	
7	1005GWMMW035-UDUP	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

x Signatures on chain(s) and all samples accounted for

X Gross alpha and beta: preserved with nitric acid to ph < 2; 6-month holding time (if preserved)

A total of 4 groundwater samples were collected on 5/24/10 in preserved containers. Samples were shipped and arrived at the laboratory on 5/27/10. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on 6/9/10, 19 days from collection to analysis.

II. Instrument Calibration

x Confirm dates of calibration, detector IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards

x Confirm matrix used in geometry standard

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

X Calibration points including efficiencies fo reach detector

NA Background checks performed at the time of initial calibration

NA Self absorption curves for each detector, covering an appropriate range of residue masses

X Alpha-beta cross talk values and voltage plateaus (if needed)

X Certificates for NBS- or NIST-traceable standards

X Review standard preparation and dilution logs for accuracy

III. Calibration Verification

NA Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits

X Routine (daily, weekly, monthly) background checks for each detector

X Daily efficiency checks for each detector

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

X Confirm defector IDs and geometries used in analysis

NA Check if sample residues are within the range of the self absorption curve

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

MWH Americas, Inc.
2121 N. California Blvd. Suite 600
Walnut Creek, CA 94596
ATTN: Ms. Ruth Siegmund

August 4, 2010

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. Siegmund,

Enclosed is the revised data validation report for the fraction listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 23452:

SDG #	**Fraction**
L10050741	Metals

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

Revision 1

Report# 23452F4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10050741

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW035-U	05/21/2010	L10050741-01
1005GWMMW034-1-U	05/21/2010	L10050741-07
1005GWMMW034-2-U	05/21/2010	L10050741-09
1005GWMMW036-U	05/21/2010	L10050741-11
1005GWMMW023-U	05/21/2010	L10050741-13
1005GWMMW035-U-MS	05/21/2010	L10050741-03
1005GWMMW035-U-MSD	05/21/2010	L10050741-05

*Indicates change as the result of report review.
SDG L10050741

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Antimony, Arsenic, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Nickel, Selenium, Silver, Thallium, Uranium, and Zinc.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

*Indicates change as the result of report review.

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

*VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1005GWMMW035-U-MS/MSD (1005GWMMW035-U 1005GWMMW034-1-U 1005GWMMW034-2-U 1005GWMMW036-U)	Manganese	-6.41 (75-125)	-15.6 (75-125)	-	J- (all detects) R (all non-detects)	A
1005GWMMW035-U-MS/MSD (1005GWMMW035-U 1005GWMMW034-1-U 1005GWMMW034-2-U 1005GWMMW036-U)	Nickel	71.1 (75-125)	67.5 (75-125)	-	J- (all detects) UJ (all non-detects)	A
1005GWMMW035-U-MS/MSD (1005GWMMW035-U 1005GWMMW034-1-U 1005GWMMW034-2-U 1005GWMMW036-U)	Zinc	134 (75-125)	-	30.7 (≤20)	J (all detects) UJ (all non-detects)	A

*Indicates change as the result of report review.

*Selenium results were outside the QC limits; results were not qualified since the original sample (1005GWMMW035-U) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Arsenic and Selenium results were outside the QC limits; results were not qualified since the original sample (1005GWMBW032-1-F) was less than 50 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

*Added selenium MS/MSD results

Metals - Data Qualification Summary - SDG L10050741

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L10050741	1005GWMMW035-U 1005GWMMW034-1-U 1005GWMMW034-2-U 1005GWMMW036-U	Manganese	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
L10050741	1005GWMMW035-U 1005GWMMW034-1-U 1005GWMMW034-2-U 1005GWMMW036-U	Nickel	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
L10050741	1005GWMMW035-U 1005GWMMW034-1-U 1005GWMMW034-2-U 1005GWMMW036-U	Zinc	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (RPD)	16, 17

Metals - Laboratory Blank Data Qualification Summary - SDG L10050741

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10050741

No Sample Data Qualified in this SDG

*Indicates change as the result of report review.

LDC #: 23452F4b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-1-10

SDG #: L10050741

Page: 1 of 1

Laboratory: Microbac Laboratories, Inc.

Reviewer: QR

2nd Reviewer: W

METHOD: Metals (EPA SW846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/21/10
II.	Calibration / ICP MS Tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	(SDG# L10050740)
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW035-U	11		21	PBW	31	
2	1005GWMMW034-1-U	12		22		32	
3	1005GWMMW034-2-U	13		23		33	
4	1005GWMMW036-U	14		24		34	
5	1005GWMMW023-U	15		25		35	
6	1005GWMMW035-U-MS	16		26		36	
7	1005GWMMW035-U-MSD	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 23452F4b
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 6 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, U
5		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
QC:6,7		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, U
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,

Comments: Mercury by CVAA if performed

LDC #: 23452F4b
SDG #: See case

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	6/7	W	Mn*	-6.41	-15.6		1-4	J-/R/A (16)
			Ni	71.1	67.5		↓	J-/UJ/A ↓
			Zn	134		30.7	↓	J/UJ/A (16,17)
			Se	198	235		All	No Qual (>4xspike)

Comments: * No Post spike on sample

MSD.4SW

LDC #: 23432F4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA CLP SOW ILM02.1)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the IDL, was ~~an ICP~~ serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) <10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		1005GWMB4032-1-F	W	As	241.00	1-4	No Qual (<50x MDL)
		(5006YAL10050740)		Se	~~77.60~~ 11.80	All	~~J+UJ/A (18)~~ ✓ [illegible]

Comments:

SDIL.4C

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

MWH Americas, Inc.
2121 N. California Blvd. Suite 600
Walnut Creek, CA 94596
ATTN: Ms. Ruth Siegmund

July 26, 2010

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. Siegmund,

Enclosed are the final verification reports for the fractions listed below. This SDG was received on July 14, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 23572:

SDG #	**Fraction**
L10060575	Metals, Wet Chemistry

The data verification was performed under Stage 2B guidelines. The analyses were validated using the following documents, as applicable to each method:

- QAPP Addendum, MWH 2009, to the project SAP, MWH 2004
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004

Please feel free to contact us if you have any questions.

Sincerely,

ERauto

Erlinda T. Rauto
Operations Manager/Senior Chemist

EDD

LDC #23572 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Cd,Se (6020A)		SO_4 (300.0)		TDS (160.1)																													
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	L10060575	07/14/10	08/04/10	1	0	1	0	1	0																												
Total	T/LR			1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3

Shaded cells indicate Level III validation (all other cells are ADR review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

Monsanto, P4 Production LLC
Data Verification Reports
LDC #23572

Wet Chemistry

LDC

Report# 23572A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 21, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10060575

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW025-U	06/17/10	L10060575-01
1005GWMMW025-F	06/17/10	L10060575-02

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 160.1) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) limits.

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10060575

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10060575

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10060575

No Sample Data Qualified in this SDG

LDC #: 23572A6

SDG #: L10060575

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7/9-10

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/17/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	
V	Duplicates	A	Dup (L10060568-nondient)
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1005GWMMW025-U	11	PBW	21		31	
2	1005GWMMW025-F	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 23512A6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter
1	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
2	pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____

Comments:

Monsanto, P4 Production LLC
Data Verification Reports
LDC #23572

Metals

LDC

Report# 23572A4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 21, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10060575

Sample Identification	Collection Date	Laboratory Sample Identification
1005GWMMW025-U	06/17/2010	L10060575-01

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Although the original laboratory control sample was outside control limits, all samples and laboratory control sample were rerun and the percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq$ 20% for water or $\leq$ 35% for soil. For low level results, <5 x RL, a difference of $\pm$ 1 x RL is allowed for water and $\pm$ 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of $\pm$10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10060575

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10060575

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10060575

No Sample Data Qualified in this SDG

LDC #: 23572A4b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-19-10

SDG #: L10060575

Page: 1 of 1

Laboratory: Microbac Laboratories, Inc.

Reviewer: CR

2nd Reviewer: W

METHOD: Cd & Se (EPA SW846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/17/10
II.	Calibration / ICP MS Tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D (L10060560 (non-client))
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	SW	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	~~(L10060544 - non-client)~~ CR
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Water

1	1005GWMMW025-U	11	PBW	21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 23572A4b
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: OR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Analysis Method		
ICP		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mo, Mn, Hg, Ni, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 23572A4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a laboratory control sample (LCS) analyzed for each matrix in this SDG?

Y N N/A Were all aqueous LCS percent recoveries (%R) within the control limits of 80-120% and all soil LCS %R within laboratory established control limits.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	LCS ID	Matrix	Analyte	%R (limits)	Associated Samples	Qualifications
	LCS	W	Se	79.7 (80-120)	None	No Qual (sample & LCS rerun)

Comments:

LCS.4S2

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

MWH Americas, Inc.
2121 N. California Blvd. Suite 600
Walnut Creek, CA 94596
ATTN: Ms. Ruth Siegmund

January 13, 2011

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. Siegmund,

Enclosed is the revised data validation report for the fraction listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 24013:

SDG #	Fraction
L10080495	Metals

Please feel free to contact us if you have any questions.

Sincerely,

ERauto

Erlinda T. Rauto
Operations Manager/Senior Chemist

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: September 29, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10080495

*Sample Identification	Collection Date	Laboratory Sample Identification
HENRY-GW169	08/17/10	L10080495-01
HENRY-GW171	08/17/10	L10080495-02
HENRY-GW167**	08/17/10	L10080495-03**
HENRY-EQ400	08/17/10	L10080495-04
BALLARD-GW166**	08/18/10	L10080495-05**
BALLARD-GW400	08/18/10	L10080495-06
BALLARD-GW164	08/18/10	L10080495-07
BALLARD-GW162	08/19/10	L10080495-08
BALLARD-GW172	08/19/10	L10080495-11
BALLARD-GW161	08/19/10	L10080495-12
BALLARD-EQ400	08/19/10	L10080495-13
BALLARD-GW160	08/19/10	L10080495-14
BALLARD-GW159	08/19/10	L10080495-15
BALLARD-GW162-MS	08/19/10	L10080495-09
BALLARD-GW162-MSD	08/19/10	L10080495-10
*BALLARD-GW162RE	08/19/10	L10080495-08RE
*BALLARD-GW172RE	08/19/10	L10080495-11RE
*BALLARD-GW162-MSRE	08/19/10	L10080495-09RE
*BALLARD-GW162-MSDRE	08/19/10	L10080495-10RE

*Added "RE" samples listed above
**Indicates sample underwent Stage 4 review

*Introduction

This data review covers 19 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Dissolved Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

*Corrected number of samples in this SDG

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

*Indicates change as the result of report review.

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples HENRY-EQ400 and BALLARD-EQ400 were identified as rinsates. No dissolved selenium was found in these blanks.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]).

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

*Indicates change as the result of report review.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

*XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Analyte	Flag	A or P
BALLARD-GW162 BALLARD-GW172	Selenium	R	A

*Added above qualification

*Indicates change as the result of report review.

*Metals - Data Qualification Summary - SDG L10080495

SDG	Sample	Analyte	Flag	A or P	Reason
L10080495	BALLARD-GW162 BALLARD-GW172	Selenium	R	A	Overall assessment of data

*Added above qualification

Metals - Laboratory Blank Data Qualification Summary - SDG L10080495

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10080495

No Sample Data Qualified in this SDG

LDC #: 24013A4b

SDG #: L10080495

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 9-29-10

Page: 1 of 1

Reviewer: OR

2nd Reviewer: ✓

METHOD: Dissolved Selenium (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/17-19/10
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	Not reviewed for Level III validation.
XIII.	Overall Assessment of Data	~~A~~ SW	
XIV.	Field Duplicates	N	
XV	Field Blanks	ND	R=4, 11

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

water

1	HENRY-GW169	11	BALLARD-EQ400	21	PBW	31	
2	HENRY-GW171	12	BALLARD-GW160	22		32	
3	HENRY-GW167**	13	BALLARD-GW159	23		33	
4	HENRY-EQ400	14	BALLARD-GW162-MS	24		34	
5	BALLARD-GW166**	15	BALLARD-GW162-MSD	25		35	
6	BALLARD-GW400	16	(M8) RE	26		36	
7	BALLARD-GW164	17	(M9) RE	27		37	
8	BALLARD-GW162	18	~~M14 RE~~ (M14 RE)	28		38	
9	BALLARD-GW172	19	(M15) RE	29		39	
10	BALLARD-GW161	20		30		40	

Notes:

LDC #: 26034b

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: N

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 24012A4b

VALIDATION FINDINGS CHECKLIST

Reviewer: cR
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 24013A4b

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualification
		8,9	Sampled switched		R/A (23)

Comments:

OVR.4SW

LDC #: 24013A4b

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CS
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Se	50.5	50.0	101	101	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV (19:00)	ICP/MS (Continuing calibration)	Se	54.8	50.0	110	110	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 24013AB2

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ mg/L	True / D / SDR ~~(units)~~ mg/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICS AB	ICP interference check	Y	96.7 ug/L	100 ug/L	96.7	96.7	Y
LCS	Laboratory control sample		0.0622	0.0625	99.5	99.5	
MS14	Matrix spike		(SSR-SR) 0.05438	0.0625	87	87	
14/15	Duplicate		0.0607	0.0565	7.2	7.2	
2	ICP serial dilution		ND	ND	—	—	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 24013A4b

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Se were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{7.3074\ \mu g/L\ (100mL)}{(40mL)(1000)} = \cancel{0.0813}\ 0.0183\ mg/L$$

CR

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	3	Se	0.0183	0.0183	Y

Note:

RECALC.4SW

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

MWH Americas, Inc.
2121 N. California Blvd. Suite 600
Walnut Creek, CA 94596
ATTN: Ms. Ruth Siegmund

October 28, 2010

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. Siegmund,

Enclosed are the final verification reports for the fractions listed below. This SDG was received on October 20, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 24167:

SDG #	Fraction
L10090504	Metals, Wet Chemistry

The data verification was performed under Stage 2B guidelines. The analyses were validated using the following documents, as applicable to each method:

- QAPP Addendum, MWH 2009, to the project SAP, MWH 2004
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

LDC #24167 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Cd,Se (6020A)		SO_4 (300.0)		TDS (160.1)																															
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	L10090504	10/20/10	11/10/10	4	0	4	0	4	0																														
Total	T/LR			4	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12

Shaded cells indicate Level III validation (all other cells are ADR review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

Monsanto, P4 Production LLC
Data Verification Reports
LDC #24167

Metals

LDC

Report# 24167A4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 22, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090504

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMMW010-U	09/17/10	L10090504-01
1009GWMMW013-U	09/17/10	L10090504-03
1009GWMMW029-1-U	09/17/10	L10090504-05
1009GWMMW029-2-U	09/17/10	L10090504-07

Introduction

This data review covers 4 water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met with the exception of Selenium. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

Selenium recovery was 59.2%; however, the associated sample results were greater than 2x the RL, therefore no data required qualification.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Although the original laboratory control sample was outside control limits, all samples and laboratory control sample were rerun and the percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils). A non-client sample (L10090638-01) was used.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met. Non-client samples (L10090608-09 and L10090638-01) were used.

ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10090504

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10090504

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10090504

No Sample Data Qualified in this SDG

LDC #: 24167A4b

SDG #: L10090504

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 10-22-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Cd & Se (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/17/10
II.	Calibration / ICP MS Tune	SW A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D (non-client sample - L10090638-01)
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	L10090608-09 (non-client), L10090638-01 (non-client)
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1009GWMMW010-U	11	RBW	21		31	
2	1009GWMMW013-U	12		22		32	
3	1009GWMMW029-1-U	13		23		33	
4	1009GWMMW029-2-U	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 24167A4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: M

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 24167A4b

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	10/6/10	~~CRI~~ (13:29) CRDL	Se	59.2 (70-130)	1,2,4	~~J-/UJ/R (9)~~ CR No Qual (> 2x RL)

Comments:

CAL.4SW

Monsanto, P4 Production LLC
Data Verification Reports
LDC #24167

Wet Chemistry

LDC

Report# 24167A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 22, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090504

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMMW010-U	09/17/10	L10090504-01
1009GWMMW010-F	09/17/10	L10090504-02
1009GWMMW013-U	09/17/10	L10090504-03
1009GWMMW013-F	09/17/10	L10090504-04
1009GWMMW029-1-U	09/17/10	L10090504-05
1009GWMMW029-1-F	09/17/10	L10090504-06
1009GWMMW029-2-U	09/17/10	L10090504-07
1009GWMMW029-2-F	09/17/10	L10090504-08
1009GWMMW013-FDUP	09/17/10	L10090504-04DUP

Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 160.1) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) samples analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10090504

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10090504

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10090504

No Sample Data Qualified in this SDG

LDC #: 24167A6

SDG #: L10090504

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 10-22-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/17/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	Not performed
V	Duplicates	A	Dup
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1009GWMMW010-U	11		21	PBW	31	
2	1009GWMMW013-U	12		22		32	
3	1009GWMMW029-1-U	13		23		33	
4	1009GWMMW029-2-U	14		24		34	
5	1009GWMMW010-F	15		25		35	
6	1009GWMMW013-F	16		26		36	
7	1009GWMMW029-1-F	17		27		37	
8	1009GWMMW029-2-F	18		28		38	
9	(~~1~~ 6) Dup	19		29		39	
10	~~1009GWMMW013 FOUR~~	20		30		40	

Notes:

LDC #: 24167A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: W

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-4		pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
5-8		pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
QC-9		pH TDS Cl F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

MWH Americas, Inc.
2121 N. California Blvd. Suite 600
Walnut Creek, CA 94596
ATTN: Ms. Ruth Siegmund

October 28, 2010

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. Siegmund,

Enclosed are the final verification reports for the fractions listed below. These SDGs were received on October 13, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 24156:

SDG #	Fraction
L10090445, L10090446 L10090447	Metals, Wet Chemistry

The data verification was performed under Stage 2B guidelines. The analyses were validated using the following documents, as applicable to each method:

- QAPP Addendum, MWH 2009, to the project SAP, MWH 2004
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004

Please feel free to contact us if you have any questions.

Sincerely,

ERauto

Erlinda T. Rauto
Operations Manager/Senior Chemist

LDC #24156 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	V (6010B)		Se (6020A)		Cd,Se (6020A)		Diss. Cd (6020A)		(4)Diss. Metals (6010B)		Diss. Ca,Mg (6010B)		Cl (300.0)		SO_4 (300.0)		Hard. (2340B)		TDS (160.1)															
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	L10090445	10/13/10	11/03/10	4	0	-	-	2	0	2	0	-	-	2	0	2	0	2	0	2	0	2	0														
B	L10090446	10/13/10	11/03/10	3	0	-	-	3	0	3	0	1	0	2	0	3	0	3	0	3	0	3	0														
C	L10090447	10/13/10	11/03/10	5	0	1	0	4	0	5	0	1	0	4	0	5	0	5	0	5	0	5	0														
Total	T/LR			12	0	1	0	9	0	10	0	2	0	8	0	10	0	10	0	10	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80

Shaded cells indicate Level III validation (all other cells are ADR review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

Monsanto, P4 Production LLC
Data Verification Reports
LDC #24156

Metals

LDC

Report# 24156A4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 26, 2009

Matrix: Water

Parameters: Metals by ICP SW-846 Method 6010B

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090445

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMSG004-U	09/14/10	L10090445-01
1009GWMSG004-F	09/14/10	L10090445-02
1009GWMDS026-U	09/15/10	L10090445-03
1009GWMDS026-F	09/15/10	L10090445-04
1009GWMDS026-U-MS	09/15/10	L10090445-05
1009GWMDS026-F-MS	09/15/10	L10090445-06
1009GWMDS026-U-MSD	09/15/10	L10090445-07
1009GWMDS026-F-MSD	09/15/10	L10090445-08

Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium, Magnesium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1009ER-GW-02-U, 1009ER-GW-02-F, 1009ER-GW-01-U, and 1009ER-GW-01-F (all from SDG L10090447) were identified as equipment rinsates. No contaminant concentrations were found in these blanks.

Samples 1009B-GW-02-U and 1009B-GW-02-F (both from SDG L10090447) were identified as source blanks. No contaminant concentrations were found in these blanks.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium and Magnesium results were outside the QC limits; results were not qualified since the original sample (1009GWMDS026-F) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10090445

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10090445

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10090445

No Sample Data Qualified in this SDG

LDC #: 24156A4a

SDG #: L10090445

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 10-26-10

Page: 1 of 2

Reviewer: [illegible]

2nd Reviewer: ✓

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/14/10 - 9/15/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	ER=1009ER-GW-02-U, 1009ER-GW-02-F, 1009ER-GW-01-U, 1009ER-GW-01-F / SDG #: L10090447

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

* see below

Validated Samples:

water

1 9/14	1009GWMSG004-U	11		21		31	
2 9/15	1009GWMDS026-U	12		22		32	
3	1009GWMSG004-F	13		23		33	
4	1009GWMDS026-F	14		24		34	
5	1009GWMDS026-U-MS	15		25		35	
6	1009GWMDS026-U-MSD	16		26		36	
7	1009GWMDS026-F-MS	17		27		37	
8	1009GWMDS026-F-MSD	18		28		38	
9		19		29		39	
10		20		30		40	

Notes: * Source Blk = 1009B-GW-02-U, 1009B-GW-02-F / L10090447

LDC #: 24156A4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: W

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
3,4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
QC:5,6		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
↳ 7,8		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 24156A4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	7/8	W	Ca	300	278		3,4	No Qual (>4x spike)
			Mg	63.7	35.9		↓	↓

Comments:

MSD.4SW

Report# 24156B4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 26, 2009

Matrix: Water

Parameters: Metals by ICP SW-846 Method 6010B

Validation Level: EPA Level IV

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090446

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMST069-U	09/14/10	L10090446-01
1009GWMST069-F	09/14/10	L10090446-02
1009GWMDS030-1-U	09/14/10	L10090446-03
1009GWMDS030-1-F	09/14/10	L10090446-04
1009GWMDS030-2-U	09/14/10	L10090446-05
1009GWMDS030-2-F	09/14/10	L10090446-06

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium, Iron, Magnesium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1009ER-GW-02-U and 1009ER-GW-02-F (from SDG L1009447) were identified as equipment rinsates. No metal contaminants were found in these blanks.

Samples 1009B-GW-02-U and 1009B-GW-02-F (from SDG L10090447) were identified as source blanks. No metal contaminants were found in these blanks.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium and Magnesium results were outside the QC limits; results were not qualified since the original sample (1009GWMDS026-F) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10090446

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10090446

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10090446

No Sample Data Qualified in this SDG

LDC #: 24156B4a

SDG #: L10090446

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level ~~III~~ IV

Date: 10-26-10

Page: 1 of 1

Reviewer: ER

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/14/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D (SDG# L10090445)
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	A	SDG# L10090445
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	ER= 1009ER-GW-02-U, 1009ER-GW-02-F; SourceBlk= 1009B-GW-02-U, 1009B-GW-02-F (SDG# L10090447)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1009GWMST069-U	11	PBW	21		31	
2	1009GWMDS030-1-U	12		22		32	
3	1009GWMDS030-2-U	13		23		33	
4	1009GWMST069-F	14		24		34	
5	1009GWMDS030-1-F	15		25		35	
6	1009GWMDS030-2-F	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: B241563 4b

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.		✓		
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 24156B46

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysis have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 24156B46

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
5,6		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 24186B4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	1009GWMDSB26F	W	Ca	300	278		4-6	No Qual (>4x spike)
			Mg	637	35.9		↓	↓

Comments:

MSD.4SW

LDC #: 24158B46

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CB
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{Found}{True} \times 100$$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (~~ug~~ mg/L)	True (~~ug~~ mg/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Mg	10.2	10	102	102	Y
	ICP/MS (Initial calibration)						
	CVAA (Initial calibration)						
CCV	ICP (Continuing calibration)	V	1.03	1	103	103	Y
	ICP/MS (Continuing calibration)						
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24158B4b

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (~~units~~) mg/L	True / D / SDR (~~units~~) mg/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Fe	97.3	100	97.3	97.3	Y
LCS	Laboratory control sample	Ca	5.26	5	105	105	↓
1009GWM05026-U	Matrix spike	V	(SSR-SR) 0.385	0.5	77	77	↓
↓	Duplicate	Fe	4.44	2.29	63.9	63.9	↓
1009GWMS6004-U	ICP serial dilution	Mg	20.1	21.65	7.71	7.71	✓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 24156B4B

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Mg were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

Raw Data = 90.5 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	4	Fe	0.0584	0.0584	Y
		Mg	90.5	90.4	↓
		Ca	490	490	↓

Note:

RECALC.4SW

Report# 24156C4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 26, 2009

Matrix: Water

Parameters: Metals by ICP SW-846 Method 6010B

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090447

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMDS025-U	09/15/10	L10090447-01
1009GWMDS025-F	09/15/10	L10090447-02
1009ER-SW-01-U	09/14/10	L10090447-03
1009ER-SW-01-F	09/14/10	L10090447-04
1009ER-GW-02-U	09/14/10	L10090447-05
1009ER-GW-02-F	09/14/10	L10090447-06
1009B-GW-02-U	09/14/10	L10090447-07
1009B-GW-02-F	09/14/10	L10090447-08
1009ER-GW-01-U	09/15/10	L10090447-09
1009ER-GW-01-F	09/15/10	L10090447-10
1009GWMDS025-UMS	09/15/10	L10090447-01MS
1009GWMDS025-UMSD	09/15/10	L10090447-01MSD

Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium, Iron, Magnesium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1009ER-SW-01-U, 1009ER-GW-02-U, 1009ER-GW-01-U, 1009ER-SW-01-F, 1009ER-GW-02-F, and 1009ER-GW-01-F were identified as equipment rinsates. No metal contaminants were found in these blanks.

Samples 1009B-GW-02-U and 1009B-GW-02-F were identified as source blanks. No metal contaminants were found in these blanks.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Iron, Calcium, and Magnesium results were outside the QC limits; results were not qualified since the original sample (1009GWMDS025-U) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10090447

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10090447

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10090447

No Sample Data Qualified in this SDG

LDC #: 24156C4a

SDG #: L10090447

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 10-26-10

Page: 1 of 1

Reviewer: CS

2nd Reviewer: W

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/14/10 - 9/15/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	ER=2,3,5,7,8,10, ~~1,9~~ Source Blk= 4,9

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1009GWMDS025-U	11	~~1009~~ (~~N~~ 1) MS	21	RBW	31	
2	1009ER-SW-01-U	12	↓ MSD	22		32	
3	1009ER-GW-02-U	13		23		33	
4	1009B-GW-02-U	14		24		34	
5	1009ER-GW-01-U	15		25		35	
6	1009GWMDS025-F	16		26		36	
7	1009ER-SW-01-F	17		27		37	
8	1009ER-GW-02-F	18		28		38	
9	1009B-GW-02-F	19		29		39	
10	1009ER-GW-01-F	20		30		40	

Notes:

LDC #: 24156C4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-5		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
6,8,9,10		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
7		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
QC 11,12		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN- Fe Mg
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 24156C4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	11/12	W	Fe	128	141		7	No Qual (Sample > 4X spike)
			Mg	161	187		6-10	↓ ↓
			Ca	6,56	977		↓	↓ ↓

Comments:

Report# 24156A4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 26, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090445

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMSG004-U	09/14/10	L10090445-01
1009GWMSG004-F	09/14/10	L10090445-02
1009GWMDS026-U	09/15/10	L10090445-03
1009GWMDS026-F	09/15/10	L10090445-04
1009GWMDS026-U-MS	09/15/10	L10090445-05
1009GWMDS026-F-MS	09/15/10	L10090445-06
1009GWMDS026-U-MSD	09/15/10	L10090445-07
1009GWMDS026-F-MSD	09/15/10	L10090445-08

Samples appended with "F" were analyzed for dissolved metals

Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1009ER-GW-02-U, 1009ER-GW-02-F, 1009ER-GW-01-U, and 1009ER-GW-01-F (all from SDG L10090447) were identified as equipment rinsates. No metal contaminants were found in these blanks.

Samples 1009B-GW-02-U and 1009B-GW-02-F (both from SDG L10090447) were identified as source blanks. No metal contaminants were found in these blanks.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1009GWMDS026-U-MS/MSD (1009GWMSG004-U 1009GWMDS026-U)	Cadmium	-	53.6 (75-125)	46.3 (≤20)	J (all detects) UJ (all non-detects)	A

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Selenium results were outside the QC limits; results were not qualified since the original sample (1009GWMSG004-U) was less than 50 times the MDLs.

Cadmium and Selenium were outside QC limits; however, since there were no associated samples reported from the run, no data were qualified.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10090445

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L10090445	1009GWMSG004-U 1009GWMDS026-U	Cadmium	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)(RPD)	16, 17

Metals - Laboratory Blank Data Qualification Summary - SDG L10090445

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10090445

No Sample Data Qualified in this SDG

LDC #: 24156A4b

SDG #: L10090445

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 10-26-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

METHOD: Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/14-15/10
II.	Calibration / ICP MS Tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	ER=1009ER-GW-02-U, 1009ER-GW-02-F, 1009ER-GW-01-U, 1009ER-GW-01-F > L10090447

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

*see below

Validated Samples: water

1	1009GWMSG004-U	11	PBW	21		31	
2	1009GWMDS026-U	12		22		32	
3	1009GWMSG004-F	13		23		33	
4	1009GWMDS026-F	14		24		34	
5	1009GWMDS026-U-MS	15		25		35	
6	1009GWMDS026-U-MSD	16		26		36	
7	1009GWMDS026-F-MS	17		27		37	
8	1009GWMDS026-F-MSD	18		28		38	
9		19		29		39	
10		20		30		40	

Notes: Samples appended with "F" were analyzed for dissolved cadmium

* Source blk = 1009B-GW-02-U, 1009B-GW-02-F > L10090447

LDC #: 24150A1b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
3,4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
QC 5,6		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
7,8		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 24156A4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	5/6	W	Cd		53.6	46.3	1,2	J/UJ/A (16,17)

Comments:

LDC #: 24156A4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
	9/27/10	1	W	Cd	17.60	None	No Qual (not reported from run)
	↓	↓	↓	Se	15.50	1, 2	No Qual (< 50xMDL)
	9/30/10	↓	↓	Se	21.00	None	No Qual (not reported from run)

Comments:

SDILICPMS.wpd

Report# 24156B4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 26, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: EPA Level IV

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090446

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMST069-U	09/14/10	L10090446-01
1009GWMST069-F	09/14/10	L10090446-02
1009GWMDS030-1-U	09/14/10	L10090446-03
1009GWMDS030-1-F	09/14/10	L10090446-04
1009GWMDS030-2-U	09/14/10	L10090446-05
1009GWMDS030-2-F	09/14/10	L10090446-06

Samples appended with "F" were analyzed for dissolved metals

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1009ER-GW-02-U and 1009ER-GW-02-F, (both from SDG L10090447) were identified as equipment rinsates. No metal contaminants were found in these blanks.

Samples 1009B-GW-02-U and 1009B-GW-02-F (both from SDG L10090447) were identified as source blanks. No metal contaminants were found in these blanks.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils)) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1009GWMDS026-UMS/MSD (1009GWMST069-T 1009GWMDS030-1-U 1009GWMDS030-2-U)	Cadmium	-	53.6 (75-125)	46.3 (≤20)	J (all detects) UJ (all non-detects)	A

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Selenium results were outside the QC limits; results were not qualified since the original sample (1009GWMSG004-0) was less than 50 times the MDLs.

Cadmium and Selenium were outside QC limits; however, since there were no associated samples reported from the run, no data were qualified.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10090446
Metals - Laboratory Blank Data Qualification Summary - SDG L10090446

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L10090446	1009GWMST069-T 1009GWMDS030-1-U 1009GWMDS030-2-U	Cadmium	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)(RPD)	16, 17

Metals - Field Blank Data Qualification Summary - SDG L10090446

No Sample Data Qualified in this SDG

LDC #: 24156B4b

VALIDATION COMPLETENESS WORKSHEET

Date: 10/26/10

SDG #: L10090446

Level ~~III~~ IV

Page: 1 of 1

Laboratory: Microbac Laboratories, Inc.

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/14/10
II.	Calibration / ICP MS Tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D (SDG# L10090445)
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	SDG# L10090445
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	NP	ER=1009ER-GW-02-U, 1009ER-GW-02-F SDG# L10090447 SourceBlk= 1009B-GW-02-U, 1009B-GW-02-F

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Water

1	1009GWMST069-U	11	PBW	21		31	
2	1009GWMDS030-1-U	12		22		32	
3	1009GWMDS030-2-U	13		23		33	
4	1009GWMST069-F	14		24		34	
5	1009GWMDS030-1-F	15		25		35	
6	1009GWMDS030-2-F	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: Samples appended with "F" were analyzed for dissolved metals

LDC #: 24156B4a

VALIDATION FINDINGS CHECKLIST

Reviewer: QR
2nd Reviewer: ✓

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.		✓		
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 24156B4a

VALIDATION FINDINGS CHECKLIST

Reviewer: ak
2nd Reviewer: ✓

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysis have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?		✓		
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 24156B4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
4-6		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 24156B4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	1009GWMDS026-U	W	Cd		53.6	46.3	1-3	J/UJ/A (16,17)

Comments:

LDC #: 24156B3/a

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP/MS) ~~≥100X the MDL (ICP/MS)~~, was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
	9/27/10	1009GWMS60040	W	Cd	17.60	None	No Qual (not reported from run)
	↓			Se	15.50	1-3	No Qual ~~(<100xMDL)~~ (<50xMDL)
	9/30/10	↓	W	Se	21.00	None	No Qual (not reported from run)

Comments:

SDILICPMS.wpd

LDC #: 24156B34

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CB
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Se	49.0	50	98.0	98.1	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV(2305)	ICP/MS (Continuing calibration)	Cd	52.4	50	105	105	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24188B4g

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (~~units~~) mg/L	True / D / SDR (~~units~~) mg/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Cd	101 ug/L	100 ug/L	101	101	Y
LCS	Laboratory control sample	Se	0.0620	0.0625	99.2	99.2	
1009GWM05D26U	Matrix spike	Cd	(SSR-SR) 0.05462	0.0625	87.4	87.3	
↓	Duplicate	Se	0.154	0.157	1.93	1.58	
1009GWM5G004-U	ICP serial dilution	Se	4.98 ug/L	5.75 ug/L	15.5	15.5	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 24156B4a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Se were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{(100mL)\left(\frac{93.8698 ug/L}{1000}\right)(5)}{40mL} = 1.17 mg/L$$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Cd	0.00973	0.0973	Y
		Se	1.17	1.17	↓

Note:

RECALC.4SW

Report# 24156C4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 26, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090447

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMDS025-U	09/15/10	L10090447-01
1009GWMDS025-F	09/15/10	L10090447-02
1009ER-SW-01-U	09/14/10	L10090447-03
1009ER-SW-01-F	09/14/10	L10090447-04
1009ER-GW-02-U	09/14/10	L10090447-05
1009ER-GW-02-F	09/14/10	L10090447-06
1009B-GW-02-U	09/14/10	L10090447-07
1009B-GW-02-F	09/14/10	L10090447-08
1009ER-GW-01-U	09/15/10	L10090447-09
1009ER-GW-01-F	09/15/10	L10090447-10
1009ER-GW-01-FMS	09/15/10	L10090447-10MS
1009ER-GW-01-FMSD	09/15/10	L10090447-10MSD

Samples appended with "F" were analyzed for dissolved metals

Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1009ER-SW-01-U, 1009ER-GW-02-U, 1009ER-GW-01-U, 1009ER-SW-01-F, 1009ER-GW-02-F, and 1009ER-GW-01-F were identified as equipment rinsates. No metal contaminants were found in these blanks.

Samples 1009B-GW-02-U and 1009B-GW-02-F were identified as source blanks. No metal contaminants were found in these blanks.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10090447

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10090447

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10090447

No Sample Data Qualified in this SDG

LDC #: 24156C4b

SDG #: L10090447

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 10-26-10

Page: 1 of 1

Reviewer: OR

2nd Reviewer: ✓

METHOD: Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/14-15/10
II.	Calibration / ICP MS Tune	A/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	EB= 2,3,5,7,8,10, ~~4,9~~ Source Blk=4,9

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1009GWMDS025-U	11	CK 10 / MS	21	PBW	31	
2	1009ER-SW-01-U	12	↓ MSD	22		32	
3	1009ER-GW-02-U	13		23		33	
4	1009B-GW-02-U	14		24		34	
5	1009ER-GW-01-U	15		25		35	
6	1009GWMDS025-F	16		26		36	
7	1009ER-SW-01-F	17		27		37	
8	1009ER-GW-02-F	18		28		38	
9	1009B-GW-02-F	19		29		39	
10	1009ER-GW-01-F	20		30		40	

Notes: Samples appended with "F" were analyzed for dissolved metals

LDC #: 24156C4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1, 3-5		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
2		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
6-10		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
QC: 11, 12		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

Monsanto, P4 Production LLC
Data Verification Reports
LDC #24156

Wet Chemistry

LDC

Report# 24156A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 26, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090445

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMSG004-U	09/14/10	L10090445-01
1009GWMSG004-F	09/14/10	L10090445-02
1009GWMDS026-U	09/15/10	L10090445-03
1009GWMDS026-F	09/15/10	L10090445-04
1009GWMDS026-U-MS	09/15/10	L10090445-05
1009GWMDS026-F-MS	09/15/10	L10090445-06
1009GWMDS026-U-MSD	09/15/10	L10090445-07
1009GWMDS026-F-MSD	09/15/10	L10090445-08
1009GWMDS026-FDUP	09/15/10	L10090445-08DUP
1009GWMDS026-UDUP	09/15/10	L10090445-03DUP

Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the Methods noted below:

- EPA Method 300.0 for Chloride and Sulfate, Standard Method 2340B for Hardness and EPA Method 160.1 for Total Suspended Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 7 days for method 160.1, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1009ER-GW-02-U, 1009ER-GW-02-F, 1009ER-GW-01-U and 1009ER-GW-01-F (all from SDG L10090447) were identified as equipment rinsates. No contaminant concentrations were found in these blanks with the following exceptions with the following exceptions:

Equipment Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
1009ER-GW-02-U	9/14/09	Total dissolved solids	9.00 mg/L	1009GWMDS026-U

Samples 1009B-GW-02-U and 100B-GW-02-F (both from SDG L10090447) were identified as source blanks. No contaminant concentrations were found in these blanks.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (> blank contaminants) than the concentrations found in the associated field blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10090445

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10090445

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10090445

No Sample Data Qualified in this SDG

LDC #: 24156A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 10-26-10

SDG #: L10090445 Level III Page: 1 of 1

Laboratory: Microbac Laboratories, Inc. Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) Chloride, Sulfate (EPA Method 300.0), Hardness (SM2340B), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/14-15/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	Dup
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	SW	ER=1009ER-GW-02-U, 1009ER-GW-02-F, 1009ER-GW-01-U, 1009ER-GW-01-F } L10090447

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

* See below

Validated Samples: water

1	1009GWMSG004-U	11	PBW	21		31	
2	1009GWMDS026-U	12		22		32	
3	1009GWMSG004-F	13		23		33	
4	1009GWMDS026-F	14		24		34	
5	1009GWMDS026-U-MS	15		25		35	
6	1009GWMDS026-U-MSD	16		26		36	
7	1009GWMDS026-F-MS	17		27		37	
8	1009GWMDS026-F-MSD	18		28		38	
9	↓ DUP	19		29		39	
10	(W2) DUP	20		30		40	

Notes: * Source blk = 1009B-GW-02-U, 1009B-GW-02-F } L10090447

24156A6W.wpd

LDC #: 24156A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1,2		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
3,4		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 Hardness
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC:5,6		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
7,8,9		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ~~Hardness~~ CR
9		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
10		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC #: 24156A6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 9/14/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: ER Associated Samples: 2

Analyte	Blank ID	Action Limit	Sample Identification							
	1009ER-GW-02-U		No Qualifiers							
TDS	9.00	~~45~~ 9.0								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Report# 24156B6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 26, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level IV

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090446

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMST069-U	09/14/10	L10090446-01
1009GWMST069-F	09/14/10	L10090446-02
1009GWMDS030-1-U	09/14/10	L10090446-03
1009GWMDS030-1-F	09/14/10	L10090446-04
1009GWMDS030-2-U	09/14/10	L10090446-05
1009GWMDS030-2-F	09/14/10	L10090446-06

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the Methods noted below:

- EPA Method 300.0 for Chloride and Sulfate, Standard Method 2340B for Hardness and EPA Method 160.1 for Total Suspended Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 7 days for method 160.1, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1009ER1009ER-GW-02-U and 1009ER-GW-02-F (from SDG L10090447) were identified as equipment rinsates. No contaminant concentrations were found in these blanks with the following exceptions:

Equipment Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
1009ER-GW-02-U	9/14/09	Total dissolved solids	9.00 mg/L	1009GWMST069-U 1009GWMDS030-1-U 1009GWMDS030-2-U

Samples 1009B-GW-02-U and 1009B-GW-02-F (from SDG L10090447) were identified as source blanks. No contaminant concentrations were found in these blanks.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (> blank contaminants) than the concentrations found in the associated field blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not performed by the laboratory.

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10090446

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10090446

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10090446

No Sample Data Qualified in this SDG

LDC #: 24156B6

SDG #: L10090446

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level ~~III~~ IV

Date: 10-28-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: (Analyte) Chloride, Sulfate (EPA Method 300.0), Hardness (SM2340B), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/14/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	~~A~~ N	~~Client specified~~ Not performed
V	Duplicates	A	DUP (SDG# L10090445)
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	SW	EB=1009EB-GW-02-U, 1009EB-GW-02-F / SDG# L10090447 SourceBlk= 1009B-GW-02-U, 1009B-GW-02-F

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water

1	1009GWMST069-U	11	PBW	21		31	
2	1009GWMDS030-1-U	12		22		32	
3	1009GWMDS030-2-U	13		23		33	
4	1009GWMST069-F	14		24		34	
5	1009GWMDS030-1-F	15		25		35	
6	1009GWMDS030-2-F	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 24156B6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: W

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 24156B6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 24156B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: W

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-3		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
4-6		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 Hardness
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC #: 24156B6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 9/14/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: ER Associated Samples: 1-3

Analyte	Blank ID	Action Limit	Sample Identification							
	1009ER-GW-02-U		No Qualifiers							
TDS	9.00	~~45~~ 9.0								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24156B6

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics, Method SW846

The correlation coefficient (r) for the calibration of SO4 was recalculated.Calibration date: 7/29/10

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial Calibration Verification	SO4	0	1	0.097	0.9999	1.0000	Y
		s1	5	0.501			
		s2	20	2.098			
		s3	40	4.453			
		s4	60	7.001			
		s5	120	15.406			
		s6	180	24.688			
Calibration verification	Cl	ICV	8.00	Found (mg/L) 8.00	100	100	
Calibration verification	SO4	CCV	40	40.0	100	100	
Calibration verification	Cl	↓	8	7.97	100	100	✓

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24506B6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S ~~(units)~~ mg/L	True / D ~~(units)~~ mg/L	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Cl	7.91	8	98.9	98.9	Y
N	Matrix spike sample		(SSR-SR)				
1009WM05026-U	Duplicate sample	TB	1490	1470	1.35	1.62	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 24156B6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for SO_4 reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$y = 0.00016x^2 + 0.10875x - 0.07861$

Recalculation:

$$\frac{10\sqrt{4(0.00016)(15.565+0.07861)+0.10875^2} - 0.10875}{2(0.00016)}$$

$= 1218$ mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	4	Cl	10.5	10.5	Y
		SO_4	1220	1220	↓
		Hardness	1600	1600	↓

Note:

RECALC.6

Report# 24156C6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 26, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090447

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMDS025-U	09/15/10	L10090447-01
1009GWMDS025-F	09/15/10	L10090447-02
1009ER-SW-01-U	09/14/10	L10090447-03
1009ER-SW-01-F	09/14/10	L10090447-04
1009ER-GW-02-U	09/14/10	L10090447-05
1009ER-GW-02-F	09/14/10	L10090447-06
1009B-GW-02-U	09/14/10	L10090447-07
1009B-GW-02-F	09/14/10	L10090447-08
1009ER-GW-01-U	09/15/10	L10090447-09
1009ER-GW-01-F	09/15/10	L10090447-10
1009ER-GW-02-FDUP	09/14/10	L10090447-06DUP

Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the Methods noted below:

- EPA Method 300.0 for Chloride and Sulfate, Standard Method 2340B for Hardness and EPA Method 160.1 for Total Suspended Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 7 days for method 160.1, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1009ER-SW-01-U, 1009ER-SW-01-F, 1009ER-GW-02-U, 1009ER-GW-02-F, 1009ER-GW-01-U, and 1009ER-GW-01-F were identified as equipment rinsates. No contaminant concentrations were found in these blanks with the following exceptions:

Equipment Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
1009ER-SW-01-U	9/14/09	Total dissolved solids	7.00 mg/L	No associated samples
1009ER-GW-02-U	9/14/09	Total dissolved solids	7.00 mg/L	No associated samples

Samples 1009B-GW-02-U and 1009B-GW-02-F were identified as source blanks. No contaminant concentrations were found in these blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not performed by the laboratory.

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10090447

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10090447

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L10090447

No Sample Data Qualified in this SDG

LDC #: 24156C6

SDG #: L10090447

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 10-26-16

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

METHOD: (Analyte) Chloride, Sulfate (EPA Method 300.0), Hardness (SM2340B), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/14-15/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	Client specified
V	Duplicates	A	Dup
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	SW	ER= 2,3,5,7,8,10, ~~4,9~~ Source Blk=4,9

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1009GWMDS025-U	11	(MS) Dup	21		31	
2	1009ER-SW-01-U	12		22		32	
3	1009ER-GW-02-U	13		23		33	
4	1009B-GW-02-U	14		24		34	
5	1009ER-GW-01-U	15		25		35	
6	1009GWMDS025-F	16		26		36	
7	1009ER-SW-01-F	17		27		37	
8	1009ER-GW-02-F	18		28		38	
9	1009B-GW-02-F	19		29		39	
10	1009ER-GW-01-F	20		30		40	

Notes:

LDC #: 24156G6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-5		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
6-10		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 Hardness
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC-11		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC #: 24156C6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 9/14/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: No associated samples

Analyte	Blank ID	Action Limit	Sample Identification							
	2		No Qualifiers							
TDS	7.00	70 ~~35~~								

Sampling date: 9/14/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: No associated samples

Analyte	Blank ID	Action Limit	Sample Identification							
	3		No Qualifiers							
TDS	9.00	90 ~~45~~								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

MWH Americas, Inc.
2121 N. California Blvd. Suite 600
Walnut Creek, CA 94596
ATTN: Ms. Ruth Siegmund

November 19, 2010

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. Siegmund,

Enclosed are the final verification reports for the fractions listed below. These SDGs were received on October 27, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 24287:

SDG #	Fraction
L10090503, L10090682 261516	Metals, Wet Chemistry

The data verification was performed under Stage 2B/4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- QAPP Addendum, MWH 2009, to the project SAP, MWH 2004
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior

ChemistV:\LOGIN\MWH\Monsanto\24287COV.wpd

EDD

LDC #24287 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Al,Fe V (6010B)		Cd,Pb Se (6020)		(5) Metals (6020A)		Se (6020A)		Diss. Cd (6020A)		(4)Diss. Metals (6010B)		(5)Diss. Metals (6010B)		Alk. (310.2)		Cl (300.0)		SO_4 (300.0)		Hard. (2340B)		NO_3/ NO_2-N (353.2)		TDS (160.1)		TSS (160.2)		Gross α&β (900.0)					
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	L10090503	10/27/10	11/17/10	-	-	-	-	-	-	8	0	8	0	8	0	-	-	-	-	8	0	8	0	8	0	-	-	8	0	-	-	-	-				
B	L10090682	10/27/10	11/17/10	1	0	-	-	1	0	-	-	-	-	-	-	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	-	-				
C	261516	10/27/10	11/17/10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0				
Total	T/LR			1	0	0	0	1	0	8	0	8	0	8	0	1	0	1	0	9	0	9	0	9	0	1	0	9	0	1	0	1	0	0	0	0	67

Shaded cells indicate Level III validation (all other cells are ADR review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

Monsanto, P4 Production LLC
Data Verification Reports
LDC #24287

Wet Chemistry

LDC

Report# 24287A4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: November 10, 2010

Matrix: Water

Parameters: Dissolved Metals by ICP SW-846 Method 6010B

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090503

Sample Identification	Collection Date	Laboratory Sample Identification
1009SWMST044-F	09/16/10	L10090503-02
1009SWMST019-F	09/16/10	L10090503-04
1009SWMST019-F-MS	09/16/10	L10090503-06
1009SWMST019-F-MSD	09/16/10	L10090503-08
1009SWMST020-F	09/16/10	L10090503-10
1009ER-SW-02-F	09/16/10	L10090503-12
1009B-SW-01-F	09/16/10	L10090503-14
1009SWMST045-1-F	09/16/10	L10090503-16
1009SWMST045-2-F	09/16/10	L10090503-18
1009SWMST045-3-F	09/16/10	L10090503-20

Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium, Iron, Magnesium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Sample 1009ER-SW-02-F was identified as an equipment rinsate. No metal contaminants were found in this blank with the following exceptions:

Equipment Rinsate Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1009ER-SW-02-F	9/16/10	Iron	0.0473 mg/L	1009SWMST044-F 1009SWMST019-F 1009SWMST020-F 1009SWMST045-1-F 1009SWMST045-2-F 1009SWMST045-3-F

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (> blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1009SWMST044-F	Iron	0.0367 mg/L	0.0367J+/B mg/L
1009SWMST019-F	Iron	0.0346 mg/L	0.0346J+/B mg/L
1009SWMST020-F	Iron	0.0342 mg/L	0.0342J+/B mg/L
1009SWMST045-1-F	Iron	0.0382 mg/L	0.0382J+/B mg/L

Sample 1009B-SW-01-F was identified as a source blank. No metal contaminants were found in this blank.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% limits and relative percent differences (RPD) were within 20% limits (35% soils) limits.

Calcium results were outside the QC limits; results were not qualified since the original sample (L10090503-04) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Calcium and Iron results were outside the QC limits; data were not qualified since the original sample (L10090670-1) was a non-client sample.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Dissolved Metals - Data Qualification Summary - SDG L10090503

No Sample Data Qualified in this SDG

Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG L10090503

No Sample Data Qualified in this SDG

Dissolved Metals - Field Blank Data Qualification Summary - SDG L10090503

SDG	Sample	Analyte	Modified Final Concentration	A or P	Reason Code
L10090503	1009SWMST044-F	Iron	0.0367J+/B mg/L	A	21
L10090503	1009SWMST019-F	Iron	0.0346J+/B mg/L	A	21
L10090503	1009SWMST020-F	Iron	0.0342J+/B mg/L	A	21
L10090503	1009SWMST045-1-F	Iron	0.0382J+/B mg/L	A	21

LDC #: 24287A4a

SDG #: L10090503

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-8-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: V

METHOD: Dissolved Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/16/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	~~A~~ SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	ER=4, *Source Blks=5

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; *ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1009SWMST044-F	11		21	PBW	31	
2	1009SWMST019-F	12		22		32	
3	1009SWMST020-F	13		23		33	
4	1009ER-SW-02-F	14		24		34	
5	1009B-SW-01-F	15		25		35	
6	1009SWMST045-1-F	16		26		36	
7	1009SWMST045-2-F	17		27		37	
8	1009SWMST045-3-F	18		28		38	
9	1009SWMST019-F-MS	19		29		39	
10	1009SWMST019-F-MSD	20		30		40	

Notes:

LDC #: 24287A4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-8		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
QC: 9, 10		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,

Comments: Mercury by CVAA if performed

LDC #: 24287A4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks? Reason Code: 21
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 9/16/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: ER Associated Samples: 1-3, 6-8

Analyte	Blank ID	Sample Identification											
	4	Action Level	1	2	3	6							
Fe	0.0473	0.0473	0.0367 J+/B	0.0346 J+/B	0.0342 J+/B	0.0382 J+/B							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24287A4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	9/10	W	Ca (10/1/10)		73.8		All	No Qual (>4x spike)
			Ca (9/30/10)	62.4	17.2		None	No Qual (Not reported from 9/30/10)
			Mg ↓	50.4	~~16.4~~ 38.5		↓	↓

Comments:

MSD.4SW

LDC #: 24287A4a

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
	9/30/10	L10090670-1	W	Ca	10.90	None	No Qual (not reported from 9/30, non-client)
				Fe	14.90	↓	↓ ↓

Comments:

SDILICPMS.wpd

Report# 24287B4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: November 10, 2010

Matrix: Water

Parameters: Metals by ICP SW-846 Method 6010B

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090682

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMMW037-U	09/23/10	L10090682-01
1009GWMMW037-F	09/23/10	L10090682-02

Samples appended with "F" were analyzed for dissolved metals

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Aluminum, Calcium, Iron, Magnesium, Potassium, Sodium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Calcium	0.116 mg/L	1009GWMMW037-F

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (> blank contaminants) than the concentrations found in the associated method blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% limits and relative percent differences (RPD) were within 20% limits (35% soils) limits.

Calcium and Sodium results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L10090539-14) is representative of client's sample matrix.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10090682

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L10090682

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10090682

No Sample Data Qualified in this SDG

LDC #: 24287B4a

SDG #: L10090682

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 11-8-10

Page: 1 of 1

Reviewer: OR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/23/10
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D (non-client)
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	A	~~(L10090752 nonclient sample)~~ OR(#2)
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1009GWMMW037-U	11	RBW	21		31	
2	1009GWMMW037-F	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: Samples appended with "F" were analyzed for dissolved metals

LDC #: 24287B4a

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: W

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			Non Client
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 24287B4a 24263B4 02

VALIDATION FINDINGS CHECKLIST

Reviewer: ce
2nd Reviewer: w

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 24287B4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
2		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 24287B4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: mg/L

Soil preparation factor applied: NA
Associated Samples: 2

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (mg/L)	Action Limit	No Qualifiers (>5x)									
Ca			0.116	0.58										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24287B4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125~~? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	L10090539-14	water	Ca (9/28/10)	195	176		none	No qual (non-client sample)
			Na	130	130		2	
			Ca (9/30/10)	17.7	34.2			

Comments:

MSD.4SW

2287B4/9

LDC #: ~~2324694~~ GR
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{Found}{True} \times 100$$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Al	10.2	10	102	102	Y
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
CCV(15:51)	ICP (Continuing calibration)	Ca	10.4	10.0	104	101	Y
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
	ICP/MS (Initial calibration)						
	ICP/MS (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24287B4a

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (~~units~~) mg/L	True / D / SDR (~~units~~) mg/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Fe	98.8	100	98.8	98.8	Y
LCS	Laboratory control sample	Ca	5.04	5	101	101	Y
N	Matrix spike		(SSR-SR)				
N	Duplicate						
2	ICP serial dilution	Mg	18.5	19.65	6.03	6.22	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 24287B4a
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Na were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)(%S)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

Raw Data = 6.17 mg/L

Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
2	Ca	53.8	53.8	Y
	Mg	17.6	17.6	↓
	K	1.06	1.06	↓
	Na	6.17	6.17	↓

RECALC.4S2

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: November 10, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090503

Sample Identification	Collection Date	Laboratory Sample Identification
1009SWMST044-U	09/16/10	L10090503-01
1009SWMST044-F	09/16/10	L10090503-02
1009SWMST019-U	09/16/10	L10090503-03
1009SWMST019-F	09/16/10	L10090503-04
1009SWMST019-U-MS	09/16/10	L10090503-05
1009SWMST019-F-MS	09/16/10	L10090503-06
1009SWMST019-U-MSD	09/16/10	L10090503-07
1009SWMST019-F-MSD	09/16/10	L10090503-08
1009SWMST020-U	09/16/10	L10090503-09
1009SWMST020-F	09/16/10	L10090503-10
1009ER-SW-02-U	09/16/10	L10090503-11
1009ER-SW-02-F	09/16/10	L10090503-12
1009B-SW-01-U	09/16/10	L10090503-13
1009B-SW-01-F	09/16/10	L10090503-14
1009SWMST045-1-U	09/16/10	L10090503-15
1009SWMST045-1-F	09/16/10	L10090503-16
1009SWMST045-2-U	09/16/10	L10090503-17
1009SWMST045-2-F	09/16/10	L10090503-18
1009SWMST045-3-U	09/16/10	L10090503-19
1009SWMST045-3-F	09/16/10	L10090503-20

Samples appended with "F" were analyzed for dissolved cadmium

Introduction

This data review covers 20 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
10/13/10	CDRL (13:52)	Selenium	65.9 (90-110)	1009SWMST045-3-U	J- (all detects) UJ (all non-detects)	P

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1009ER-SW-02-U and 1009ER-SW-02-F were identified as equipment rinsates. No metal contaminants were found in these blanks.

Samples 1009B-SW-01-U and 1009B-SW-01-F were identified as source blanks. No metal contaminants were found in these blanks.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and relative percent differences (RPD) were within 20% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1009SWMST019-F-MS/MSD (1009SWMST044-F 1009SWMST019-F 1009SWMST020-F 1009ER-SW-02-F 1009B-SW-01-F 1009SWMST045-1-F 1009SWMST045-2-F 1009SWMST045-3-F)	Cadmium	-	454 (75-125)	129 (≤20)	J (all detects) UJ (all non-detects)	A

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10090503

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L10090503	1009SWMST045-3-U	Selenium	J- (all detects) UJ (all non-detects)	P	Continuing calibration (%R)	9
L10090503	1009SWMST044-F 1009SWMST019-F 1009SWMST020-F 1009ER-SW-02-F 1009B-SW-01-F 1009SWMST045-1-F 1009SWMST045-2-F 1009SWMST045-3-F	Cadmium	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (RPD)	16, 17

Metals - Laboratory Blank Data Qualification Summary - SDG L10090503

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10090503

No Sample Data Qualified in this SDG

LDC #: 24287A4b

SDG #: L10090503

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 11-8-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/16/10
II.	Calibration / ICP MS Tune	SW/A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	EB = 4, 12, Source Blk = 5, 13

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1009SWMST044-U	11	1009SWMST020-F	21		31	PBW
2	1009SWMST019-U	12	1009ER-SW-02-F	22		32	
3	1009SWMST020-U	13	1009B-SW-01-F	23		33	
4	1009ER-SW-02-U	14	1009SWMST045-1-F	24		34	
5	1009B-SW-01-U	15	1009SWMST045-2-F	25		35	
6	1009SWMST045-1-U	16	1009SWMST045-3-F	26		36	
7	1009SWMST045-2-U	17	1009SWMST019-U-MS	27		37	
8	1009SWMST045-3-U	18	1009SWMST01-9-U-MSD	28		38	
9	1009SWMST044-F	19	1009SWMST019-F-MS	29		39	
10	1009SWMST019-F	20	1009SWMST019-F-MSD	30		40	

Notes: Samples appended with "F" were analyzed for dissolved cadmium

LDC #: 24287Atb

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-8		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
9-16		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
RC:17,18		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
19,20		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____

Comments: Mercury by CVAA if performed

LDC #: 44681H4D

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: CR
2nd Reviewer: L

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	10/13/10	CRDL (13:52)	Se	65.9	8	J-/UJ/P (9)

Comments:

CAL.4SW

LDC #: 24287A4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	19/20	W	Cd		454	129	9-16	J/UJ/A (16,17)

Comments:

Report# 24287B4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: November 10, 2010

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090682

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMMW037-U	09/23/10	L10090682-01

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Manganese, Nickel, Selenium, and Zinc.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
10/1/10	CDRL (15:40)	Cadmium	134 (70-130)	All samples in SDG L10090682	J+ (all detects)	P

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Selenium	0.281 ug/L	All samples in SDG L10090682

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>blank contaminants) than the concentrations found in the associated method blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and relative percent differences (RPD) were within 20% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Manganese results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L10090539-14) is representative of client's sample matrix.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L10090682

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L10090682	1009GWMMW037-U	Cadmium	J+ (all detects)	P	Continuing calibration (%R)	9

Metals - Laboratory Blank Data Qualification Summary - SDG L10090682

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L10090682

No Sample Data Qualified in this SDG

LDC #: 24287B4b

SDG #: L10090682

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 11-8-10

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: ~~Dissolved~~ Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/23/10
II.	Calibration	ICP MS Tune ~~A SW/A~~ or SW/A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D (non-client)
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	(L10090539-24 - non-client)
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1009GWMMW037-~~R~~ U	11	RBW	21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 24278B4b

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			Non-Client
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 24287B1b

VALIDATION FINDINGS CHECKLIST

Reviewer: CE
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			Non Client
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓	✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 24287B4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 24287B4b

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: CK
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?
Y N N/A Are all correlation coefficients ≥0.995?
Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	10/01/10	CRDL (15:40)	Cd	134 (70-130)	All	~~Jdet~~ J+det/P (9)

Comments:

LDC #: 24287B4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: mg/L

Soil preparation factor applied: NA
Associated Samples: 2A11

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers (>5x)									
Se			0.281	0.00141										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24287B4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	L10090539-14	W	Mn	214	158		All	No Qual (nonclient)

Comments:

MSD.4SW

LDC #: 24787B4b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
I	ICP (Initial calibration)						
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
ICV	ICP/MS (Initial calibration)	Mn	51.1	50	102	102	Y
CCV	ICP/MS (Continuing calibation)	Zn	51.3	50	103	103	Y

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 24287B46

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: L

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ mg/L	True / D / SDR ~~(units)~~ mg/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Zn	97.7 mg/L	100 mg/L	97.7	97.7	Y
LCS	Laboratory control sample	Cd	0.0615	0.0625	98.4	98.4	Y
N	Matrix spike		(SSR-SR)				
N	Duplicate						
N	ICP serial dilution						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 24287B4D

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Mn were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{100mL\left(\frac{2.6992 ug/L}{1000}\right)}{40mL} = 0.00675\ mg/L$$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Mn	0.00675	0.00675	Y
		Se	0.00876	0.00876	✓

Note:

RECALC.4SW

Monsanto, P4 Production LLC
Data Verification Reports
LDC #24287

Metals

LDC

Report# 24287A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: November 10, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090503

Sample Identification	Collection Date	Laboratory Sample Identification
1009SWMST044-U	09/16/10	L10090503-01
1009SWMST044-F	09/16/10	L10090503-02
1009SWMST019-U	09/16/10	L10090503-03
1009SWMST019-F	09/16/10	L10090503-04
1009SWMST019-U-MS	09/16/10	L10090503-05
1009SWMST019-F-MS	09/16/10	L10090503-06
1009SWMST019-U-MSD	09/16/10	L10090503-07
1009SWMST019-F-MSD	09/16/10	L10090503-08
1009SWMST020-U	09/16/10	L10090503-09
1009SWMST020-F	09/16/10	L10090503-10
1009ER-SW-02-U	09/16/10	L10090503-11
1009ER-SW-02-F	09/16/10	L10090503-12
1009B-SW-01-U	09/16/10	L10090503-13
1009B-SW-01-F	09/16/10	L10090503-14
1009SWMST045-1-U	09/16/10	L10090503-15
1009SWMST045-1-F	09/16/10	L10090503-16
1009SWMST045-2-U	09/16/10	L10090503-17
1009SWMST045-2-F	09/16/10	L10090503-18
1009SWMST045-3-U	09/16/10	L10090503-19
1009SWMST045-3-F	09/16/10	L10090503-20
1009SWMST019-FDUP	09/16/10	L10090503-04DUP

Introduction

This data review covers 21 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the Methods noted below:

- EPA Method 300.0 for Chloride and Sulfate, Standard Method 2340B for Hardness, and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 7 days for method 160, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 5 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified.

The absolute value of the contaminant concentrations found in the initial, continuing and preparation blanks were less than the reporting limit (RL).

Samples 1009ER-SW-02-U and 1009ER-SW-02-F were identified as equipment rinsates. No contaminant concentrations were found in these blanks.

Samples 1009B-SW-01-U and 1009B-SW-01-F were identified as source blanks. No contaminant concentrations were found in these blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within QC limits of 80-120% and relative percent differences (RPD) were within QC limits of 20% .

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10090503

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10090503

No Sample Data Qualified in this SDG

Wet Chemistry – Field Blank Data Qualification Summary - SDG L10090503

No Sample Data Qualified in this SDG

LDC #: 24287A6

SDG #: L10090503

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-8-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: (Analyte) Chloride, Sulfate (EPA Method 300.0), Hardness (SM2340B), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/16/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	ND	ER = 4, 12, Source Blk = 5, 13

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1009SWMST044-U	11	1009SWMST020-F	21	1009SWMST019~~FDUP~~ - FDUP	31	PBW
2	1009SWMST019-U	12	1009ER-SW-02-F	22		32	
3	1009SWMST020-U	13	1009B-SW-01-F	23		33	
4	1009ER-SW-02-U	14	1009SWMST045-1-F	24		34	
5	1009B-SW-01-U	15	1009SWMST045-2-F	25		35	
6	1009SWMST045-1-U	16	1009SWMST045-3-F	26		36	
7	1009SWMST045-2-U	17	1009SWMST019-U-MS	27		37	
8	1009SWMST045-3-U	18	1009SWMST01-9-U-MSD	28		38	
9	1009SWMST044-F	19	1009SWMST019-F-MS	29		39	
10	1009SWMST019-F	20	1009SWMST019-F-MSD	30		40	

Notes:

LDC #: 24287A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-8		pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
9-16		pH TDS (Cl) F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 (Hardness)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC: 17,18		pH (TDS) (Cl) F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
19,20		pH TDS (Cl) F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
21		pH TDS (Cl) F NO_3 NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: November 10, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L10090682

Sample Identification	Collection Date	Laboratory Sample Identification
1009GWMMW037-U	09/23/10	L10090682-01
1009GWMMW037-F	09/23/10	L10090682-02

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the Methods noted below:

- EPA Method 310.2 for Alkalinity, EPA Method 300.0 for Chloride and Sulfate, Standard Method 2340B for Hardness, EPA Method 353.2 for Nitrate/Nitrite as Nitrogen, EPA Method 160.1 for Total Dissolved Solids, and EPA Method 160.2 for Total Suspended Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for methods 300.0 and 353.2, 14 days for method 310.2, 7 days for methods 160.1 and 160.2, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 5 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total alkalinity	8.19 mg/L	1009GWMMW037-F

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified.

The absolute value of the contaminant concentrations found in the initial, continuing and preparation blanks were less than the reporting limit (RL).

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within QC limits of 80-120% and relative percent differences (RPD) were within QC limits of 20% .

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) samples analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L10090682

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L10090682

No Sample Data Qualified in this SDG

Wet Chemistry – Field Blank Data Qualification Summary - SDG L10090682

No Sample Data Qualified in this SDG

LDC #: 24287B6

SDG #: L10090503682

Laboratory: Microbac Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 11/8/10

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) Alkalinity (EPA Method 310.2), Chloride, Sulfate (EPA Method 300.0), Hardness (SM2340B), Nitrate/Nitrite-N (EPA Method 353.2), TDS (EPA Method 160.1), TSS (EPA Method 160.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/23/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV	Matrix Spike/Matrix Spike Duplicates	N	Not performed
V	Duplicates	A	Dup (non-client sample)
VI.	Laboratory control samples	A	LCS/D
VII.	Sample result verification	A	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1009GWMMW037-U	11	PBW	21		31	
2	1009GWMMW037-F	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 24287B6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			non client
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 2428B6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓	✓	
Target analytes were detected in the field blanks.				

LDC #: 24287B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1		pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 (TSS)
2		pH TDS (Cl) F (NO_3 / NO_2) (SO) PO_4 (ALK) CN^- NH_3 TKN TOC CR^{6+} ClO_4 (Hardness)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC #: 24287B6

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were blank analyses performed as required? If no, please see qualifications below.
Y N N/A Were any activities in the blanks greater than the minimum detectable activity? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** 2

Analyte	Blank ID	Blank ID	Blank Action Limit											
	PB	ICB/CCB (mg/L)		No Qualifiers (>5x)										
Total Alk.	8.19		40.95											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 24287B6
SDG #: —

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of ___
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cl was recalculated.Calibration date: 9/21/10

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	Cl	s1	0.2	0.025	~~0.998~~ CR 0.999	0.997	Y
		s2	1	0.132			
		s3	4	0.553			
		s4	8	1.146			
		s5	12	1.771			
		s6	24	3.864			
		s7	36	6.102			
Calibration verification	Cl	CCV	8	Found (mg/L) 8.10	101	—	
Calibration verification	SO_4	↓	40	40.5	101	—	
Calibration verification	NO_3/NO_2-N	CCV	1	0.985	99	—	

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24286B6
SDG #: —

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method see calc

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (~~units~~) µg/L	True / D (~~units~~) µg/L	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Alk	198	200	98.9	98.9	Y
N	Matrix spike sample		(SSR-SR)				
N	Duplicate sample						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 24287B6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for SO4 reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$y = 0.00015x^2 + 0.11077x - 0.10500$

Recalculation:

$$\frac{\sqrt{4(0.00015)(2.303+0.105)+0.11077^2}}{2(0.00015)} = 21.133 \text{ mg/L}$$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	2	Cl	7.03	7.00	Y
		SO4	21.1	21.1	↓
		Alk	186	186	↓
		Hardness	207	207	↓
		NO3/NO2-N	1.48	1.48	↓

Note:

RECALC.6

Report# 24287C22

Data Validation Company Name
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: November 10, 2010

Matrix: Water

Parameters: Gross Alpha and Gross Beta by Method 900.0
Gas Flow Proportional Counting System (GFPC)

Validation Level: Stage 2B

Laboratory: GEL Laboratories, LLC

Sample Delivery Group (SDG): 261516

Field Sample Identification	Date Collected	Laboratory Sample Identification
MMW037	09/23/10	261516001

Introduction

This data review covers one water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 900.0: Gross Alpha and Gross Beta.

This review follows the specific guidance in the Data Validation Technical Memorandum (MWH, 2009) to the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 - not applicable to this method -
6 Initial Calibration
7 -not applicable to this method-
8 Continuing Calibration Verification
9 - not applicable to this method -
10 - not applicable to this method -
11 Laboratory or Preparation Blank
12 - not applicable to this method -
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 - not applicable to this method –
19 - not applicable to this method -
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
24 Result is less than the MDC
25 Result is less than two times the error

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

_X__ Signatures on chain(s) and all samples accounted for
_X__ Gross alpha and beta: preserved with nitric acid to pH < 2; 6-month holding time (if preserved)

A total of one groundwater sample was collected on September 23, 2010 in preserved containers. Samples were shipped and arrived at the laboratory on September 28, 2010. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on October 13, 2010, 20 days from collection to analysis.

II. Instrument Calibration

_X___ Confirm dates of calibration, detectors IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards
_X___ Confirm matrix used in geometry standard
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Calibration points including efficiencies for each detector
_NA__ Background checks performed at the time of initial calibration
_NA__ Self absorption curves for each detector, covering an appropriate range of residue masses
_X___ Alpha-beta cross talk values and voltage plateaus (if needed)
_X___ Certificates for NBS- or NIST-traceable standards
_X___ Review standard preparation and dilution logs for accuracy

Initial calibration data were within all required criteria.

III. Calibration Verification

_NA__ Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits
_X___ Routine (daily, weekly, monthly) background checks for each detector
_X___ Daily efficiency checks for each detector
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Confirm detector IDs and geometries used in analysis
_NA__ Check if sample residues are within the range of the self absorption curve

Calibration verification data were within all required criteria.

IV. Target Compound Identification and Quantitation

_X___ Confirm all samples less than MDC are qualified not detected (U)
_X___ Less than two times the uncertainty (2 sigma error) were reported by the laboratory as not detected

No Gross Alpha or Gross Beta results were reported below the MDC.

V. Blanks

_X___ Confirm method blank results < MDC
If method blank result is ≥ MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤ 5X the concentration of the method blank, then U at detected value.

No Gross Alpha or Gross Beta was detected in the method blanks.

VI. Laboratory Duplicates

_X___ Confirm laboratory duplicate analyzed for each batch or for every 20 samples

_X___ Confirm that the DER ≤ 1.42 or RPD ≤ 20

Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2 \text{ sigma error}^2_{\text{Sample}}] + [2 \text{ sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

__NA_ If DER > 1.42, qualify sample J

__NA_ If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

All DERs are less than 1.42 (or RPDs less than 20) for Gross Alpha and Gross Beta.

VII. Laboratory Control Samples

_X___ Must be analyzed for each batch or for every 20 samples

_X___ Compare %R for Gross Alpha with lab control limits (75-125%)

_X___ Compare %R for Gross Beta with lab control limits (75-125%)

Recoveries for Gross Alpha and Gross Beta in each laboratory control sample were within control limits.

VIII. Matrix Spike Samples

_X___ Must be analyzed for each batch or for every 20 samples

_X___ Compare %R for Gross Alpha with lab control limits (65-135%)

_X___ Compare %R for Gross Beta with lab control limits (65-135%)

Recoveries for Gross Alpha and Gross Beta in each matrix spike sample were within control limits.

IX. Equipment and Water Blank Samples

No field blanks were identified in this SDG.

X. Overall Assessment of Data

With the following exceptions, all quality control data associated with the field samples were within control limits. All other field results are usable as reported by the laboratory.

Summary of Qualified Data:

No Gross Alpha or Gross Beta results required qualification in this SDG.

LDC #: 24287C22 **VALIDATION COMPLETENESS WORKSHEET** Date: 1-8-10
SDG #: 261516 Level III Page: 1 of 1
Laboratory: GEL Laboratories LLC Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Gross Alpha & Beta (EPA SW 846 Method 900.0)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/23/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	MS/D, Dup (MW comp (non-client sample))
IVb.	Laboratory control samples	A	LCS
V.	Minimum dectectable activity (MDA)	A	
VI.	Sample result verification	N	
VII.	Overall assessment of data	A	
VIII.	Field duplicates	N	
IX	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water

1	MMW037	11	PMW	21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

MWH Americas, Inc.
2121 N. California Blvd. Suite 600
Walnut Creek, CA 94596
ATTN: Ms. Ruth Siegmund

December 30, 2010

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. Siegmund,

Enclosed are the final verification reports for the fractions listed below. These SDGs were received on November 24, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 24471:

SDG #	Fraction
K1010867, K1011004, K1011005 K1011006, K1011007, K1011129 K1011130	Metals, Wet Chemistry

The data verification was performed under Stage 2B/4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan, MWH 2010
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

ERauto

Erlinda T. Rauto
Operations Manager/Senior

ChemistV:\LOGIN\MWH\Monsanto\24471COV.wpd

LDC #24471 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Metals (6010B)		Metals (6020)		Se (6020)		Hg (7000)		SEM (6010B)		SEM Hg (7000)		AVS 821/R-91-100)		TOC (W/B)																			
Matrix:	Water/Soil-Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	K1010867	11/24/10	12/17/10	6	25	6	25	4	0	6	24	0	24	0	24	0	24	0	24																		
B	K1011004	11/24/10	12/17/10	3	10	3	10	3	0	3	10	0	10	0	10	0	10	0	10																		
C	K1011005	11/24/10	12/17/10	4	15	4	15	4	0	4	15	0	9	0	9	0	9	0	15																		
D	K1011006	11/24/10	12/17/10	2	11	2	11	2	0	2	11	0	4	0	4	0	4	0	11																		
E	K1011007	11/24/10	12/17/10	7	13	7	13	3	0	7	13	0	5	0	5	0	5	0	13																		
F	K1011129	11/24/10	12/17/10	0	18	0	18	-	-	0	18	0	6	0	6	0	6	0	18																		
G	K1011130	11/24/10	12/17/10	3	6	3	6	-	-	3	6	0	2	0	2	0	2	0	6																		
Total	T/LR			25	98	25	97	16	0	25	97	0	60	0	60	0	60	0	97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	660

Shaded cells indicate Level III validation (all other cells are ADR review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

Monsanto, P4 Production LLC
Data Verification Reports
LDC #24471

Metals

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 17, 2010

Matrix: Sediment/Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1010867

Sample Identification	Collection Date	Laboratory Identification
1010-MSP018-SD-001	09/29/10	K1010867-003
1010-MSP018-SD-002	09/29/10	K1010867-004
1010-MSP018-SD-003	09/29/10	K1010867-005
1010-MSP017-SD-001	09/29/10	K1010867-008
1010-MSP017-SD-002	09/29/10	K1010867-009
1010-MSP017-SD-003	09/29/10	K1010867-010
1010-MSP017-SD-004	09/29/10	K1010867-011
1010-MSP031-SD-001-1	09/28/10	K1010867-012
1010-MSP031-SD-001-2	09/28/10	K1010867-013
1010-MSP031-SD-002	09/28/10	K1010867-014
1010-MSP031-SD-003	09/28/10	K1010867-015
1010-MSP015-SD-001	09/30/10	K1010867-018
1010-MSP015-SD-002	09/30/10	K1010867-019
1010-MSP015-SD-003	09/30/10	K1010867-020
1010-MSP015-SD-004	09/30/10	K1010867-021
1010-MSP014-SD-001-1	09/29/10	K1010867-024
1010-MSP014-SD-001-2	9/29/10	K1010867-025
1010-MSP014-SD-002	09/29/10	K1010867-026
1010-MSP014-SD-003	09/29/10	K1010867-027
1010-MSP014-SD-004	09/29/10	K1010867-028
1010-MSP014-SD-005	09/29/10	K1010867-029
1010-MSP023-SD-001	09/28/10	K1010867-031
1010-MSP023-SD-002	09/28/10	K1010867-032
1010-MSP023-SD-003	09/28/10	K1010867-033
1010-MSP023-SD-004	09/28/10	K1010867-034
1010-SWMSP018-F	09/29/10	K1010867-001

1010-SWMSP017-F	09/29/10	K1010867-006
1010-SWMSP015-F	09/30/10	K1010867-016
1010-SWMSP014-F	09/29/10	K1010867-022
1010-ER-SW-01-U	09/29/10	K1010867-030
1010-ER-SD-01-U	09/28/10	K1010867-035
1010-MSP018-SD-001MS	09/29/10	K1010867-003MS
1010-MSP018-SD-001MSD	09/29/10	K1010867-003MSD
1010-MSP014-SD-005MS	09/29/10	K1010867-029MS
1010-MSP014-SD-005MSD	09/29/10	K1010867-029MSD

Introduction

This data review covers 29 sediment samples and 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Antimony, Boron, Calcium, Chromium, Copper, Magnesium, Manganese, Molybdenum, Nickel, Vanadium, and Zinc.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Antimony Manganese	3.1 mg/Kg 0.11 mg/Kg	1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004 1010-MSP018-SD-001
ICB/CCB	Manganese	0.6 ug/L	1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004 1010-MSP018-SD-001
ICB/CCB	Vanadium	5 ug/L	1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP018-SD-001 1010-MSP014-SD-005 1010-MSP023-SD-001 1010-MSP023-SD-002 1010-MSP023-SD-003 1010-MSP023-SD-004
ICB/CCB	Molybdenum	4.3 ug/L	1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP018-SD-001

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Vanadium	4 ug/L	1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004
ICB/CCB	Molybdenum	4.0 ug/L	1010-MSP031-SD-003 1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004
ICB/CCB	Molybdenum	6.4 ug/L	1010-MSP014-SD-005 1010-MSP023-SD-001 1010-MSP023-SD-002 1010-MSP023-SD-003 1010-MSP023-SD-004
ICB/CCB	Manganese	0.8 ug/L	1010-MSP023-SD-003 1010-MSP023-SD-004
ICB/CCB	Manganese	0.7 ug/L	1010-MSP014-SD-005 1010-MSP023-SD-001 1010-MSP023-SD-002
ICB/CCB	Copper	3.4 ug/L	All sediment samples in SDG K1010867
PB (prep blank)	Calcium Magnesium Manganese	2.7 ug/L 0.7 ug/L 0.30 ug/L	All water samples in SDG K1010867
ICB/CCB	Boron Magnesium Manganese	3.5 ug/L 0.9 ug/L 0.2 ug/L	All water samples in SDG K1010867

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-MSP018-SD-001	Antimony	7.6 mg/Kg	7.6U mg/Kg
1010-MSP018-SD-002	Antimony	5.1 mg/Kg	5.1U mg/Kg
1010-MSP018-SD-003	Antimony	6.9 mg/Kg	6.9U mg/Kg
1010-MSP017-SD-001	Antimony Molybdenum	6.0 mg/Kg 2.0 mg/Kg	6.0U mg/Kg 2.0U mg/Kg
1010-MSP017-SD-002	Antimony Molybdenum	6.0 mg/Kg 2.2 mg/Kg	6.0U mg/Kg 2.2J+ mg/Kg
1010-MSP017-SD-003	Antimony	5.4 mg/Kg	5.4U mg/Kg
1010-MSP017-SD-004	Antimony	8.6 mg/Kg	8.6U mg/Kg
1010-MSP031-SD-001-1	Antimony	12 mg/Kg	12J+ mg/Kg
1010-MSP031-SD-001-2	Antimony	11 mg/Kg	11J+ mg/Kg
1010-MSP031-SD-002	Antimony	5.8 mg/Kg	5.8U mg/Kg
1010-MSP031-SD-003	Antimony	8.2 mg/Kg	8.2U mg/Kg
1010-MSP015-SD-001	Antimony	5.5 mg/Kg	5.5U mg/Kg
1010-MSP015-SD-002	Antimony Molybdenum	7.5 mg/Kg 3.0 mg/Kg	7.5U mg/Kg 3.0J+ mg/Kg
1010-MSP015-SD-003	Antimony	7.0 mg/Kg	7.0U mg/Kg
1010-MSP015-SD-004	Antimony	7.9 mg/Kg	7.9U mg/Kg
1010-MSP014-SD-001-1	Antimony	5.5 mg/Kg	5.5U mg/Kg
1010-MSP014-SD-001-2	Antimony Molybdenum	3.1 mg/Kg 2.9 mg/Kg	3.1U mg/Kg 2.9J+ mg/Kg
1010-MSP014-SD-002	Antimony Molybdenum	3.6 mg/Kg 2.2 mg/Kg	3.6U mg/Kg 2.2J+ mg/Kg
1010-MSP014-SD-003	Antimony Molybdenum	8.5 mg/Kg 2.4 mg/Kg	8.5U mg/Kg 2.4J+ mg/Kg
1010-MSP014-SD-004	Antimony Molybdenum	5.3 mg/Kg 4.0 mg/Kg	5.3U mg/Kg 4.0J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-MSP023-SD-001	Molybdenum	5.4 mg/Kg	5.4J+ mg/Kg
1010-ER-SW-01-U	Boron	2.4 ug/L	2.4U ug/L
1010-ER-SD-01-U	Manganese	0.50 ug/L	0.50U ug/L

Samples 1010-ER-SW-01-U and 1010-ER-SD-01-U were identified as equipment blanks. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-SW-01-U	9/29/10	Boron Calcium Magnesium Manganese Zinc	2.4 ug/L 313 ug/L 97.1 ug/L 3.30 ug/L 2.7 ug/L	No associated samples in this SDG
1010-ER-SD-01-U	9/28/10	Calcium Magnesium	23 ug/L 6.2 ug/L	No associated samples in this SDG
1010-ER-SD-01-U	9/28/10	Manganese Zinc Copper Nickel Uranium Vanadium	0.50 ug/L 1.5 ug/L 0.47 ug/L 0.08 ug/L 0.004 ug/L 0.04 ug/L	1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP023-SD-001 1010-MSP023-SD-002 1010-MSP023-SD-003 1010-MSP023-SD-004

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and standard reference material results were within expected ranges.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for soils and sediments with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-MSP018-SD-001MS/MSD (1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004 1010-MSP018-SD-001)	Antimony	58.4 (75-125)	60.0 (75-125)	-	J- (all detects) UJ (all non-detects)	A

Zinc results were outside the QC limits; results were not qualified since the original sample (1010-MSP018-SD-001) was greater than 4X the spike amount.

Manganese and Zinc results were outside the QC limits; results were not qualified since the original sample (1010-MSP014-SD-005) was greater than 4X the spike amount.

Selenium results were outside the QC limits; results were not qualified since the original sample (1010-SWMSP021-f-01) was greater than 4X the spike amount.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1010867

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1010867	1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004 1010-MSP018-SD-001	Antimony	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)	16

Metals - Laboratory Blank Data Qualification Summary - SDG K1010867

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K1010867	1010-MSP018-SD-001	Antimony	7.6U mg/Kg	A	11
K1010867	1010-MSP018-SD-002	Antimony	5.1U mg/Kg	A	11
K1010867	1010-MSP018-SD-003	Antimony	6.9U mg/Kg	A	11
K1010867	1010-MSP017-SD-001	Antimony	6.0U mg/Kg	A	11
K1010867	1010-MSP017-SD-001	Molybdenum	2.0U mg/Kg	A	10
K1010867	1010-MSP017-SD-002	Antimony	6.0U mg/Kg	A	11
K1010867	1010-MSP017-SD-002	Molybdenum	2.2J+ mg/Kg	A	10
K1010867	1010-MSP017-SD-003	Antimony	5.4U mg/Kg	A	11
K1010867	1010-MSP017-SD-004	Antimony	8.6U mg/Kg	A	11
K1010867	1010-MSP031-SD-001-1	Antimony	12J+ mg/Kg	A	11
K1010867	1010-MSP031-SD-001-2	Antimony	11J+ mg/Kg	A	11

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K1010867	1010-MSP031-SD-002	Antimony	5.8U mg/Kg	A	11
K1010867	1010-MSP031-SD-003	Antimony	8.2U mg/Kg	A	11
K1010867	1010-MSP015-SD-001	Antimony	5.5U mg/Kg	A	11
K1010867	1010-MSP015-SD-002	Antimony	7.5U mg/Kg	A	11
K1010867	1010-MSP015-SD-002	Molybdenum	3.0J+ mg/Kg	A	10
K1010867	1010-MSP015-SD-003	Antimony	7.0U mg/Kg	A	11
K1010867	1010-MSP015-SD-004	Antimony	7.9U mg/Kg	A	11
K1010867	1010-MSP014-SD-001-1	Antimony	5.5U mg/Kg	A	11
K1010867	1010-MSP014-SD-001-2	Antimony	3.1U mg/Kg	A	11
K1010867	1010-MSP014-SD-001-2	Molybdenum	2.9J+ mg/Kg	A	10
K1010867	1010-MSP014-SD-002	Antimony	3.6U mg/Kg	A	11
K1010867	1010-MSP014-SD-002	Molybdenum	2.2J+ mg/Kg	A	10
K1010867	1010-MSP014-SD-003	Antimony	8.5U mg/Kg	A	11
K1010867	1010-MSP014-SD-003	Molybdenum	2.4J+ mg/Kg	A	10
K1010867	1010-MSP014-SD-004	Antimony	5.3U mg/Kg	A	11
K1010867	1010-MSP014-SD-004	Molybdenum	4.0J+ mg/Kg	A	10
K1010867	1010-MSP023-SD-001	Molybdenum	5.4J+ mg/Kg	A	10
K1010867	1010-ER-SW-01-U	Boron	2.4U ug/L	A	10
K1010867	1010-ER-SD-01-U	Manganese	0.50U ug/L	A	10,11

Metals – Field Blank Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

LDC #: 24471A4a

SDG #: K1010867

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-11-10

Page: 1 of 1

Reviewer: OR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/28-30/10
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	~~A~~ N	Not utilized
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB=29,30

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/water

1	1010-MSP018-SD-002 S	11	1010-MSP015-SD-001 S	21	1010-MSP023-SD-001 S	31	1010-MSP018-SD-001MS S
2	1010-MSP018-SD-003	12	1010-MSP015-SD-002	22	1010-MSP023-SD-002	32	1010-MSP018-SD-001MSD
3	1010-MSP017-SD-001	13	1010-MSP015-SD-003	23	1010-MSP023-SD-003	33	1010-MSP014-SD-005MS
4	1010-MSP017-SD-002	14	1010-MSP015-SD-004	24	1010-MSP023-SD-004	34	1010-MSP014-SD-005MSD
5	1010-MSP017-SD-003	15	1010-MSP014-SD-001-1	25	1010-SWMSP018-F W	35	1010-MSP018-SD-001
6	1010-MSP017-SD-004	16	1010-MSP014-SD-001-2	26	1010-SWMSP017-F	36	
7	1010-MSP031-SD-001-1	17	1010-MSP014-SD-002	27	1010-SWMSP015-F	37	
8	1010-MSP031-SD-001-2	18	1010-MSP014-SD-003	28	1010-SWMSP014-F	38	
9	1010-MSP031-SD-002	19	1010-MSP014-SD-004	29	1010-ER-SW-01-U	39	
10	1010-MSP031-SD-003	20	1010-MSP014-SD-005	30	1010-ER-SD-01-U	40	

Notes: PBS1 (1-20) 9,35
PBS2 (20-24)

LDC #: 24471A4 ~~5~~G

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-24,35		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
25-30		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
QC: 31-34		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 24471A4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: 100x x 2xdil
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1-19, 35 (Reason: 11)

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	35	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Sb	3.1		15.5	7.6	5.1	6.9	6.0	6.0	5.4	8.6	12 J+	11 J+	5.8	8.2	5.5	7.5	7.0	7.9	5.5	3.1	3.6	8.5	5.3
Mn	0.11	0.6	0.6																				

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1-3, 35, 20-24

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
V			5	5										

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1-9, 35 Reason: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	3	4								
Mo			4.3	4.3	2.0	2.2 J+								

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 4-19

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
V			4	4										

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 10-19 (Reason: 10)

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	12	16	17	18	19					
Mo			4.0	4	3.0 J+	2.9 J+	2.2 J+	2.4 J+	4.0 J+					

LDC #: 24471A4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: 02
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: 100x x 2xdil

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 20-24 Reason: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	21									
Mo			6.4	6.4	5.4 J+									

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 23, 24

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mn			0.8	0.8										

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 20-22

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mn			0.7	0.7										

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: All Sediment

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Cu			3.4	3.4										

LDC #: 24471A4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 2xdil
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All Water

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	29	30								
B			3.5	17.5	2.4 RR,SR2:10									
Ca		2.7		13.5										
Mg		0.7	0.9	4.5										
Mn		0.30	0.2	1.5		0.50 (RR,SR2:10,11)								

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U". Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471A4

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 9/29/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Analyte	Blank ID	Sample Identification										
	29	Action Level	No Qualifiers									
B	2.4	~~12~~ 0.24										
Ca	313	~~1565~~ 3.13										
Mg	97.1	~~485.5~~ 9.71										
Mn	3.30	~~16.5~~ 0.33										
Zn	2.7	~~13.5~~ 0.27										

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 9/28/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: Mn, Zn, Cu, Ni, U, V=7-10, 21-24. Ca, Mg = None

Analyte	Blank ID	Sample Identification										
	30	Action Level	No Qualifiers									
Ca	23	~~11.5~~ 0.23										
Mg	6.2	~~3.1~~ 0.62										
Mn	0.50	~~0.25~~ 0.05										
Zn	1.5	~~0.75~~ 0.15										
Cu (~~by 6020~~)	0.47	~~0.235~~ 0.047										
Ni (by 6020)	0.08	~~0.04~~ 0.008										
U (by 6020)	0.004	~~0.002~~ 0.0001										
V (~~by 6020~~)	0.04	~~0.02~~ 0.004										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24471A4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	31/32	Sed	Sb	58.4	60.0		1-19,35	J-UJ/A (16)
			Zn	-50	-10.1		↓	No Qual (>4x)
	33/34	Sed	Mn	144.0	138.4		20-24	No Qual
			Zn	161.0	152.5		↓	↓
	1010-SWMSP021-F-01	W	Se	137.5			All Water	No Qual (>4x)

Comments:

MSD.4SW

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 13, 2010

Matrix: Sediment/Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011004

Sample Identification	Collection Date	Laboratory Identification
1010-MSP021-SD-001	10/02/10	K1011004-003
1010-MSP021-SD-002-1	10/02/10	K1011004-004
1010-MSP021-SD-002-2	10/02/10	K1011004-005
1010-MSP021-SD-003	10/02/10	K1011004-006
1010-MSP021-SD-004	10/02/10	K1011004-007
1010-MSP020-SD-001	10/02/10	K1011004-016
1010-MSP020-SD-002	10/02/10	K1011004-017
1010-MSP020-SD-003	10/02/10	K1011004-018
1010-MSP020-SD-004	10/02/10	K1011004-019
1010-MSP020-SD-005	10/02/10	K1011004-020
1010-SWMSP021-F-01	10/02/10	K1011004-001
1010-SWMSP021-F-2	10/02/10	K1011004-008
1010-SWMSP020-F	10/02/10	K1011004-014
1010-SWMSP021-F-01MS	10/02/10	K1011004-001MS
1010-SWMSP021-F-01MSD	10/02/10	K1011004-001MSD
1010-MSP020-SD-005MS	10/02/10	K1011004-020MS
1010-MSP020-SD-005MSD	10/02/10	K1011004-020MSD

Introduction

This data review covers 12 sediment samples and 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Antimony, Boron, Calcium, Chromium, Copper, Magnesium, Manganese, Molybdenum, Nickel, Vanadium, and Zinc.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Vanadium	0.4 mg/Kg	All sediment samples in SDG K1011004
ICB/CCB	Copper Manganese Vanadium	3.4 ug/L 0.6 ug/L 8 ug/L	All sediment samples in SDG K1011004
ICB/CCB	Antimony Molybdenum	16 ug/L 4.1 ug/L	1010-MSP021-SD-002-2 1010-MSP021-SD-003 1010-MSP021-SD-004 1010-MSP020-SD-001 1010-MSP020-SD-002 1010-MSP020-SD-003 1010-MSP020-SD-004

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Molybdenum	5.2 ug/L	1010-MSP021-SD-001 1010-MSP021-SD-002-1 1010-MSP020-SD-005
PB (prep blank)	Calcium Magnesium	2.7 ug/L 0.7 ug/L	All water samples in SDG K1011004
ICB/CCB	Boron Magnesium Manganese	3.5 ug/L 0.5 ug/L 0.2 ug/L	All water samples in SDG K1011004

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-MSP021-SD-002-2	Antimony Molybdenum	6.4 mg/Kg 3.0 mg/Kg	6.4U mg/Kg 3.0J+ mg/Kg
1010-MSP021-SD-003	Antimony	9.7 mg/Kg	9.7U mg/Kg
1010-MSP021-SD-004	Antimony	9.7 mg/Kg	9.7U mg/Kg
1010-MSP020-SD-001	Antimony	6.3 mg/Kg	6.3U mg/Kg
1010-MSP020-SD-002	Antimony Molybdenum	7.9 mg/Kg 3.9 mg/Kg	7.9U mg/Kg 3.9J+ mg/Kg
1010-MSP020-SD-003	Antimony	6.3 mg/Kg	6.3U mg/Kg
1010-MSP020-SD-004	Antimony	4.2 mg/Kg	4.2U mg/Kg
1010-MSP021-SD-001	Molybdenum	4.2 mg/Kg	4.2J+ mg/Kg
1010-MSP021-SD-002-1	Molybdenum	2.6 mg/Kg	2.6J+ mg/Kg

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and standard reference material results were within expected ranges.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for soils and sediments with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-MSP020-SD-005MS/MSD (All sediment samples in SDG K1011004)	Antimony	59.4 (75-125)	60.4 (75-125)	-	J- (all detects) UJ (all non-detects)	A
	Chromium	-	63.1 (75-125)	-	J- (all detects) UJ (all non-detects)	

Calcium results were outside the QC limits; results were not qualified since the original sample (1010-MSP020-SD-005) was greater than 4X the spike amount.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

Boron and Zinc results were outside the QC limits; data were not qualified since the concentration was less than 50 times the MDLs.

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011004

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011004	1010-MSP021-SD-001 1010-MSP021-SD-002-1 1010-MSP021-SD-002-2 1010-MSP021-SD-003 1010-MSP021-SD-004 1010-MSP020-SD-001 1010-MSP020-SD-002 1010-MSP020-SD-003 1010-MSP020-SD-004 1010-MSP020-SD-005	Antimony Chromium	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)	16

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011004

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K1011004	1010-MSP021-SD-002-2	Antimony Molybdenum	6.4U mg/Kg 3.0J+ mg/Kg	A	10
K1011004	1010-MSP021-SD-003	Antimony	9.7U mg/Kg	A	10
K1011004	1010-MSP021-SD-004	Antimony	9.7U mg/Kg	A	10
K1011004	1010-MSP020-SD-001	Antimony	6.3U mg/Kg	A	10
K1011004	1010-MSP020-SD-002	Antimony Molybdenum	7.9U mg/Kg 3.9J+ mg/Kg	A	10
K1011004	1010-MSP020-SD-003	Antimony	6.3U mg/Kg	A	10
K1011004	1010-MSP020-SD-004	Antimony	4.2U mg/Kg	A	10
K1011004	1010-MSP021-SD-001	Molybdenum	4.2J+ mg/Kg	A	10
K1011004	1010-MSP021-SD-002-1	Molybdenum	2.6J+ mg/Kg	A	10

Mercury – Field Blank Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

LDC #: 24471B4a

SDG #: K1011004

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 12-13-10

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/2/10
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment | water

1	1010-MSP021-SD-001 S	11	1010-SWMSP021-F-01 W	21	PBW	31	
2	1010-MSP021-SD-002-1	12	1010-SWMSP021-F-2	22	PBS	32	
3	1010-MSP021-SD-002-2	13	1010-SWMSP020-F	23		33	
4	1010-MSP021-SD-003	14	1010-SWMSP021-F-01MS W	24		34	
5	1010-MSP021-SD-004	15	1010-SWMSP021-F-01MSD	25		35	
6	1010-MSP020-SD-001	16	1010-MSP020-SD-005MS S	26		36	
7	1010-MSP020-SD-002	17	1010-MSP020-SD-005MSD	27		37	
8	1010-MSP020-SD-003	18		28		38	
9	1010-MSP020-SD-004	19		29		39	
10	1010-MSP020-SD-005	20		30		40	

Notes:

LDC #: 24471B4a

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: ✓

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 24471B1a

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: ✓

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 24471B4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
11-13		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
QC: 14,15		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
16,17		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 24471B4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 2xdil

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All Sediment

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Cu			3.4	3.4										
Mn			0.6	0.6										
V	0.4		8	8										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 3-9 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	3	4	5	6	7	8	9			
Sb			16	16	6.4	9.7	9.7	6.3	7.9	6.3	4.2			
Mo			4.1	4.1	3.0 J+				3.9 J+					

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1, 2, 10 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	2								
Mo			5.2	5.2	4.2 J+	2.6 J+								

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All Water

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
B			3.5	17.5										
Ca		2.7		13.5										
Mg		0.7	0.5	3.5										
Mn			0.2	1										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24411109a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N ~~N/A~~ Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	16/17	Sed	Sb	59.4	60.4		All Sediment	J-/UJ/A (16)
			Cr		63.1		↓	↓
	14/15	W	Ca	60.0	60.0		All Water	No Qual (>4x)

Comments:

MSD.4SW

LDC #: 24471B49

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		10	Sed	B	10.1	All Sed	No Qual (<50xMDL)
		11	Water	Zn	100	All Water	No Qual

Comments:

SDILICPMS.wpd

LDC #: 24471B4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CS
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	V	1264	1250	101	101	Y
	ICP/MS (Initial calibration)						
	CVAA (Initial calibration)						
CCV3	ICP (Continuing calibration)	Mo	1011	1000	101	101	Y
	ICP/MS (Continuing calibration)						
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24471B4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ mg/kg	True / D / SDR ~~(units)~~ mg/kg	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICV	ICP interference check	Sb	1061.1 ug/L	1000 ug/L	106.1	106.1	Y
LCS	Laboratory control sample	Mo	954 ug/L	1000 ug/L	95.4	95.4	
16	Matrix spike	Ni	(SSR-SR) 90	99.01	90.9	90.9	
16/17	Duplicate	Cr	191	170	11.6	11.6	
10	ICP serial dilution	Zn	7117.09 ug/L	6717.05 ug/L	5.6	5.6	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 24471B4a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: V

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Sb/Mn were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

I: $\frac{100mL(2)(0.290mg/L)}{1.02g} = 5.686 mg/kg$

II: Mn = Raw Data = 0.0421 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	I	Sb	5.7	5.7	Y
		B	7.6	7.6	
		Cr	78.4	78.4	
		Cu	42.1	42.1	
		Mn	402	402	
		Mo	4.2	4.2	
		Ni	171	171	
		V	97.4	97.4	
		Zn	1020	1020	
			(ug/L)	(ug/L)	
	II	B	116	116	Y
		Ca	214000	214000	
		Mg	68200	68200	
		Mn	42.1	42.1	
		Mo	7.1	7.1	
		Zn	2.3	2.3	

Note:

RECALC.4SW

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Molybdenum	5.2 ug/L	1010-MSP021-SD-001 1010-MSP021-SD-002-1 1010-MSP020-SD-005
PB (prep blank)	Calcium Magnesium	2.7 ug/L 0.7 ug/L	All water samples in SDG K1011004
ICB/CCB	Boron Magnesium Manganese	3.5 ug/L 0.5 ug/L 0.2 ug/L	All water samples in SDG K1011004

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-MSP021-SD-002-2	Antimony Molybdenum	6.4 mg/Kg 3.0 mg/Kg	6.4U mg/Kg 3.0J+ mg/Kg
1010-MSP021-SD-003	Antimony	9.7 mg/Kg	9.7U mg/Kg
1010-MSP021-SD-004	Antimony	9.7 mg/Kg	9.7U mg/Kg
1010-MSP020-SD-001	Antimony	6.3 mg/Kg	6.3U mg/Kg
1010-MSP020-SD-002	Antimony Molybdenum	7.9 mg/Kg 3.9 mg/Kg	7.9U mg/Kg 3.9J+ mg/Kg
1010-MSP020-SD-003	Antimony	6.3 mg/Kg	6.3U mg/Kg
1010-MSP020-SD-004	Antimony	4.2 mg/Kg	4.2U mg/Kg
1010-MSP021-SD-001	Molybdenum	4.2 mg/Kg	4.2J+ mg/Kg
1010-MSP021-SD-002-1	Molybdenum	2.6 mg/Kg	2.6J+ mg/Kg

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and standard reference material results were within expected ranges.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for soils and sediments with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-MSP020-SD-005MS/MSD (All sediment samples in SDG K1011004)	Antimony	59.4 (75-125)	60.4 (75-125)	-	J- (all detects) UJ (all non-detects)	A
	Chromium	-	63.1 (75-125)	-	J- (all detects) UJ (all non-detects)	

Calcium results were outside the QC limits; results were not qualified since the original sample (1010-MSP020-SD-005) was greater than 4X the spike amount.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

Mercury - Data Qualification Summary - SDG K1011004

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011004	1010-MSP021-SD-001 1010-MSP021-SD-002-1 1010-MSP021-SD-002-2 1010-MSP021-SD-003 1010-MSP021-SD-004 1010-MSP020-SD-001 1010-MSP020-SD-002 1010-MSP020-SD-003 1010-MSP020-SD-004 1010-MSP020-SD-005	Antimony Chromium	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)	16

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011004

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K1011004	1010-MSP021-SD-002-2	Antimony Molybdenum	6.4U mg/Kg 3.0J+ mg/Kg	A	10
K1011004	1010-MSP021-SD-003	Antimony	9.7U mg/Kg	A	10
K1011004	1010-MSP021-SD-004	Antimony	9.7U mg/Kg	A	10
K1011004	1010-MSP020-SD-001	Antimony	6.3U mg/Kg	A	10
K1011004	1010-MSP020-SD-002	Antimony Molybdenum	7.9U mg/Kg 3.9J+ mg/Kg	A	10
K1011004	1010-MSP020-SD-003	Antimony	6.3U mg/Kg	A	10
K1011004	1010-MSP020-SD-004	Antimony	4.2U mg/Kg	A	10
K1011004	1010-MSP021-SD-001	Molybdenum	4.2J+ mg/Kg	A	10
K1011004	1010-MSP021-SD-002-1	Molybdenum	2.6J+ mg/Kg	A	10

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 17, 2010

Matrix: Soil/Sediment/Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011005

Sample Identification	Collection Date	Laboratory Identification
1010-MSP016-SD-001	09/30/10	K1011005-003
1010-MSP016-SD-002	09/30/10	K1011005-004
1010-MSP016-SD-003	09/30/10	K1011005-005
1010-MSP016-SD-004-1	09/30/10	K1011005-006
1010-MSP016-SD-004-2	09/30/10	K1011005-007
1010-MST053-SD-001	10/03/10	K1011005-010
1010-MST053-SD-002	10/03/10	K1011005-011
1010-MST053-RS-001	10/03/10	K1011005-012
1010-MST053-RS-002	10/03/10	K1011005-013
1010-MST275B-SD-001	10/01/10	K1011005-016
1010-MST275B-RS-001	10/01/10	K1011005-017
1010-MST275B-RS-002	10/01/10	K1011005-018
1010-MST275A-SD-001	10/01/10	K1011005-021
1010-MST275A-RS-001	10/01/10	K1011005-022
1010-MST275A-RS-002	10/01/10	K1011005-023
1010-SWMSP016-F	09/30/10	K1011005-001
1010-SWMST053-F	10/03/10	K1011005-008
1010-SWMST275B-F	10/01/10	K1011005-014
1010-SWMST275A-F	10/01/10	K1011005-019
1010-MSP016-SD-003MS	09/30/10	K1011005-005MS
1010-MSP016-SD-003MSD	09/30/10	K1011005-005MSD

Introduction

This data review covers 6 soil samples, 11 sediment samples, and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Antimony, Boron, Calcium, Chromium, Copper, Magnesium, Manganese, Molybdenum, Nickel, Vanadium, and Zinc.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Vanadium Zinc	0.7 mg/Kg 0.3 mg/Kg	All soil and sediment samples in SDG K1011005
ICB/CCB	Copper Manganese Molybdenum	3.4 ug/L 0.6 ug/L 5.9 ug/L	All soil and sediment samples in SDG K1011005
ICB/CCB	Antimony	16 ug/L	1010-MSP016-SD-001 1010-MSP016-SD-002 1010-MSP016-SD-003 1010-MSP016-SD-004-1 1010-MSP016-SD-004-2 1010-MST053-SD-001

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Vanadium	5 ug/L	1010-MST053-SD-002 1010-MST053-RS-001 1010-MST053-RS-002 1010-MST275B-SD-001 1010-MST275B-RS-001 1010-MST275B-RS-002 1010-MST275A-SD-001 1010-MST275A-RS-001 1010-MST275A-RS-002
PB (prep blank)	Calcium Magnesium Manganese	2.7 ug/L 0.7 ug/L 0.30 ug/L	All water samples in SDG K1011005
ICB/CCB	Boron Magnesium Manganese	3.5 ug/L 0.9 ug/L 0.2 ug/L	All water samples in SDG K1011005

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-MSP016-SD-001	Molybdenum Antimony	1.7 mg/Kg 7.4 mg/Kg	1.7U mg/Kg 7.4U mg/Kg
1010-MSP016-SD-002	Molybdenum Antimony	2.9 mg/Kg 4.7 mg/Kg	2.9J+ mg/Kg 4.7U mg/Kg
1010-MSP016-SD-003	Molybdenum Antimony	5.0 mg/Kg 9.5 mg/Kg	5.0J+ mg/Kg 9.5U mg/Kg
1010-MSP016-SD-004-1	Molybdenum Antimony	1.6 mg/Kg 5.4 mg/Kg	1.6U mg/Kg 5.4U mg/Kg
1010-MSP016-SD-004-2	Molybdenum Antimony	1.2 mg/Kg 4.7 mg/Kg	1.2U mg/Kg 4.7U mg/Kg
1010-MST053-SD-001	Antimony	4.2 mg/Kg	4.2U mg/Kg
1010-MST275B-SD-001	Molybdenum	0.5 mg/Kg	0.5U mg/Kg
1010-MST275B-RS-001	Molybdenum	0.6 mg/Kg	0.6U mg/Kg
1010-MST275A-SD-001	Molybdenum	0.8 mg/Kg	0.8U mg/Kg
1010-MST275A-RS-001	Molybdenum	1.3 mg/Kg	1.3U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-MST275A-RS-002	Molybdenum	1.1 mg/Kg	1.1U mg/Kg
1010-SWMSP016-F	Boron	8.4 ug/L	8.4U ug/L
1010-SWMST053-F	Boron	14.6 ug/L	14.6J+ ug/L

Samples 1010-ER-SD-02-U, 1010-ER-RS-01U, and 1010-ER-RS-SD-03-U (all from SDG K1011007) were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-SD-02-U	9/30/10	Boron Manganese Zinc Chromium Copper Nickel Vanadium	6.0 ug/L 0.4 ug/L 1.2 ug/L 0.43 ug/L 0.68 ug/L 0.09 ug/L 0.09 ug/L	1010-MSP016-SD-001 1010-MSP016-SD-002 1010-MSP016-SD-003 1010-MSP016-SD-004-1 1010-MSP016-SD-004-2
1010-ER-RS-01-U	10/1/10	Boron Manganese Zinc Chromium Copper Nickel Vanadium	4.5 ug/L 4.5 ug/L 2.2 ug/L 0.59 ug/L 1.04 ug/L 0.96 ug/L 0.23 ug/L	1010-MST275B-RS-001 1010-MST275B-RS-002 1010-MST275A-RS-001 1010-MST275A-RS-002
1010-ER-RS-SD-03-U	10/3/10	Manganese Zinc Chromium Copper Nickel Vanadium	1.2 ug/L 1.8 ug/L 0.52 ug/L 0.79 ug/L 0.47 ug/L 0.15 ug/L	1010-MST053-SD-001 1010-MST053-SD-002

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and standard reference material results were within expected ranges.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for soils and sediments.

Chromium, Vanadium, and Zinc results were outside the QC limits; results were not qualified since the original sample (1010-MSP016-SD-003) was greater than 4X the spike amount.

Calcium results were outside the QC limits; results were not qualified since the original sample (1010-SWMSP021-F-01) was greater than 4X the spike amount.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

Boron and Zinc results were outside the QC limits; data were not qualified since the concentration was less than 50 times the MDLs.

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG K1011005

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K1011005	1010-MSP016-SD-001	Molybdenum Antimony	1.7U mg/Kg 7.4U mg/Kg	A	10
K1011005	1010-MSP016-SD-002	Molybdenum Antimony	2.9J+ mg/Kg 4.7U mg/Kg	A	10
K1011005	1010-MSP016-SD-003	Molybdenum Antimony	5.0J+ mg/Kg 9.5U mg/Kg	A	10
K1011005	1010-MSP016-SD-004-1	Molybdenum Antimony	1.6U mg/Kg 5.4U mg/Kg	A	10
K1011005	1010-MSP016-SD-004-2	Molybdenum Antimony	1.2U mg/Kg 4.7U mg/Kg	A	10
K1011005	1010-MST053-SD-001	Antimony	4.2U mg/Kg	A	10
K1011005	1010-MST275B-SD-001	Molybdenum	0.5U mg/Kg	A	10
K1011005	1010-MST275B-RS-001	Molybdenum	0.6U mg/Kg	A	10
K1011005	1010-MST275A-SD-001	Molybdenum	0.8U mg/Kg	A	10
K1011005	1010-MST275A-RS-001	Molybdenum	1.3U mg/Kg	A	10
K1011005	1010-MST275A-RS-002	Molybdenum	1.1U mg/Kg	A	10
K1011005	1010-SWMSP016-F	Boron	8.4U ug/L	A	10
K1011005	1010-SWMST053-F	Boron	14.6J+ ug/L	A	10

Metals – Field Blank Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

LDC #: 24471C4a

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

SDG #: K1011005

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/30-10/3/10
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB= 1010-ER-SD-02-U, 1010-ER-RS-01-U, 1010-ER-SD-03-U (SDG: K1011007)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil/water

1	1010-MSP016-SD-001 Sed	11	1010-MST275B-RS-001 S	21	1010-MSP016-SD-003MSD Sed		
2	1010-MSP016-SD-002	12	1010-MST275B-RS-002	22		32	
3	1010-MSP016-SD-003	13	1010-MST275A-SD-001 Sed	23		33	
4	1010-MSP016-SD-004-1	14	1010-MST275A-RS-001 S	24		34	
5	1010-MSP016-SD-004-2	15	1010-MST275A-RS-002	25		35	
6	1010-MST053-SD-001	16	1010-SWMSP016-F W	26		36	
7	1010-MST053-SD-002	17	1010-SWMST053-F	27		37	
8	1010-MST053-RS-001 S	18	1010-SWMST275B-F	28		38	
9	1010-MST053-RS-002	19	1010-SWMST275A-F	29		39	
10	1010-MST275B-SD-001 Sed	20	1010-MSP016-SD-003MS Sed	30		40	

Notes:

LDC #: 24471C4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-15		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
16-19		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
QC: 20,21		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,

Comments: Mercury by CVAA if performed

LDC #: 24471C4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 2xdil

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All Sediment and Soil Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	2	3	4	5	10	11	13	14	15
Cu			3.4	3.4										
Mn			0.6	0.6										
Mo			5.9	5.9	1.7	2.9 J+	5.0 J+	1.6	1.2	0.5	0.6	0.8	1.3	~~0.8~~ 1.1
V	0.7			3.5										
Zn	0.3			1.5										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-6 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	2	3	4	5	6				
Sb			16	16	7.4	4.7	9.5	5.4	4.7	4.2				

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 7-15 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
V			5	5										

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All Water Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	16	17								
B			3.5	17.5	8.4	14.6 J+								
Ca		2.7		13.5										
Mg		0.7	0.9	4.5										
Mn		0.30	0.2	1.5										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471C4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CC
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 9/30/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1-5

Analyte	Blank ID	Sample Identification										
	1010-ER-SD-02-U	Action Level	No Qualifiers									
B	6.0	0.6										
Mn	0.4	0.04										
Zn	1.2	0.12										
Cr (by 6020)	0.43	0.043										
Cu (by 6020)	0.68	0.068										
Ni (by 6020)	0.09	0.009										
V (by 6020)	0.09	0.009										

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/1/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 11, 12, 14, 15

Analyte	Blank ID	Sample Identification										
	1010-ER-RS-01-U	Action Level	No Qualifiers									
B	4.5	0.45										
Mn	4.5	0.45										
Zn	2.2	0.22										
Cr (by 6020)	0.59	0.059										
Cu (by 6020)	1.04	0.104										
Ni (by 6020)	0.96	0.096										
V (by 6020)	0.23	0.023										

LDC #: 24471C4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 2 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/3/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 6, 7

Analyte	Blank ID	Sample Identification										
	1010-ER-SD-03-U	Action Level	No Qualifiers									
Mn	1.2	0.12										
Zn	1.8	0.18										
Cr (by 6020)	0.52	0.052										
Cu (by 6020)	0.79	0.079										
Ni (by 6020)	0.47	0.047										
V (by 6020)	0.15	0.015										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24471C4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: L

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	20/21	sed	Cr		59.0		1-7,10,13	No Qual (>4x)
			V		58.2		↓	↓
			Zn		51.0			
	1010-SWM SR001-F-01	W	Ca	60.0	60.0		All water	No Qual (>4x)

Comments:

MSD.4SW

LDC #: 24471C4a

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: OR
2nd Reviewer: h

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		3	Sed	Mo	16.0	1-7,10,13	No Qual (<50xMDL)
		1010-SWMS8021-F-01	W	Zn	100	All water	↓ ↓

Comments:

SDILICPMS.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 20, 2010

Matrix: Soil/Sediment/Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011006

Sample Identification	Collection Date	Laboratory Identification
1010-MST277A-SD-001	10/03/10	K1011006-001
1010-MST277A-RS-001	10/03/10	K1011006-002
1010-MST277A-RS-002	10/03/10	K1011006-003
1010-MST277B-SD-001	10/03/10	K1011006-004
1010-MST277B-RS-001	10/03/10	K1011006-005
1010-MST277B-RS-002	10/03/10	K1011006-006
1010-MST066-SD-001-1	10/03/10	K1011006-011
1010-MST066-SD-001-2	10/03/10	K1011006-012
1010-MST066-RS-001-1	10/03/10	K1011006-013
1010-MST066-RS-001-2	10/03/10	K1011006-014
1010-MST066-RS-002	10/03/10	K1011006-015
1010-SWMST066-F-1	10/03/10	K1011006-007
1010-SWMST066-F-2	10/03/10	K1011006-009
1010-MST277A-SD-001MS	10/03/10	K1011006-001MS
1010-MST277A-SD-001MSD	10/03/10	K1011006-001MSD

Introduction

This data review covers 7 soil samples, 6 sediment samples, and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Antimony, Boron, Calcium, Chromium, Copper, Magnesium, Manganese, Molybdenum, Nickel, Vanadium, and Zinc.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Chromium Vanadium Zinc	0.5 mg/Kg 0.6 mg/Kg 0.4 mg/Kg	All soil and sediment samples in SDG K1011006
ICB/CCB	Copper	3.4 ug/L	All soil and sediment samples in SDG K1011006

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Molybdenum Manganese Vanadium	5.8 ug/L 0.9 ug/L 6 ug/L	1010-MST277A-RS-001 1010-MST277A-RS-002 1010-MST277B-SD-001 1010-MST277B-RS-001 1010-MST277B-RS-002 1010-MST066-SD-001-1 1010-MST066-SD-001-2 1010-MST066-RS-001-1 1010-MST066-RS-001-2 1010-MST066-RS-002
ICB/CCB	Molybdenum Manganese Vanadium	6.4 ug/L 0.8 ug/L 5 ug/L	10-MST277A-SD-001
PB (prep blank)	Calcium Magnesium Manganese	2.7 ug/L 0.7 ug/L 0.30 ug/L	All water samples in SDG K1011006
ICB/CCB	Boron Calcium Magnesium Manganese	3.5 ug/L 3.1 ug/L 1.7 ug/L 0.4 ug/L	All water samples in SDG K1011006

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-MST277A-RS-001	Molybdenum	0.6 mg/Kg	0.6U mg/Kg
1010-MST277B-SD-001	Molybdenum	1.3 mg/Kg	1.3U mg/Kg
1010-MST277B-RS-001	Molybdenum	1.3 mg/Kg	1.3U mg/Kg
1010-MST277B-RS-002	Molybdenum	1.5 mg/Kg	1.5U mg/Kg
1010-MST066-RS-001-1	Molybdenum	0.9 mg/Kg	0.9U mg/Kg
1010-MST066-RS-001-2	Molybdenum	2.5 mg/Kg	2.5J+ mg/Kg
1010-MST066-RS-002	Molybdenum	0.9 mg/Kg	0.9U mg/Kg
1010-MST277A-SD-001	Molybdenum	1.5 mg/Kg	1.5U mg/Kg

Sample 1010-ER-SD-03-U (from SDG K1011007) was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-SD-03-U	10/3/10	Manganese Zinc Chromium Copper Nickel Vanadium	1.2 ug/L 1.8 ug/L 0.52 ug/L 0.79 ug/L 0.47 ug/L 0.15 ug/L	1010-MST277A-SD-001 1010-MST277B-SD-001 1010-MST066-SD-001-1 1010-MST066-SD-001-2

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and standard reference material results were within expected ranges.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for soils and sediments with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-MST277A-SD-001MS/MSD (All sediment samples in SDG 44433)	Antimony	39.4 (75-125)	40.4 (75-125)	-	J- (all detects) UJ (all non-detects)	A
1010-MST277A-SD-001MS/MSD (All sediment samples in SDG 44433)	Manganese	-	153.5 (75-125)	-	J+ (all detects)	A

Calcium results were outside the QC limits; results were not qualified since the original sample (1010-SWMSP021-F-01) was greater than 4X the spike amount.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

Boron Copper, Nickel, and Zinc results were outside the QC limits; data were not qualified since the concentration was less than 50 times the MDLs.

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011006

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011006	1010-MST277A-SD-001 1010-MST277A-RS-001 1010-MST277A-RS-002 1010-MST277B-SD-001 1010-MST277B-RS-001 1010-MST277B-RS-002 1010-MST066-SD-001-1 1010-MST066-SD-001-2 1010-MST066-RS-001-1 1010-MST066-RS-001-2 1010-MST066-RS-002	Antimony	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)	16
K1011006	1010-MST277A-SD-001 1010-MST277A-RS-001 1010-MST277A-RS-002 1010-MST277B-SD-001 1010-MST277B-RS-001 1010-MST277B-RS-002 1010-MST066-SD-001-1 1010-MST066-SD-001-2 1010-MST066-RS-001-1 1010-MST066-RS-001-2 1010-MST066-RS-002	Manganese	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R)	16

Metals - Laboratory Blank Data Qualification Summary - SDG K1011006

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K1011006	1010-MST277A-RS-001	Molybdenum	0.6U mg/Kg	A	10
K1011006	1010-MST277B-SD-001	Molybdenum	1.3U mg/Kg	A	10
K1011006	1010-MST277B-RS-001	Molybdenum	1.3U mg/Kg	A	10
K1011006	1010-MST277B-RS-002	Molybdenum	1.5U mg/Kg	A	10
K1011006	1010-MST066-RS-001-1	Molybdenum	0.9U mg/Kg	A	10
K1011006	1010-MST066-RS-001-2	Molybdenum	2.5J+ mg/Kg	A	10
K1011006	1010-MST066-RS-002	Molybdenum	0.9U mg/Kg	A	10
K1011006	1010-MST277A-SD-001	Molybdenum	1.5U mg/Kg	A	10

Metals – Field Blank Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

LDC #: 24471D4a **VALIDATION COMPLETENESS WORKSHEET** Date: 12-13-10
SDG #: K1011006 Level III Page: 1 of 1
Laboratory: Columbia Analytical Services Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/3/10
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB=1010-ER-SD-03-U (K1011007)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil/water

1	1010-MST277A-SD-001 Sed	11	1010-MST066-RS-002 S	21		31	PBW
2	1010-MST277A-RS-001 S	12	1010-SWMST066-F-1 W	22		32	PBS
3	1010-MST277A-RS-002 ↓	13	1010-SWMST066-F-2 ↓	23		33	
4	1010-MST277B-SD-001 Sed	14	1010-MST277A-SD-001MS Sed	24		34	
5	1010-MST277B-RS-001 S	15	1010-MST277A-SD-001MSD ↓	25		35	
6	1010-MST277B-RS-002 ↓	16		26		36	
7	1010-MST066-SD-001-1 Sed	17		27		37	
8	1010-MST066-SD-001-2 ↓	18		28		38	
9	1010-MST066-RS-001-1 S	19		29		39	
10	1010-MST066-RS-001-2 ↓	20		30		40	

Notes:

LDC #: 44710H9

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-11		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
~~5~~ 12, 13		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Q		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
QC 14, 15		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 24471D4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 2
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 2xdil
Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All Sediment and Soil

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Cr	0.5			2.5										
Cu			3.4	3.4										
V	0.6			3										
Zn	0.4			2										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2-11 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	2	4	5	6	9	10	11			
Mo			5.8	5.8	0.6	1.3	1.3	1.5	0.9	2.5 J+	0.9			
Mn			0.9	0.9										
V			6	6										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1									
Mo			6.4	6.4	1.5									
Mn			0.8	0.8										
V			5	5										

LDC #: 24471D4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: SR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 2xdil

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All Water

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
B			3.5	17.5										
Ca		2.7	3.1	15.5										
Mg		0.7	1.7	8.5										
Mn		0.30	0.4	2										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471D4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/3/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1, 4, 7, 8

Analyte	Blank ID	Sample Identification										
	1010-ER-SD-03-U	Action Level	No Qualifiers									
Mn	1.2	0.12										
Zn	1.8	0.18										
Cr (by 6020)	0.52	0.052										
Cu (by 6020)	0.79	0.079										
Ni (by 6020)	0.47	0.047										
V (by 6020)	0.15	0.015										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24471D4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	14/15	sed	Sb	39.4	40.4		All Sediment	J/UJ/A (16)
			Mn		153.5		↓	~~[illegible]~~ J+det/A ↓
	1010-SWMSP021-F-01 (CK1011004)	w	Ca	60.0	60.0		All water	No Qual (>4x)

Comments:

MSD.4SW

LDC #: 24471D4a

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		1	sed	B	12.9	All Sediment	NO Qual (<50xMDL)
				Cu	15.2	↓	↓
				Ni	22.1	↓	↓
		1010-SUMSP02-F01 (CR1011004)	W	Zn	100	All Water	No Qual (<50xMDL)

Comments:

SDILICPMS.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 20, 2010

Matrix: Soil/Sediment/Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011007

Sample Identification	Collection Date	Laboratory Identification
1010-MST067-SD-001-1	10/03/10	K1011007-001
1010-MST067-RS-001-1	10/03/10	K1011007-002
1010-MST067-RS-002	10/03/10	K1011007-003
1010-MST131-SD-001	10/02/10	K1011007-006
1010-MST131-SD-002	10/02/10	K1011007-007
1010-MST131-RS-001	10/02/10	K1011007-008
1010-MST131-RS-002	10/02/10	K1011007-009
1010-MST274A-SD-001	10/02/10	K1011007-012
1010-MST274A-RS-001	10/02/10	K1011007-013
1010-MST274A-RS-002	10/02/10	K1011007-014
1010-MST274B-SD-001	10/02/10	K1011007-017
1010-MST274B-RS-001	10/02/10	K1011007-018
1010-MST274B-RS-002	10/02/10	K1011007-019
1010-SWMST131-F	10/02/10	K1011007-004
1010-SWMST274A-F	10/01/10	K1011007-010
1010-SWMST274B-F	10/01/10	K1011007-015
1010-ER-SD-02-U	9/30/10	K1011007-020
1010-ER-RS-01-U	10/01/10	K1011007-021
1010-ER-RS-02-U	10/02/10	K1011007-022
1010-ER-SD-03-U	10/03/10	K1011007-023
1010-MST067-SD-001-1MS	10/03/10	K1011007-001MS
1010-MST067-SD-001-1MSD	10/03/10	K1011007-001MSD
1010-ER-SD-02-UMS	10/02/10	K1011007-020MS
1010-ER-SD-02-UMSD	10/02/10	K1011007-020MSD

Introduction

This data review covers 8 soil samples, 7 sediment samples, and 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Antimony, Boron, Calcium, Chromium, Copper, Magnesium, Manganese, Molybdenum, Nickel, Vanadium, and Zinc.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met with the exception of Magnesium and Vanadium. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Boron	2.3 ug/L	All water samples in SDG K1011007
ICB/CCB	Manganese	0.2 ug/L	All water samples in SDG K1011007
PB (prep blank)	Magnesium	0.4 ug/L	1010-SWMST131-F 1010-SWMST274A-F 1010-SWMST274B-F

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Magnesium	0.4 ug/L	1010-SWMST131-F 1010-SWMST274A-F 1010-SWMST274B-F
ICB/CCB	Boron	4.7 ug/L	1010-SWMST131-F 1010-SWMST274A-F 1010-SWMST274B-F 1010-ER-SD-02-U 1010-ER-RS-01-U 1010-ER-RS-02-U
ICB/CCB	Boron	7.3 ug/L	1010-ER-SD-03-U
ICB/CCB	Antimony Boron Niobium	16 ug/L 2.0 ug/L 2.0 ug/L	All soil and sediment samples in SDG K1011007
ICB/CCB	Molybdenum	3.8 ug/L	1010-MST067-SD-001-1 1010-MST067-RS-001-1 1010-MST067-RS-002 1010-MST131-SD-001 1010-MST131-SD-002 1010-MST131-SD-001
ICB/CCB	Molybdenum	4.9 ug/L	1010-MST131-RS-002 1010-MST274A-SD-001 1010-MST274A-RS-001 1010-MST274A-RS-002 1010-MST274B-SD-001 1010-MST274B-RS-001 1010-MST274B-RS-002

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-MST067-SD-001-1	Antimony	6.6 mg/Kg	6.6U mg/Kg
1010-MST067-RS-001-1	Antimony	5.7 mg/Kg	5.7U mg/Kg
1010-MST067-RS-002	Antimony	7.1 mg/Kg	7.1U mg/Kg
1010-MST131-SD-001	Antimony Molybdenum	12 mg/Kg 1.0 mg/Kg	12J+ mg/Kg 1.0U mg/Kg
1010-MST131-SD-002	Antimony	6.1 mg/Kg	6.1U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-MST131-RS-001	Antimony	11 mg/Kg	11J+ mg/Kg
1010-MST131-RS-002	Antimony	6.3 mg/Kg	6.3U mg/Kg
1010-MST274A-SD-001	Antimony Molybdenum	8.0 mg/Kg 0.5 mg/Kg	8.0U mg/Kg 0.5U mg/Kg
1010-MST274A-RS-001	Antimony Molybdenum	6.7 mg/Kg 0.5 mg/Kg	6.7U mg/Kg 0.5U mg/Kg
1010-MST274A-RS-002	Antimony Molybdenum	5.2 mg/Kg 0.8 mg/Kg	5.2U mg/Kg 0.8U mg/Kg
1010-MST274B-SD-001	Antimony Molybdenum	7.9 mg/Kg 0.5 mg/Kg	7.9U mg/Kg 0.5U mg/Kg
1010-MST274B-RS-001	Antimony Molybdenum	8.7 mg/Kg 0.6 mg/Kg	8.7U mg/Kg 0.6U mg/Kg
1010-MST274B-RS-002	Antimony	5.0 mg/Kg	5.0U mg/Kg
1010-SWMST131-F	Boron	22.5 ug/L	22.5J+ ug/L
1010-SWMST274A-F	Boron	16.0 ug/L	16.0J+ ug/L
1010-SWMST274B-F	Boron	15.3 ug/L	15.3J+ ug/L
1010-ER-SD-02-U	Boron Manganese	6.0 ug/L 0.4 ug/L	6.0U ug/L 0.4U ug/L
1010-ER-RS-01-U	Boron	4.5 ug/L	4.5U ug/L
1010-ER-RS-02-U	Boron Manganese	4.1 ug/L 0.6 ug/L	4.1U ug/L 0.6J+ ug/L

Samples 1010-ER-SD-02-U, 1010-ER-RS-01-U, 1010-ER-RS-02-U, and 1010-ER-SD-03-U were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-SD-02-U	9/3010	Boron Manganese Zinc Copper Nickel	6.0 ug/L 0.4 ug/L 1.2 ug/L 0.68 ug/L 0.09 ug/L	No associated samples in this SDG

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-RS-01-U	10/1/10	Boron Manganese Zinc Copper Nickel	4.5 ug/L 4.5 ug/L 2.2 ug/L 1.04 ug/L 0.96 ug/L	No associated samples in this SDG
1010-ER-RS-02-U	10/2/10	Boron Manganese Zinc Copper Nickel	4.1 ug/L 0.6 ug/L 1.0 ug/L 0.78 ug/L 2.09 ug/L	1010-MST131-RS-001 1010-MST131-RS-002 1010-MST274A-RS-001 1010-MST274A-RS-002 1010-MST274B-RS-001 1010-MST274B-RS-002
1010-ER-SD-03-U	10/3/10	Manganese Zinc Copper Nickel	1.2 ug/L 1.8 ug/L 0.79 ug/L 0.47 ug/L	1010-MST067-SD-001-1

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and standard reference material results were within expected ranges.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for soils and sediments with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-MST067-SD-001-1MS/MSD (All sediment samples in SDG K1011007)	Antimony	38.8 (75-125)	40.4 (75-125)	-	J- (all detects) UJ (all non-detects)	A

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met, with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1010-MST067-SD-001-1L	Copper	13.4 (≤10)	All sediment samples in SDG K1011007	J (all detects) UJ (all non-detects)	A

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011007

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011007	1010-MST067-SD-001-1 1010-MST131-SD-001 1010-MST131-SD-002 1010-MST274A-SD-001 1010-MST274B-SD-001	Antimony	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)	16
K1011007	1010-MST067-SD-001-1 1010-MST131-SD-001 1010-MST131-SD-002 1010-MST274A-SD-001 1010-MST274B-SD-001	Copper	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG K1011007

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K1011007	1010-MST067-SD-001-1	Antimony	6.6U mg/Kg	A	10
K1011007	1010-MST067-RS-001-1	Antimony	5.7U mg/Kg	A	10
K1011007	1010-MST067-RS-002	Antimony	7.1U mg/Kg	A	10
K1011007	1010-MST131-SD-001	Antimony Molybdenum	12J+ mg/Kg 1.0U mg/Kg	A	10
K1011007	1010-MST131-SD-002	Antimony	6.1U mg/Kg	A	10
K1011007	1010-MST131-RS-001	Antimony	11J+ mg/Kg	A	10
K1011007	1010-MST131-RS-002	Antimony	6.3U mg/Kg	A	10
K1011007	1010-MST274A-SD-001	Antimony Molybdenum	8.0U mg/Kg 0.5U mg/Kg	A	10
K1011007	1010-MST274A-RS-001	Antimony Molybdenum	6.7U mg/Kg 0.5U mg/Kg	A	10
K1011007	1010-MST274A-RS-002	Antimony Molybdenum	5.2U mg/Kg 0.8U mg/Kg	A	10
K1011007	1010-MST274B-SD-001	Antimony Molybdenum	7.9U mg/Kg 0.5U mg/Kg	A	10
K1011007	1010-MST274B-RS-001	Antimony Molybdenum	8.7U mg/Kg 0.6U mg/Kg	A	10

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K1011007	1010-MST274B-RS-002	Antimony	5.0U mg/Kg	A	10
K1011007	1010-SWMST131-F	Boron	22.5J+ ug/L	A	10
K1011007	1010-SWMST274A-F	Boron	16.0J+ ug/L	A	10
K1011007	1010-SWMST274B-F	Boron	15.3J+ ug/L	A	10
K1011007	1010-ER-SD-02-U	Boron	6.0U ug/L	A	10
K1011007	1010-ER-SD-02-U	Manganese	0.4U ug/L	A	11
K1011007	1010-ER-RS-01-U	Boron	4.5U ug/L	A	10
K1011007	1010-ER-RS-02-U	Boron	4.1U ug/L	A	10
K1011007	1010-ER-RS-02-U	Manganese	0.6J+ ug/L	A	11

Metals – Field Blank Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

LDC #: 24471E4a

SDG #: K1011007

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-11-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: ~~10/1-3/10~~ 9/30 - 10/3/10
II.	Calibration	SW	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB=17,18,19,20

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil/water

1	1010-MST067-SD-001-1	sed	11	1010-MST274B-SD-001	sed	21	1010-MST067-SD-001-1MS	sed	31	PBW
2	1010-MST067-RS-001-1	S	12	1010-MST274B-RS-001	S	22	1010-MST067-SD-001-1MSD	↓	32	PBS
3	1010-MST067-RS-002	↓	13	1010-MST274B-RS-002	↓	23	1010-ER-SD-02-UMS	W	33	
4	1010-MST131-SD-001	sed	14	1010-SWMST131-F	W	24	1010-ER-SD-02-UMSD	↓	34	
5	1010-MST131-SD-002	↓	15	1010-SWMST274A-F		25			35	
6	1010-MST131-RS-001	Soil	16	1010-SWMST274B-F		26			36	
7	1010-MST131-RS-002	↓	17	1010-ER-SD-02-U		27			37	
8	1010-MST274A-SD-001	sed	18	1010-ER-RS-01-U		28			38	
9	1010-MST274A-RS-001	S	19	1010-ER-RS-02-U		29			39	
10	1010-MST274A-RS-002	↓	20	1010-ER-SD-03-U	↓	30			40	

Notes:

LDC #: 24471E4G

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
14-20	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
17-20		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
1-13		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
QC: 21,22		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
23,24		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,

Comments: Mercury by CVAA if performed

LDC #: 24471249

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?
Y N N/A Are all correlation coefficients ≥0.995?
Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	11/6/10	CRDL (09:30)	Mg	145 (70-130)	14-16	No Qual (>2xRL)
	11/10/10	CRDL (09:55)	V	51	All Sediment + Soil	

Comments:

CAL.4SW

LDC #: 24417E4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 2xdil

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All Water Reason Code: B=10, Mn=11

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	17	18	19							
B		2.3		11.5	6.0	4.5	4.1							
Mn			0.2	1	0.4		0.6 J+							

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 14-16

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mg		0.4	0.4	2										

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 14-19 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	14	15	16	17	18	19				
B			4.7	23.5	22.5 J+	16.0 J+	15.3 J+	See PB	See PB	See PB				

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 20

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
B			7.3	36.5										

LDC #: 24417E4a

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Soil preparation factor applied: 100x x 2xdil

Reviewer: [illegible]
2nd Reviewer: [illegible]

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All Sediment and Soil Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	2	3	4	5	6	7	8	9	10	11	12	13
Sb			16	16	6.6	5.7	7.1	12 J+	6.1	11 J+	6.3	8.0	6.7	5.2	7.9	8.7	5.0
B			2.0	2													
Mn			2.0	2													

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-6 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	4									
Mo			3.8	3.8	1.0									

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 7-13 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	8	9	10	11	12					
Mo			4.9	4.9	0.5	0.5	0.8	0.5	0.6					

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471E4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 9/30/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Analyte	Blank ID	Sample Identification										
	17	Action Level	No Qualifiers									
B	6.0	0.6										
Mn	0.4	0.04										
Zn	1.2	0.12										
Cu (by 6020)	0.68	0.068										
Ni (by 6020)	0.09	0.009										

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/1/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Analyte	Blank ID	Sample Identification										
	18	Action Level	No Qualifiers									
B	4.5	0.45										
Mn	4.5	0.45										
Zn	2.2	0.22										
Cu (by 6020)	1.04	0.104										
Ni (by 6020)	0.96	0.096										

LDC #: 24471E4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: L

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/2/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 6, 7, 9, 10, 12, 13

Analyte	Blank ID	Sample Identification										
	19	Action Level	No Qualifiers									
B	4.1	0.41										
Mn	0.6	0.06										
Zn	1.0	0.1										
Cu (by 6020)	0.78	0.078										
Ni (by 6020)	2.09	0.209										

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/3/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1

Analyte	Blank ID	Sample Identification										
	20	Action Level	No Qualifiers									
Mn	1.2	0.12										
Zn	1.8	0.18										
Cu (by 6020)	0.79	0.079										
Ni (by 6020)	0.47	0.047										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24471E4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	21/22	Sed.	Sb	38.8	40.4		All Sed.	J-/UJ/A (16)

Comments:

MSD.4SW

LDC #: 24471E4a

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		1	Sed.	Cu	13.4	All Sediment	J/UJ/A (18)

Comments:

SDILICPMS.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 20, 2010

Matrix: Soil/Sediment

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011129

Sample Identification	Collection Date	Laboratory Identification
1010-MST093A-SD-001-1	10/04/10	K1011129-001
1010-MST093A-SD-001-2	10/04/10	K1011129-002
1010-MST093A-RS-001-1	10/04/10	K1011129-003
1010-MST093A-RS-001-2	10/04/10	K1011129-004
1010-MST093A-RS-002-1	10/04/10	K1011129-005
1010-MST093A-RS-002-2	10/04/10	K1011129-006
1010-MST093B-SD-001	10/04/10	K1011129-007
1010-MST093B-RS-001	10/04/10	K1011129-008
1010-MST093B-RS-002	10/04/10	K1011129-009
1010-MST095-SD-001	10/04/10	K1011129-010
1010-MST095-RS-001	10/04/10	K1011129-011
1010-MST095-RS-002	10/04/10	K1011129-012
1010-MST089-SD-001	10/05/10	K1011129-013
1010-MST089-RS-001	10/05/10	K1011129-014
1010-MST089-RS-002	10/05/10	K1011129-015
1010-MST092-SD-001	10/04/10	K1011129-016
1010-MST092-RS-001	10/04/10	K1011129-017
1010-MST092-RS-002	10/04/10	K1011129-018
1010-MST092-RS-001MS	10/04/10	K1011129-017MS
1010-MST092-RS-001MSD	10/04/10	K1011129-017MSD

Introduction

This data review covers 14 soil samples and 6 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Antimony, Boron, Chromium, Copper, Manganese, Molybdenum, Nickel, Vanadium, and Zinc.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met with the exception of Vanadium. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Boron Manganese	16 ug/L 2.0 ug/L 2.0 ug/L	All samples in SDG K1011129
ICB/CCB	Molybdenum	7.5 ug/L	1010-MST092-RS-001

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Molybdenum	4.7 ug/L	1010-MST093A-SD-001-1 1010-MST093A-SD-001-2 1010-MST093A-RS-001-1 1010-MST093A-RS-001-2 1010-MST093A-RS-002-1 1010-MST093A-RS-002-2 1010-MST093B-SD-001 1010-MST093B-RS-001 1010-MST093B-RS-002 1010-MST095-SD-001 1010-MST095-RS-001 1010-MST095-RS-002 1010-MST089-SD-001 1010-MST089-RS-001 1010-MST089-RS-002 1010-MST092-SD-001 1010-MST092-RS-002
ICB/CCB	Chromium Nickel	2.2 ug/L 3.2 ug/L	1010-MST093A-SD-001-1 1010-MST093A-SD-001-2 1010-MST093A-RS-001-1 1010-MST093A-RS-001-2 1010-MST093A-RS-002-1 1010-MST093A-RS-002-2 1010-MST093B-SD-001 1010-MST093B-RS-001 1010-MST093B-RS-002 1010-MST095-SD-001

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-MST093A-SD-001-1	Antimony	4.5 mg/Kg	4.5U mg/Kg
1010-MST093A-SD-001-2	Antimony	4.8 mg/Kg	4.8U mg/Kg
1010-MST093A-RS-001-1	Antimony	3.2 mg/Kg	3.2U mg/Kg
1010-MST093A-RS-001-2	Antimony	6.1 mg/Kg	6.1U mg/Kg
1010-MST093A-RS-002-1	Antimony	3.9 mg/Kg	3.9U mg/Kg
1010-MST093A-RS-002-2	Antimony	4.8 mg/Kg	4.8U mg/Kg
1010-MST093B-SD-001	Antimony	3.2 mg/Kg	3.2U mg/Kg
1010-MST093B-RS-001	Antimony	4.4 mg/Kg	4.4U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-MST093B-RS-002	Antimony	3.6 mg/Kg	3.6U mg/Kg
1010-MST095-SD-001	Antimony	8.2 mg/Kg	8.2U mg/Kg
1010-MST095-RS-001	Antimony Molybdenum	6.0 mg/Kg 2.7 mg/Kg	6.0JU mg/Kg 2.7J+ mg/Kg
1010-MST095-RS-002	Antimony	6.3 mg/Kg	6.3U mg/Kg
1010-MST089-SD-001	Antimony	8.8 mg/Kg	8.8U mg/Kg
1010-MST089-RS-001	Antimony	3.0 mg/Kg	3.0U mg/Kg
1010-MST089-RS-002	Antimony	4.1 mg/Kg	4.1U mg/Kg
1010-MST092-SD-001	Antimony Molybdenum	1.2 mg/Kg 1.2 mg/Kg	1.2U mg/Kg 1.2U mg/Kg
1010-MST092-RS-001	Antimony Molybdenum	6.4 mg/Kg 0.8 mg/Kg	6.4U mg/Kg 0.8U mg/Kg
1010-MST092-RS-002	Antimony Molybdenum	4.7 mg/Kg 0.7 mg/Kg	4.7U mg/Kg 0.7U mg/Kg

Samples 1010-ER-RS-03-U and 1010-ER-RS-04-U (both from SDG K1011130) were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-RS-03-U	10/4/10	Boron Manganese Molybdenum Zinc Chromium Copper Nickel Vanadium	4.7 ug/L 0.60 ug/L 0.9 ug/L 1.2 ug/L 0.71 ug/L 1.09 ug/L 0.34 ug/L 0.06 ug/L	1010-MST093A-RS-001-1 1010-MST093A-RS-001-2 1010-MST093A-RS-002-1 1010-MST093A-RS-002-2 1010-MST093B-RS-001 1010-MST093B-RS-002 1010-MST095-RS-001 1010-MST095-RS-002 1010-MST092-RS-001 1010-MST092-RS-002
1010-ER-RS-04-U	10/5/10	Boron Manganese Zinc Chromium Copper Nickel Vanadium	4.6 ug/L 2.00 ug/L 1.5 ug/L 0.25 ug/L 0.94 ug/L 0.19 ug/L 0.13 ug/L	1010-MST089-RS-001 1010-MST089-RS-002

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and standard reference material results were within expected ranges.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for soils and sediments with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-MST092-RS-001MS/MSD (All soil samples in SDG K1011129)	Antimony	40.0 (75-125)	41.6 (75-125)	-	J- (all detects) UJ (all non-detects)	A

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

Antimony and Molybdenum results were outside the QC limits; data were not qualified since the concentration was less than 50 times the MDLs.

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011129

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011129	1010-MST093A-RS-001-1 1010-MST093A-RS-001-2 1010-MST093A-RS-002-1 1010-MST093A-RS-002-2 1010-MST093B-RS-001 1010-MST093B-RS-002 1010-MST095-RS-001 1010-MST095-RS-002 1010-MST089-RS-001 1010-MST089-RS-002 1010-MST092-RS-001 1010-MST092-RS-002	Antimony	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)	16

Metals - Laboratory Blank Data Qualification Summary - SDG K1011129

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K1011129	1010-MST093A-SD-001-1	Antimony	4.5U mg/Kg	A	10
K1011129	1010-MST093A-SD-001-2	Antimony	4.8U mg/Kg	A	10
K1011129	1010-MST093A-RS-001-1	Antimony	3.2U mg/Kg	A	10
K1011129	1010-MST093A-RS-001-2	Antimony	6.1U mg/Kg	A	10
K1011129	1010-MST093A-RS-002-1	Antimony	3.9U mg/Kg	A	10
K1011129	1010-MST093A-RS-002-2	Antimony	4.8U mg/Kg	A	10
K1011129	1010-MST093B-SD-001	Antimony	3.2U mg/Kg	A	10
K1011129	1010-MST093B-RS-001	Antimony	4.4U mg/Kg	A	10
K1011129	1010-MST093B-RS-002	Antimony	3.6U mg/Kg	A	10
K1011129	1010-MST095-SD-001	Antimony	8.2U mg/Kg	A	10
K1011129	1010-MST095-RS-001	Antimony Molybdenum	6.0JU mg/Kg 2.7J+ mg/Kg	A	10
K1011129	1010-MST095-RS-002	Antimony	6.3U mg/Kg	A	10
K1011129	1010-MST089-SD-001	Antimony	8.8U mg/Kg	A	10
K1011129	1010-MST089-RS-001	Antimony	3.0U mg/Kg	A	10

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K1011129	1010-MST089-RS-002	Antimony	4.1U mg/Kg	A	10
K1011129	1010-MST092-SD-001	Antimony Molybdenum	1.2U mg/Kg 1.2U mg/Kg	A	10
K1011129	1010-MST092-RS-001	Antimony Molybdenum	6.4U mg/Kg 0.8U mg/Kg	A	10
K1011129	1010-MST092-RS-002	Antimony Molybdenum	4.7U mg/Kg 0.7U mg/Kg	A	10

Metals – Field Blank Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

LDC #: 24471F4a

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

SDG #: K1011129

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: OR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/4-5/10
II.	Calibration	SW	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB= 1010-ERT-RS-03-U, 1010-ERT-RS-04-U (SDG: K1011130)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil

1	1010-MST093A-SD-001-1 sed	11	1010-MST095-RS-001 S	21		31	PBS
2	1010-MST093A-SD-001-2 ↓	12	1010-MST095-RS-002 ↓	22		32	
3	1010-MST093A-RS-001-1 S	13	1010-MST089-SD-001 sed	23		33	
4	1010-MST093A-RS-001-2	14	1010-MST089-RS-001 S	24		34	
5	1010-MST093A-RS-002-1	15	1010-MST089-RS-002 ↓	25		35	
6	1010-MST093A-RS-002-2 ↓	16	1010-MST092-SD-001 sed	26		36	
7	1010-MST093B-SD-001 sed	17	1010-MST092-RS-001 S	27		37	
8	1010-MST093B-RS-001 S	18	1010-MST092-RS-002	28		38	
9	1010-MST093B-RS-002 ↓	19	1010-MST092-RS-001MS	29		39	
10	1010-MST095-SD-001 sed	20	1010-MST092-RS-001MSD ↓	30		40	

Notes:

LDC #: 04071F4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-18		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
QC 19,20		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 24411MQ

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: QR
2nd Reviewer: M

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	11/10/10	CRDL (09:55)	V	51 (70-130)	All	No Qual (>2xRL)

Comments:

CAL.4SW

LDC #: 24471F4a

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 2xdil

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All Reason Code: 10

Analyte	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Sb	16	16	4.5	4.8	3.2	6.1	3.9	4.8	3.2	4.4	3.6	8.2	6.0	6.3	8.8	3.0	4.1	1.2	6.4	4.7
B	2.0	2																		
Mn	2.0	2																		

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 17 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	17									
Mo			7.5	7.5	0.8									

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-16, 18 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	11	16	18							
Mo			4.7	4.7	2.7 J+	1.2	0.7							

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-10 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Cr			2.2	2.2										
Ni			3.2	3.2										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471F4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/4/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 3-6, 8, 9, 11, 12, 17, 18

Analyte	Blank ID	Sample Identification										
	1010-ER-RS-03-U	Action Level	No Qualifiers									
B	4.7	0.47										
Mn	0.60	0.06										
Mo	0.9	0.09										
Zn	1.2	0.12										
Cr (by 6020)	0.71	0.071										
Cu (by 6020)	1.09	0.109										
Ni (by 6020)	0.34	0.034										
V (by 6020)	0.06	0.006										

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/5/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 14, 15

Analyte	Blank ID	Sample Identification										
	1010-ER-RS-04-U	Action Level	No Qualifiers									
B	4.6	0.46										
Mn	2.00	0.2										
Zn	1.5	0.15										
Cr (by 6020)	0.25	0.025										
Cu (by 6020)	0.94	0.094										
Ni (by 6020)	0.19	0.019										
V (by 6020)	0.13	0.013										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24471F4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: QR
2nd Reviewer: L

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	19/20	Soil	Sb	40.0	41.6		All Soil	J-/UJ/A (6)

Comments:

LDC #: 24471F4a

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		17	Soil	Sb	100	All Soil	No Qual (<50xMDL)
				Mo	100	"	"

Comments:

SDILICPMS.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 20, 2010

Matrix: Soil/Sediment/Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011130

Sample Identification	Collection Date	Laboratory Identification
1010-MST272-SD-001	10/05/10	K1011130-001
1010-MST272-RS-001	10/05/10	K1011130-002
1010-MST272-RS-002	10/05/10	K1011130-003
1010-MST273-SD-001	10/05/10	K1011130-004
1010-MST273-RS-001	10/05/10	K1011130-005
1010-MST273-RS-002	10/05/10	K1011130-006
1010-ER-RS-03-U	10/04/10	K1011130-007
1010-ER-RS-04-U	10/05/10	K1011130-008
1010-B -SW-01	10/05/10	K1011130-009
1010-MST272-SD-001MS	10/05/10	K1011130-001MS
1010-MST272-SD-001MSD	10/05/10	K1011130-001MSD
1010-B -SW-01MS	10/05/10	K1011130-009MS
1010-B -SW-01MSD	10/05/10	K1011130-009MSD

Introduction

This data review covers 4 soil samples, 4 sediment samples, and 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Antimony, Boron, Chromium, Copper, Manganese, Molybdenum, Nickel, Vanadium, and Zinc.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met with the exception of Vanadium. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Chromium Zinc	0.4 mg/Kg 0.4 mg/Kg	All sediment and soil samples in SDG K1011130
ICB/CCB	Antimony Boron Manganese	16 ug/L 2.0 ug/L 2.0 ug/L	All sediment and soil samples in SDG K1011130
ICB/CCB	Molybdenum	6.8 ug/L	1010-MST272-SD-001 1010-MST272-RS-001 1010-MST272-RS-002 1010-MST273-SD-001

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Molybdenum	7.5 ug/L	1010-MST273-RS-001 1010-MST273-RS-002
PB (prep blank)	Manganese	0.20 ug/L	All water samples in SDG K1011130
ICB\CCB	Boron Manganese	4.2 ug/L 0.2 ug/L	All water samples in SDG K1011130

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-MST272-SD-001	Antimony Molybdenum	6.1 mg/Kg 1.0 mg/Kg	6.1U mg/Kg 1.0U mg/Kg
1010-MST272-RS-001	Antimony	4.6 mg/Kg	4.6U mg/Kg
1010-MST272-RS-002	Antimony Molybdenum	7.8 mg/Kg 0.6 mg/Kg	7.8U mg/Kg 0.6U mg/Kg
1010-MST273-SD-001	Antimony	6.2 mg/Kg	6.2U mg/Kg
1010-MST273-RS-002	Antimony	3.7 mg/Kg	3.7U mg/Kg
1010-ER-RS-03-U	Boron Manganese	4.7 ug/L 0.60 ug/L	4.7U ug/L 0.60J+ ug/L
1010-ER-RS-04-U	Boron	4.6 ug/L	4.6U ug/L
1010-B -SW-01	Boron Manganese	2.7 ug/L 0.30 ug/L	2.7U ug/L 0.30U ug/L

Samples 1010-ER-RS-03-U and 1010-ER-RS-04-U were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-RS-03-U	10/4/10	Boron Manganese Molybdenum Zinc Chromium Copper Nickel Vanadium	4.7 ug/L 0.60 ug/L 0.9 ug/L 1.2 ug/L 0.71 ug/L 1.09 ug/L 0.34 ug/L 0.06 ug/L	No associated samples in this SDG
1010-ER-RS-04-U	10/5/10	Boron Manganese Zinc Chromium Copper Nickel Vanadium	4.6 ug/L 2.00 ug/L 1.5 ug/L 0.25 ug/L 0.94 ug/L 0.19 ug/L 0.13 ug/L	All soil samples in SDG K1011130

Sample 1010-B -SW-01 was identified as a source blank. No metal contaminants were found in this blank with the following exceptions:

Source Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-B -SW-01	10/5/10	Boron Manganese Molybdenum Zinc	2.7 ug/L 0.30 ug/L 0.7 ug/L 0.7 ug/L	No associated samples in this SDG

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and standard reference material results were within expected ranges.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for soils and sediments with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-MST272-SD-001MS/MSD (All sediment samples in SDG K1011130)	Antimony	34.2 (75-125)	34.2 (75-125)	-	J- (all detects) UJ (all non-detects)	A

Manganese results were outside the QC limits; results were not qualified since the original sample (1010-MST272-SD-001) was greater than 4X the spike amount.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

Antimony, Boron, Copper, Manganese, Molybdenum, and Zinc results were outside the QC limits; data were not qualified since the concentration was less than 50 times the MDLs.

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011130

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011130	1010-MST272-SD-001 1010-MST273-SD-001	Antimony	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)	16

Metals - Laboratory Blank Data Qualification Summary - SDG K1011130

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K1011130	1010-MST272-SD-001	Antimony Molybdenum	6.1U mg/Kg 1.0U mg/Kg	A	10
K1011130	1010-MST272-RS-001	Antimony	4.6U mg/Kg	A	10
K1011130	1010-MST272-RS-002	Antimony Molybdenum	7.8U mg/Kg 0.6U mg/Kg	A	10
K1011130	1010-MST273-SD-001	Antimony	6.2U mg/Kg	A	10
K1011130	1010-MST273-RS-002	Antimony	3.7U mg/Kg	A	10
K1011130	1010-ER-RS-03-U	Boron	4.7U ug/L	A	10
K1011130	1010-ER-RS-03-U	Manganese	0.60J+ ug/L	A	10,11
K1011130	1010-ER-RS-04-U	Boron	4.6U ug/L	A	10
K1011130	1010-B -SW-01	Boron	2.7U ug/L	A	10
K1011130	1010-B -SW-01	Manganese	0.30U ug/L	A	10,11

Metals – Field Blank Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

LDC #: 24471G4a

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

SDG #: K1011130

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/5/10, 10/4/10
II.	Calibration	SW	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB=7,8, Source Blk=9

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil/water

1	1010-MST272-SD-001 sed	11	1010-MST272-SD-001MSD sed	21	PBW	31	
2	1010-MST272-RS-001 S	12	1010-B -SW-01MS W	22	PBS	32	
3	1010-MST272-RS-002 ↓	13	1010-B -SW-01MSD ↓	23		33	
4	1010-MST273-SD-001 sed	14		24		34	
5	1010-MST273-RS-001 S	15		25		35	
6	1010-MST273-RS-002 ↓	16		26		36	
7	1010-ER-RS-03-U W	17		27		37	
8	1010-ER-RS-04-U	18		28		38	
9	1010-B -SW-01 ↓	19		29		39	
10	1010-MST272-SD-001MS sed	20		30		40	

Notes:

LDC #: 44471G4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-6		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
7-9		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
10,11		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
12,13		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: [illegible]

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	11/10/10	CRDL (09:55)	V	51 (70-130)	All Sediment & Soil	No Qual (>2xRL

Comments:

CAL.4SW

LDC #: 24471G4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 2xdil

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All Sediment and Soil Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	2	3	4	6					
Cr	0.4			2										
Sb			16	16	6.1	4.6	7.8	6.2	3.7					
B			2.0	2										
Mn			2.0	2										
Zn	0.4			2										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-4 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	3								
Mo			6.8	6.8	1.0	0.6								

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 5, 6

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Mo			7.5	7.5										

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All Water Reason Code: B=10, Mn= 10, 11

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	7	8	9							
B			4.2	21	4.7	4.6	2.7							
Mn		0.20	0.2	1	0.60 J+		0.30							

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471G4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: 02
2nd Reviewer: M

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/4/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Analyte	Blank ID	Sample Identification											
	7	Action Level											
B	4.7	0.47											
Mn	0.60	0.06											
Mo	0.9	0.09											
Zn	1.2	0.12											
Cr (by 6020)	0.71	0.071											
Cu (by 6020)	1.09	0.109											
Ni (by 6020)	0.34	0.034											
V (by 6020)	0.06	0.006											

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/5/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All ~~Sediments~~ Soil

Analyte	Blank ID	Sample Identification											
	8	Action Level	No Qualifiers										
B	4.6	0.46											
Mn	2.00	0.2											
Zn	1.5	0.15											
Cr (by 6020)	0.25	0.025											
Cu (by 6020)	0.94	0.094											
Ni (by 6020)	0.19	0.019											
V (by 6020)	0.13	0.013											

LDC #: 24471G4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 10/5/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Source Blk Associated Samples: None

Analyte	Blank ID	Sample Identification											
	9	Action Level											
B	2.7	2.7											
Mn	0.30	0.3											
Mo	0.7	0.7											
Zn	0.7	0.7											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24471G4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: CR
2nd Reviewer: LA

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	10/11	SED	Sb	34.2	34.2		All Sediment	J-/UJ/A (16)
			Mn	329.3	486.8		↓	No Qual (>4x)

Comments:

LDC #: 24471G2

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		1	Sed	Cu	17.4	All sediment	No Qual (<50x MDL)
				Sb	100	↓	↓
				Mo	100	↓	↓
		9	water	B	437.0	All water	No Qual (<50x MDL)
				Mn	233.3	↓	↓
				Mo	100	↓	↓
				Zn	100	↓	↓

Comments:

SDILICPMS.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 20, 2010

Matrix: Sediment/Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1010867

Sample Identification	Collection Date	Laboratory Identification
1010-MSP018-SD-001	09/29/10	K1010867-003
1010-MSP018-SD-002	09/29/10	K1010867-004
1010-MSP018-SD-003	09/29/10	K1010867-005
1010-MSP017-SD-001	09/29/10	K1010867-008
1010-MSP017-SD-002	09/29/10	K1010867-009
1010-MSP017-SD-003	09/29/10	K1010867-010
1010-MSP017-SD-004	09/29/10	K1010867-011
1010-MSP031-SD-001-1	09/28/10	K1010867-012
1010-MSP031-SD-001-2	09/28/10	K1010867-013
1010-MSP031-SD-002	09/28/10	K1010867-014
1010-MSP031-SD-003	09/28/10	K1010867-015
1010-MSP015-SD-001	09/30/10	K1010867-018
1010-MSP015-SD-002	09/30/10	K1010867-019
1010-MSP015-SD-003	09/30/10	K1010867-020
1010-MSP015-SD-004	09/30/10	K1010867-021
1010-MSP014-SD-001-1	09/29/10	K1010867-024
1010-MSP014-SD-001-2	09/29/10	K1010867-025
1010-MSP014-SD-002	09/29/10	K1010867-026
1010-MSP014-SD-003	09/29/10	K1010867-027
1010-MSP014-SD-004	09/29/10	K1010867-028
1010-MSP014-SD-005	09/29/10	K1010867-029
1010-MSP023-SD-001	09/28/10	K1010867-031
1010-MSP023-SD-002	09/28/10	K1010867-032

1010-MSP023-SD-003	09/28/10	K1010867-033
1010-MSP023-SD-004	09/28/10	K1010867-034
1010-SWMSP018-F	09/29/10	K1010867-001
1010-SWMSP018-U	09/29/10	K1010867-002
1010-SWMSP017-F	09/29/10	K1010867-006
1010-SWMSP017-U	09/29/10	K1010867-007
1010-SWMSP015-F	09/30/10	K1010867-016
1010-SWMSP015-U	09/30/10	K1010867-017
1010-SWMSP014-F	09/29/10	K1010867-022
1010-SWMSP014-U	09/29/10	K1010867-023
1010-ER-SW-01-U	09/29/10	K1010867-030
1010-ER-SD-01-U	09/28/10	K1010867-035
1010-MSP018-SD-001MS	09/29/10	K1010867-003MS
1010-MSP018-SD-001MSD	09/29/10	K1010867-003MSD
1010-MSP014-SD-005MS	09/29/10	K1010867-029MS
1010-MSP014-SD-005MSD	09/29/10	K1010867-029MSD

Introduction

This data review covers 29 sediment samples and 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Arsenic, Cadmium, Chromium, Cobalt, Copper, Nickel, Selenium, Silver, Uranium, Thallium, Vanadium, and Zinc.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Cobalt Thallium	0.020 mg/Kg 0.008 mg/Kg	1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004 1010-MSP018-SD-001
PB (prep blank)	Cadmium Cobalt Thallium Uranium	0.007 mg/Kg 0.010 mg/Kg 0.012 mg/Kg 0.009 mg/Kg	1010-MSP014-SD-005 1010-MSP023-SD-001 1010-MSP023-SD-002 1010-MSP023-SD-003 1010-MSP023-SD-004
ICB/CCB	Cobalt	0.004 ug/L	1010-MSP018-SD-001
ICB/CCB	Cobalt	0.010 ug/L	1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003
ICB/CCB	Cobalt	0.014 ug/L	1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004 1010-MSP023-SD-001 1010-MSP023-SD-002
ICB/CCB	Cobalt Thallium	0.009 ug/L 0.006 ug/L	1010-MSP023-SD-003 1010-MSP023-SD-004

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Thallium	0.011 ug/L	1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP018-SD-001
ICB/CCB	Thallium	0.010 ug/L	1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004
ICB/CCB	Thallium	0.009 ug/L	1010-MSP023-SD-001 1010-MSP023-SD-002
ICB/CCB	Cobalt	0.006 ug/L	1010-MSP014-SD-005
ICB/CCB	Arsenic Cobalt Nickel Silver Thallium Uranium	0.08 ug/L 0.004 ug/L 0.05 ug/L 0.013 ug/L 0.004 ug/L 0.003 ug/L	1010-SWMSP018-F 1010-SWMSP017-F 1010-SWMSP015-F 1010-SWMSP014-F 1010-ER-SW-01-U 1010-ER-SD-01-U

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-SWMSP014-F	Thallium	0.008 ug/L	0.008U ug/L
1010-ER-SW-01-U	Thallium	0.002 ug/L	0.002U ug/L
1010-ER-SD-01-U	Nickel Uranium	0.08 ug/L 0.004 ug/L	0.08U ug/L 0.004U ug/L

Samples 1010-ER-SW-01-U and 1010-ER-SD-01-U were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-SW-01-U	9/29/10	Cadmium Chromium Cobalt Copper Nickel Thallium Uranium Vanadium	0.028 ug/L 0.27 ug/L 0.042 ug/L 0.17 ug/L 0.31 ug/L 0.002 ug/L 0.027 ug/L 0.15 ug/L	No associated samples in this SDG
1010-ER-SD-01-U	9/28/10	Chromium Copper Nickel Vanadium	0.18 ug/L 0.47 ug/L 0.08 ug/L 0.04 ug/L	No associated samples in this SDG
1010-ER-SD-01-U	9/28/10	Cadmium Cobalt Uranium	0.004 ug/L 0.041 ug/L 0.004 ug/L	1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP023-SD-001 1010-MSP023-SD-002 1010-MSP023-SD-003 1010-MSP023-SD-004

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediments and soils with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-MSP018-SD-001MS/MSD (1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004 1010-MSP018-SD-001)	Selenium	133 (75-125)	-	-	J+ (all detects)	A
1010-MSP014-SD-005MS/MSD (1010-MSP014-SD-005 1010-MSP023-SD-001 1010-MSP023-SD-002 1010-MSP023-SD-003 1010-MSP023-SD-004)	Cadmium	-	139.4 (75-125)	-	J+ (all detects)	A

Calcium results were outside the QC limits; results were not qualified since the original sample (1010-MSP018-SD-001) was greater than 4X the spike amount.

IX. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met, with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1010-MSP018-SD-002L	Cadmium Selenium	12 (≤10) 16 (≤10)	1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004 1010-MSP018-SD-001	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A
1010-MSP014-SD-005L	Arsenic Cadmium Cobalt Selenium	23 (≤10) 14 (≤10) 24 (≤10) 29 (≤10)	1010-MSP014-SD-005 1010-MSP023-SD-001 1010-MSP023-SD-002 1010-MSP023-SD-003 1010-MSP023-SD-004	J (all detects) UJ (all non-detects)	A

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1010867

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1010867	1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004 1010-MSP018-SD-001	Selenium	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
K1010867	1010-MSP014-SD-005 1010-MSP023-SD-001 1010-MSP023-SD-002 1010-MSP023-SD-003 1010-MSP023-SD-004	Cadmium	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
K1010867	1010-MSP018-SD-002 1010-MSP018-SD-003 1010-MSP017-SD-001 1010-MSP017-SD-002 1010-MSP017-SD-003 1010-MSP017-SD-004 1010-MSP031-SD-001-1 1010-MSP031-SD-001-2 1010-MSP031-SD-002 1010-MSP031-SD-003 1010-MSP015-SD-001 1010-MSP015-SD-002 1010-MSP015-SD-003 1010-MSP015-SD-004 1010-MSP014-SD-001-1 1010-MSP014-SD-001-2 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-004 1010-MSP018-SD-001	Cadmium Selenium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18
K1010867	1010-MSP014-SD-005 1010-MSP023-SD-001 1010-MSP023-SD-002 1010-MSP023-SD-003 1010-MSP023-SD-004	Arsenic Cadmium Cobalt Selenium	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG K1010867

SDG	Sample	Analyte	Modified Final Concentration	A or P	Reason Code
K1010867	1010-SWMSP014-F	Thallium	0.008U ug/L	A	10
K1010867	1010-ER-SW-01-U	Thallium	0.002U ug/L	A	10
K1010867	1010-ER-SD-01-U	Nickel Uranium	0.08U ug/L 0.004U ug/L	A	10

Mercury – Field Blank Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

LDC #: 24471A4b

VALIDATION COMPLETENESS WORKSHEET

Date: 12-1-10

SDG #: K1010867

Level III

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: CR

2nd Reviewer: W

METHOD: Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/28-30/10
II.	Calibration / ICPMS Tune	A/A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB = 33, 34

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/water

1	1010-MSP018-SD-002 S	11	1010-MSP015-SD-001 S	21	1010-MSP023-SD-001 S	31	1010-SWMSP014-F W
2	1010-MSP018-SD-003	12	1010-MSP015-SD-002	22	1010-MSP023-SD-002	32	1010-SWMSP014-U
3	1010-MSP017-SD-001	13	1010-MSP015-SD-003	23	1010-MSP023-SD-003	33	1010-ER-SW-01-U
4	1010-MSP017-SD-002	14	1010-MSP015-SD-004	24	1010-MSP023-SD-004	34	1010-ER-SD-01-U
5	1010-MSP017-SD-003	15	1010-MSP014-SD-001-1	25	1010-SWMSP018-F W	35	1010-MSP018-SD-001MS S
6	1010-MSP017-SD-004	16	1010-MSP014-SD-001-2	26	1010-SWMSP018-U	36	1010-MSP018-SD-001MSD
7	1010-MSP031-SD-001-1	17	1010-MSP014-SD-002	27	1010-SWMSP017-F	37	1010-MSP014-SD-005MS
8	1010-MSP031-SD-001-2	18	1010-MSP014-SD-003	28	1010-SWMSP017-U	38	1010-MSP014-SD-005MSD
9	1010-MSP031-SD-002	19	1010-MSP014-SD-004	29	1010-SWMSP015-F	39	1010-MSP018-SD-001
10	1010-MSP031-SD-003	20	1010-MSP014-SD-005	30	1010-SWMSP015-U	40	

Notes: PBS1 (1-20) 19, 35
PBS2 (21-24)

LDC #: 24471A4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: W

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-24, 39		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
25, 27, 29, 31, 33, 34		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
26, 28, 30, 32		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
QC 35-38		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN- U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-

Comments: Mercury by CVAA if performed

LDC #: 24471A4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: 100x x 5x dil
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1-19, ~~39~~ 35 39

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co	0.020			0.1										
Tl	0.008			0.04										

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 20-24

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Cd	0.007			0.035										
Co	0.010			0.05										
Tl	0.012			0.06										
U	0.009			0.045										

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: ~~39~~ 35 39

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.004	0.01										

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1-10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.010	0.025										

LDC #: 24471A4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 2 of 3
Reviewer: SR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 5x dil

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 11-19, 21, 22

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.014	0.035										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 23, 24

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.009	0.0225										
Tl			0.006	0.015										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-10, ~~29~~ 35 39

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Tl			0.011	0.0275										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 11-19

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Tl			0.010	0.025										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 21-22

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Tl			0.009	0.0225										

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: 100x x 5x dil
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 20

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.006	0.015										

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 25, 27, 29, 31, 33, 34 Reason: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	31	33	34							
As			0.08	0.4										
Co			0.004	0.02										
Ni			0.05	0.25			0.08							
Ag			0.013	0.065										
Tl			0.004	0.02	0.008	0.002								
U			0.003	0.015			0.004							

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471A4

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: SR
2nd Reviewer: L

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 9/29/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: ER Associated Samples: None

Analyte	Blank ID	Sample Identification										
	2933	Action Level	No Qualifiers									
Cd	0.028	0.028										
Cr	0.27	0.027										
Co	0.042	0.0042										
Cu	0.17	0.017										
Ni	0.31	0.031										
Tl	0.002	0.0002										
U	0.027	0.0027										
V	0.15	0.015										

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 9/28/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: U, Cd, Co=7-10, 21-24. Cr, Cu, Ni, V=None

Analyte	Blank ID	Sample Identification										
	3034	Action Level	No Qualifiers									
Cd	0.004	0.0004 ~~0.002~~										
Cr	0.18	0.09 0.018										
Co	0.041	0.0205 0.0041										
Cu	0.47	0.235 0.047										
Ni	0.08	~~0.04~~ 0.008										
U	0.004	~~0.002~~ 0.0004										
V	0.04	~~0.02~~ 0.004										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24471A4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: QR
2nd Reviewer: h

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	35/36	Sed	Se	133			1-19,39	J+det/A (16)
	37/38	Sed	Cd		139.4		20-24	↓
	35/36	Sed	Cd	390	313.1		1-19,39	No Qual (4x)

Comments:

MSD.4SW

LDC #: 24471A4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ~~, or > 100X the MDL (ICP/MS)~~, was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		39	Sed	Cd	12	1-19,39	J/UJ/A (18)
				Se	16	↓	↓
		20	Sed	As	23	20-24	J/UJ/A (18)
				Cd	14	↓	↓
				Co	24		
				Se	29		

Comments:

SDILICPMS.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 20, 2010

Matrix: Sediment/Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011004

Sample Identification	Collection Date	Laboratory Identification
1010-MSP021-SD-001	10/02/10	K1011004-003
1010-MSP021-SD-002-1	10/02/10	K1011004-004
1010-MSP021-SD-002-2	10/02/10	K1011004-005
1010-MSP021-SD-003	10/02/10	K1011004-006
1010-MSP021-SD-004	10/02/10	K1011004-007
1010-MSP020-SD-001	10/02/10	K1011004-016
1010-MSP020-SD-002	10/02/10	K1011004-017
1010-MSP020-SD-003	10/02/10	K1011004-018
1010-MSP020-SD-004	10/02/10	K1011004-019
1010-MSP020-SD-005	10/02/10	K1011004-020
1010-SWMSP021-F-01	10/02/10	K1011004-001
1010-SWMSP021-U-1	10/02/10	K1011004-002
1010-SWMSP021-F-2	10/02/10	K1011004-008
1010-SWMSP021-U-2	10/02/10	K1011004-009
1010-SWMSP020-F	10/02/10	K1011004-014
1010-SWMSP020-U	10/02/10	K1011004-015
1010-SWMSP021-F-01MS	10/02/10	K1011004-001MS
1010-SWMSP021-F-01MSD	10/02/10	K1011004-001MSD
1010-SWMSP021-U-1MS	10/02/10	K1011004-002MS
1010-SWMSP021-U-1MSD	10/02/10	K1011004-002MSD
1010-MSP020-SD-005MS	10/02/10	K1011004-020MS
1010-MSP020-SD-005MSD	10/02/10	K1011004-020MSD

Introduction

This data review covers 12 sediment samples and 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Arsenic, Cadmium, Chromium, Cobalt, Copper, Nickel, Selenium, Silver, Uranium, Thallium, and Vanadium.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Cobalt Thallium	0.008 mg/Kg 0.004 mg/Kg	All sediment samples in SDG K1011004

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Cobalt Thallium	0.009 ug/L 0.006 ug/L	1010-MSP020-SD-005
ICB/CCB	Cobalt Thallium	0.010 ug/L 0.017 ug/L	1010-MSP021-SD-001 1010-MSP021-SD-002-1 1010-MSP021-SD-002-2 1010-MSP021-SD-003 1010-MSP021-SD-004 1010-MSP020-SD-001 1010-MSP020-SD-002 1010-MSP020-SD-003 1010-MSP020-SD-004
ICB/CCB	Silver Thallium Uranium	0.013 ug/L 0.004 ug/L 0.003 ug/L	1010-SWMSP021-F-01 1010-SWMSP021-F-2 1010-SWMSP020-F
ICB/CCB	Cadmium Cobalt	0.004 ug/L 0.005 ug/L	1010-SWMSP021-F-01 1010-SWMSP021-F-2
ICB/CCB	Arsenic Cobalt Nickel	0.08 ug/L 0.004 ug/L 0.05 ug/L	1010-SWMSP020-F

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-SWMSP021-F-2	Silver	0.010 ug/L	0.010U ug/L
1010-SWMSP020-F	Silver Thallium	0.006 ug/L 0.011 ug/L	0.006U ug/L 0.011U ug/L

No field blanks were identified in this SDG.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediments and soils with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-MSP020-SD-005MS/MSD (All sediment samples in SDG K1011004)	Cadmium	180.6 (75-125)	177.8 (75-125)	-	J+ (all detects)	A
1010-SWMSP021-F-01MS/MSD (1010-SWMSP021-F-01 1010-SWMSP021-F-2 1010-SWMSP020-F)	Selenium	-	137.5 (75-125)	-	J+ (all detects)	A

IX. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met, with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1010-MSP020-SD-005L	Arsenic Cadmium Selenium Silver	17 (≤10) 16 (≤10) 21 (≤10) 14 (≤10)	All sediment samples in SDG K1011004	J (all detects) UJ (all non-detects)	A

Chromium and Thallium results were outside the QC limits; data were not qualified since the concentration was less than 50 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011004

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011004	1010-MSP021-SD-001 1010-MSP021-SD-002-1 1010-MSP021-SD-002-2 1010-MSP021-SD-003 1010-MSP021-SD-004 1010-MSP020-SD-001 1010-MSP020-SD-002 1010-MSP020-SD-003 1010-MSP020-SD-004 1010-MSP020-SD-005	Cadmium	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
K1011004	1010-SWMSP021-F-01 1010-SWMSP021-F-2 1010-SWMSP020-F	Selenium	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
K1011004	1010-MSP021-SD-001 1010-MSP021-SD-002-1 1010-MSP021-SD-002-2 1010-MSP021-SD-003 1010-MSP021-SD-004 1010-MSP020-SD-001 1010-MSP020-SD-002 1010-MSP020-SD-003 1010-MSP020-SD-004 1010-MSP020-SD-005	Arsenic Cadmium Selenium Silver	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG K1011004

SDG	Sample	Analyte	Modified Final Concentration	A or P	Reason Code
K1011004	1010-SWMSP021-F-2	Silver	0.010U ug/L	A	10
K1011004	1010-SWMSP020-F	Silver Thallium	0.006U ug/L 0.011U ug/L	A	10

Mercury – Field Blank Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

LDC #: 24471B4b

SDG #: K1011004

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 12-13-10

Page: 1 of 1

Reviewer: CS

2nd Reviewer: W

METHOD: Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/2/10
II.	Calibration / ICP MS Tune	A/A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/water

1	1010-MSP021-SD-001 S	11	1010-SWMSP021-F-01 W	21	1010-MSP020-SD-005MS S	31	PBW
2	1010-MSP021-SD-002-1	12	1010-SWMSP021-U-1	22	1010-MSP020-SD-005MSD	32	PBS
3	1010-MSP021-SD-002-2	13	1010-SWMSP021-F-2	23		33	
4	1010-MSP021-SD-003	14	1010-SWMSP021-U-2	24		34	
5	1010-MSP021-SD-004	15	1010-SWMSP020-F	25		35	
6	1010-MSP020-SD-001	16	1010-SWMSP020-U	26		36	
7	1010-MSP020-SD-002	17	1010-SWMSP021-F-01MS	27		37	
8	1010-MSP020-SD-003	18	1010-SWMSP021-F-01MSD	28		38	
9	1010-MSP020-SD-004	19	1010-SWMSP021-U-1MS	29		39	
10	1010-MSP020-SD-005	20	1010-SWMSP021-U-1MSD	30		40	

Notes:

LDC #: 24471B4b

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: ✓

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 24471B4b

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: [illegible]

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, U
11,13,15		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, U
12,14,16		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
QC: 17,18		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, U
19,20		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
21,22		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,

Comments: Mercury by CVAA if performed

LDC #: 24471B4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: OR
2nd Reviewer: K

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 5xdil

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All Sediment

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co	0.008			0.04										
Tl	0.004			0.02										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.009	0.0225										
Tl			0.006	0.015										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-9

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.010	0.025										
Tl			0.017	0.0425										

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 11, 13, 15 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	13	15								
Ag			0.013	0.065	0.010	0.006								
Tl			0.004	0.02		0.011								
U			0.003	0.015										

LDC #: 24471B4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 2 of 2
Reviewer: 02
2nd Reviewer: L

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 5xdil

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 11, 13

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Cd			0.004	0.02										
Co			0.005	0.025										

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 15

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
As			0.08	0.4										
Co			0.004	0.02										
Ni			0.05	0.25										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471B4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of ___
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	21/22	sed	Cd	180.6	177.8		All Sediment	J+det/A (16)
	17/18	w	Se		137.5		11,13,15	J+det/A (16)

Comments:

MSD.4SW

LDC #: 24471B4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		10	Sed	As	17	All Sed	J/UJ/A (8)
				Cd	16	↓	↓
				Se	21		
				Ag	14		
		11	W	Cr	100	All water	No Qual (<50x)
				Tl	17	↓	↓
				Zn			

Comments:

SDILICPMS.wpd

LDC #: 24471B4b

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: CS
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	U	25.5	25.0	102	102	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV6	ICP/MS (Continuing calibration)	Tl	25.4	25.0	102	102	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24471846

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ mg/kg	True / D / SDR ~~(units)~~ mg/kg	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Co	50.7 ug/L	50.0 ug/L	101	101	Y
LCS	Laboratory control sample	As	1070	1000	107	107	
21	Matrix spike	Ag	(SSR-SR) 8.23	9.9	83	83	
21/22	Duplicate	Cd	55.2	55.1	0.2	0.2	
10	ICP serial dilution	Co	16.08 ug/L	17.53 ug/L	9	9	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24471B4B

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Co/As were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

Recalculation: I: Co = 100mL(5)(14.87ug/L/1000) / 1.00g = 7.435 mg/kg

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

II: As = from Raw Data = 3.374 ug/L

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	I	As	12.5	12.5	Y
		Cd	22.9	22.9	
		Co	7.440	7.435	
		Se	73.5	73.5	
		Ag	0.543	0.543	
		Tl	1.270	1.274	
		U	9.620	9.625	
			ug/L	ug/L	
	II	As	3.37	3.37	Y
		Cd	0.139	0.139	
		Cr	0.38	0.38	
		Co	0.436	0.436	
		Cu	0.94	0.94	
		Ni	15.6	15.6	
		Se	78.5	78.5	
		Tl	0.041	0.041	
		U	4.370	4.370	
		V	12.1	12.1	

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 20, 2010

Matrix: Soil/Sediment/Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011005

Sample Identification	Collection Date	Laboratory Identification
1010-MSP016-SD-001	09/30/10	K1011005-003
1010-MSP016-SD-002	09/30/10	K1011005-004
1010-MSP016-SD-003	09/30/10	K1011005-005
1010-MSP016-SD-004-1	09/30/10	K1011005-006
1010-MSP016-SD-004-2	09/30/10	K1011005-007
1010-MST053-SD-001	10/03/10	K1011005-010
1010-MST053-SD-002	10/03/10	K1011005-011
1010-MST053-RS-001	10/03/10	K1011005-012
1010-MST053-RS-002	10/03/10	K1011005-013
1010-MST275B-SD-001	10/01/10	K1011005-016
1010-MST275B-RS-001	10/01/10	K1011005-017
1010-MST275B-RS-002	10/01/10	K1011005-018
1010-MST275A-SD-001	10/01/10	K1011005-021
1010-MST275A-RS-001	10/01/10	K1011005-022
1010-MST275A-RS-002	10/01/10	K1011005-023
1010-SWMSP016-F	09/30/10	K1011005-001
1010-SWMSP016-U	09/30/10	K1011005-002
1010-SWMST053-F	10/03/10	K1011005-008
1010-SWMST053-U	10/03/10	K1011005-009
1010-SWMST275B-F	10/01/10	K1011005-014
1010-SWMST275B-U	10/01/10	K1011005-015
1010-SWMST275A-F	10/01/10	K1011005-019
1010-SWMST275A-U	10/01/10	K1011005-020
1010-SWMSP016-UMS	09/30/10	K1011005-002MS

1010-SWMSP016-UMSD	09/30/10	K1011005-002MSD
1010-MSP016-SD-003MS	09/30/10	K1011005-005MS
1010-MSP016-SD-003MSD	09/30/10	K1011005-005MSD

Introduction

This data review covers 6 soil samples, 11 sediment samples, and 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Arsenic, Cadmium, Chromium, Cobalt, Copper, Nickel, Selenium, Silver, Uranium, Thallium, and Vanadium.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Cadmium Cobalt Thallium	0.008 mg/Kg 0.008 mg/Kg 0.005 mg/Kg	All soil and sediment samples in SDG K1011005
ICB/CCB	Cobalt Thallium	0.010 mg/Kg 0.017 mg/Kg	1010-MSP016-SD-003
ICB/CCB	Cobalt Thallium	0.008 ug/L 0.007 ug/L	1010-MSP016-SD-001 1010-MSP016-SD-002 1010-MSP016-SD-004-1 1010-MSP016-SD-004-2 1010-MST053-SD-001 1010-MST053-SD-002 1010-MST053-RS-001 1010-MST053-RS-002
ICB/CCB	Cobalt Thallium	0.007 ug/L 0.006 ug/L	1010-MST275B-SD-001 1010-MST275B-RS-001 1010-MST275B-RS-002 1010-MST275A-SD-001 1010-MST275A-RS-001 1010-MST275A-RS-002
PB (prep blank)	Chromium Cobalt	0.08 ug/L 0.006 ug/L	1010-SWMSP016-F 1010-SWMST053-F 1010-SWMST275B-F 1010-SWMST275A-F
ICB/CCB	Cobalt Thallium Silver	0.004 ug/L 0.004 ug/L 0.013 ug/L	1010-SWMSP016-F 1010-SWMST053-F 1010-SWMST275B-F 1010-SWMST275A-F

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-SWMSP016-F	Thallium Silver	0.002 ug/L 0.006 ug/L	0.002U ug/L 0.006U ug/L
1010-SWMST053-F	Thallium	0.002 ug/L	0.002U ug/L
1010-SWMST275B-F	Silver	0.020 ug/L	0.020U ug/L
1010-SWMST275A-F	Silver	0.010 ug/L	0.010U ug/L

Samples 1010-ER-SD-02-U, 1010-ER-RS-01-U, and 1010-ER-SD-03-U (all from SDG K1011007) were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-SD-02-U	9/30/10	Cadmium Cobalt Copper	0.008 ug/L 0.051 ug/L 0.018 ug/L	1010-MSP016-SD-001 1010-MSP016-SD-002 1010-MSP016-SD-003 1010-MSP016-SD-004-1 1010-MSP016-SD-004-2
1010-ER-RS-01-U	10/1/10	Cadmium Cobalt Thallium Uranium	0.030 ug/L 0.096 ug/L 0.004 ug/L 0.025 ug/L	1010-MST275B-RS-001 1010-MST275B-RS-002 1010-MST275A-RS-001 1010-MST275A-RS-002
1010-ER-SD-03-U	10/3/10	Cadmium Cobalt Thallium Uranium	0.024 ug/L 0.071 ug/L 0.002 ug/L 0.020 ug/L	1010-MST053-SD-001 1010-MST053-SD-002

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediments and soils with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-MSP016-SD-003MS/MSD (1010-MSP016-SD-001 1010-MSP016-SD-002 1010-MSP016-SD-003 1010-MSP016-SD-004-1 1010-MSP016-SD-004-2 1010-MST053-SD-001 1010-MST053-SD-002 1010-MST275B-SD-001 1010-MST275A-SD-001)	Cadmium Uranium	223.0 (75-125) 128.5 (75-125)	159.7 (75-125) -	- -	J+ (all detects) J+ (all detects)	A

IX. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met, with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1010-MSP016-SD-003L	Arsenic Cadmium Selenium Silver	12 (≤10) 13 (≤10) 17 (≤10) 12 (≤10)	1010-MSP016-SD-001 1010-MSP016-SD-002 1010-MSP016-SD-003 1010-MSP016-SD-004-1 1010-MSP016-SD-004-2 1010-MST053-SD-001 1010-MST053-SD-002 1010-MST275B-SD-001 1010-MST275A-SD-001	J (all detects) UJ (all non-detects)	A

Arsenic, Nickel, and Silver results were outside the QC limits for sample 1010-SWMSP016-U; since there were no associated samples in this SDG reported, data was not qualified.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011005

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011005	1010-MSP016-SD-001 1010-MSP016-SD-002 1010-MSP016-SD-003 1010-MSP016-SD-004-1 1010-MSP016-SD-004-2 1010-MST053-SD-001 1010-MST053-SD-002 1010-MST275B-SD-001 1010-MST275A-SD-001	Cadmium Uranium	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
K1011005	1010-MSP016-SD-001 1010-MSP016-SD-002 1010-MSP016-SD-003 1010-MSP016-SD-004-1 1010-MSP016-SD-004-2 1010-MST053-SD-001 1010-MST053-SD-002 1010-MST275B-SD-001 1010-MST275A-SD-001	Arsenic Cadmium Selenium Silver	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG K1011005

SDG	Sample	Analyte	Modified Final Concentration	A or P	Reason Code
K1011005	1010-SWMSP016-F	Thallium Silver	0.002U ug/L 0.006U ug/L	A	10
K1011005	1010-SWMST053-F	Thallium	0.002U ug/L	A	10
K1011005	1010-SWMST275B-F	Silver	0.020U ug/L	A	10
K1011005	1010-SWMST275A-F	Silver	0.010U ug/L	A	10

Mercury – Field Blank Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

LDC #: 24471C4b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

SDG #: K1011005

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/30-10/3/10
II.	Calibration / ICPMS Tune	A/A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/P
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB: 1010-ERT-SD-02-U, 1010-ERT-RS-01-U, 1010-ERT-SD-03-U (SDG: K1011007)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil/water

1	1010-MSP016-SD-001	sed	11	1010-MST275B-RS-001	S	21	1010-SWMST275B-U	W	31	PBS
2	1010-MSP016-SD-002		12	1010-MST275B-RS-002		22	1010-SWMST275A-F		32	PBW
3	1010-MSP016-SD-003		13	1010-MST275A-SD-001	sed	23	1010-SWMST275A-U		33	
4	1010-MSP016-SD-004-1		14	1010-MST275A-RS-001	soil	24	1010-SWMSP016-UMS		34	
5	1010-MSP016-SD-004-2		15	1010-MST275A-RS-002		25	1010-SWMSP016-UMSD		35	
6	1010-MST053-SD-001		16	1010-SWMSP016-F	W	26	1010-MSP016-SD-003MS	sed	36	
7	1010-MST053-SD-002		17	1010-SWMSP016-U		27	1010-MSP016-SD-003MSD		37	
8	1010-MST053-RS-001	S	18	1010-SWMST053-F		28			38	
9	1010-MST053-RS-002		19	1010-SWMST053-U		29			39	
10	1010-MST275B-SD-001	sed	20	1010-SWMST275B-F		30			40	

Notes:

LDC #: 24471C4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-15		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
16,18,20,22		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, U
17,19,21,23		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
QC: 24,25		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, U
26,27		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,

Comments: Mercury by CVAA if performed

LDC #: 24471C4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: SR
2nd Reviewer:

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: 100x x 5xdil
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: All Sediment + Soil

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Cd	0.008			0.04										
Co	0.008			0.04										
Tl	0.005			0.025										

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 3

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.010	0.025										
Tl			0.017	0.0425										

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1, 2, 4-9

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.008	0.02										
Tl			0.007	0.0175										

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 10-15

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.007	0.0175										
Tl			0.006	0.015										

LDC #: 24471C4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: 2nd
2nd Reviewer: 2

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 5xdil
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 16, 18, 20, 22 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	16	18	20	22						
Cr		0.08		0.4										
Co		0.006	0.004	0.03										
Tl			0.004	0.02	0.002	0.002								
Ag			0.013	0.065	0.006		0.020	0.010						

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471C4b

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 9/30/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1-5

Analyte	Blank ID	Sample Identification										
	1010-ER-SD-02-U	Action Level	No Qualifiers									
Cd	0.008	0.0008										
Co	0.051	0.0051										
U	0.018	0.0018										

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/1/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 11, 12, 14, 15

Analyte	Blank ID	Sample Identification										
	1010-ER-RS-01-U	Action Level	No Qualifiers									
Cd	0.030	0.003										
Co	0.096	0.0096										
Tl	0.004	0.0004										
U	0.025	0.0025										

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/3/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 6, 7

Analyte	Blank ID	Sample Identification										
	1010-ER-SD-03-U	Action Level	No Qualifiers									
Cd	0.024	0.0024										
Co	0.071	0.0071										
Tl	0.002	0.0002										
U	0.020	0.002										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24471C4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: CR
2nd Reviewer: ~

METHOD: ~~Inorganics~~ Metals, EPA Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A	Was a matrix spike analyzed for each matrix in this SDG?
Y (N) N/A	Were matrix spike percent recoveries (%R) within the control limits of (75-125)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.
(Y) N N/A	Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N (N/A)	Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	~~20/21~~	sed	Cd	223.0	159.7		1-7,10,13	J det / A (6)
	26/27		↓	128.5			↓	↓

Comments:

MSD.6

LDC #: 24471C4a

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of
Reviewer: OR
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or ~~>100X the MDL (ICP/MS)~~, was a serial dilution analyzed?

Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?

Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		3	Sed	As	12	1-7, 10, 13	J/UJ/A (18)
				Cd	13	↓	↓
				Se	17		
				Ag	12		
		17	W	As	16	None	No Qual (Not reported)
				Ni	14	↓	↓
				Ag	27		

Comments:

SDILICPMS.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment/Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011006

Sample Identification	Collection Date	Laboratory Identification
1010-MST277A-SD-001	10/03/10	K1011006-001
1010-MST277A-RS-001	10/03/10	K1011006-002
1010-MST277A-RS-002	10/03/10	K1011006-003
1010-MST277B-SD-001	10/03/10	K1011006-004
1010-MST277B-RS-001	10/03/10	K1011006-005
1010-MST277B-RS-002	10/03/10	K1011006-006
1010-MST066-SD-001-1	10/03/10	K1011006-011
1010-MST066-SD-001-2	10/03/10	K1011006-012
1010-MST066-RS-001-1	10/03/10	K1011006-013
1010-MST066-RS-001-2	10/03/10	K1011006-014
1010-MST066-RS-002	10/03/10	K1011006-015
1010-SWMST066-F-1	10/03/10	K1011006-007
1010-SWMST066-U-1	10/03/10	K1011006-008
1010-SWMST066-F-2	10/03/10	K1011006-009
1010-SWMST066-U-2	10/03/10	K1011006-010
1010-MST277A-SD-001MS	10/03/10	K1011006-001MS
1010-MST277A-SD-001MSD	10/03/10	K1011006-001MSD

Introduction

This data review covers 7 soil samples, 6 sediment samples and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Arsenic, Cadmium, Chromium, Cobalt, Copper, Nickel, Selenium, Silver, Uranium, Thallium, Vanadium, and Zinc.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Cobalt	0.002 mg/Kg	All soil and sediment samples in SDG K1011006

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Cobalt	0.007 ug/L	All soil and sediment samples in SDG K1011006
ICB/CCB	Thallium	0.006 ug/L	1010-MST277A-SD-001 1010-MST277A-RS-001 1010-MST277A-RS-002 1010-MST277B-SD-001 1010-MST277B-RS-001
ICB/CCB	Thallium	0.007 ug/L	1010-MST277B-RS-002 1010-MST066-SD-001-1 1010-MST066-SD-001-2 1010-MST066-RS-001-1 1010-MST066-RS-001-2 1010-MST066-RS-002
ICB/CCB	Cobalt Silver Thallium	0.004 ug/L 0.013 ug/L 0.004 ug/L	1010-SWMST066-F-1 1010-SWMST066-F-2

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified.

Sample 1010-ER-SD-03-U (from SDG K1011007) was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-SD-03-U	10/3/10	Cadmium Cobalt Thallium Uranium	0.024 ug/L 0.071 ug/L 0.002 ug/L 0.020 ug/L	1010-MST277A-SD-001 1010-MST277B-SD-001 1010-MST066-SD-001-1 1010-MST066-SD-001-2

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediments and soils with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-SWMSP021-F-01MS/MSD (1010-SWMST066-U-1 1010-SWMST066-U-2)	Selenium	-	137.5 (75-125)	-	J+ (all detects)	A

IX. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met, with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1010-MST277A-SD-001L	Arsenic Cadmium	15 (≤10) 12 (≤10)	All sediment samples in SDG K1011006	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

Chromium, Molybdenum, Selenium, and Thallium results were outside the QC limits; data were not qualified since the concentration was less than 50 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011006

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011006	1010-SWMST066-U-1 1010-SWMST066-U-2	Selenium	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R)	16
K1011006	1010-MST277A-SD-001 1010-MST277B-SD-001 1010-MST066-SD-001-1 1010-MST066-SD-001-2	Arsenic Cadmium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

Mercury – Field Blank Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

LDC #: 24471D4b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-3-10

SDG #: K1011006

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: CR

2nd Reviewer: ✓

METHOD: Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/3/10
II.	Calibration / ICPMS Tune	A/A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB=100-ER-SD-03-U (K1011007)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil/water

1	1010-MST277A-SD-001 sed	11	1010-MST066-RS-002 S	21		31	PBW
2	1010-MST277A-RS-001 S	12	1010-SWMST066-F-1 W	22		32	PBS
3	1010-MST277A-RS-002 ↓	13	1010-SWMST066-U-1 ↓	23		33	
4	1010-MST277B-SD-001 sed	14	1010-SWMST066-F-2 ↓	24		34	
5	1010-MST277B-RS-001 S	15	1010-SWMST066-U-2 ↓	25		35	
6	1010-MST277B-RS-002 ↓	16	1010-MST277A-SD-001MS sed	26		36	
7	1010-MST066-SD-001-1 sed	17	1010-MST277A-SD-001MSD ↓	27		37	
8	1010-MST066-SD-001-2 ↓	18		28		38	
9	1010-MST066-RS-001-1 S	19		29		39	
10	1010-MST066-RS-001-2 ↓	20		30		40	

Notes:

LDC #: 24471D4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-11		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
12,14		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
13,15		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
Q:16,7		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,

Comments: Mercury by CVAA if performed

LDC #: 24471D4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: GR
2nd Reviewer: L

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 5xdil

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All Sediment and Soil

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co	0.002		0.007	0.0175										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-5

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Tl			0.006	0.015										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 6-11

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Tl			0.007	0.0175										

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 12, 14

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co			0.004	0.02										
Ag			0.013	0.065										
Tl			0.004	0.02										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471D4b

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/3/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1, 4, 7, 8

Analyte	Blank ID	Sample Identification										
	1010-ER-SD-03-U	Action Level	No Qualifiers									
Cd	0.024	0.0024										
Co	0.071	0.0071										
Tl	0.002	0.0002										
U	0.020	0.002										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24471O4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: CR
2nd Reviewer: [signature]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a matrix spike analyzed for each matrix in this SDG?
Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of (75-125)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.
(Y) N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:
Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	1010-SWMSP021-F-01 (K1011004)	W	Se		137.5		~~All water~~ CR 13,15	J+dets/A (16)

Comments:

LDC #: 24471D4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: QR
2nd Reviewer: h

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or ~~>100X the MDL (ICP/MS)~~, was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		1	Sed	As	15	All Sediment	J/UJ/A (18)
				Cd	12		
				Mo	100		No Qual (<50xMDL)
				Se	21		
		1010-SWMSP021-F-01 (R1011004)	W	Cr	100	~~All water 1,3,4~~	No Qual (<50xMDL)
				Tl	17		

Comments:

SDILICPMS.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 13, 2010

Matrix: Soil/Sediment/Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011007

Sample Identification	Collection Date	Laboratory Identification
1010-MST067-SD-001-1	10/03/10	K1011007-001
1010-MST067-RS-001-1	10/03/10	K1011007-002
1010-MST067-RS-002	10/03/10	K1011007-003
1010-MST131-SD-001	10/02/10	K1011007-006
1010-MST131-SD-002	10/02/10	K1011007-007
1010-MST131-RS-001	10/02/10	K1011007-008
1010-MST131-RS-002	10/02/10	K1011007-009
1010-MST274A-SD-001	10/02/10	K1011007-012
1010-MST274A-RS-001	10/02/10	K1011007-013
1010-MST274A-RS-002	10/02/10	K1011007-014
1010-MST274B-SD-001	10/02/10	K1011007-017
1010-MST274B-RS-001	10/02/10	K1011007-018
1010-MST274B-RS-002	10/02/10	K1011007-019
1010-SWMST131-F	10/02/10	K1011007-004
1010-SWMST131-U	10/02/10	K1011007-005
1010-SWMST274A-F	10/01/10	K1011007-010
1010-SWMST274A-U	10/01/10	K1011007-011
1010-SWMST274B-F	10/01/10	K1011007-015
1010-SWMST274B-U	10/01/10	K1011007-016
1010-ER-SD-02-U	9/30/10	K1011007-020
1010-ER-RS-01-U	10/01/10	K1011007-021
1010-ER-RS-02-U	10/02/10	K1011007-022
1010-ER-SD-03-U	10/03/10	K1011007-023

1010-MST067-SD-001-1MS	10/03/10	K1011007-001MS
1010-MST067-SD-001-1MSD	10/03/10	K1011007-001MSD

Introduction

This data review covers 8 soil samples, 7 sediment samples, and 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Arsenic, Cadmium, Chromium, Cobalt, Copper, Nickel, Selenium, Silver, Uranium, Thallium, and Vanadium.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Chromium Cobalt	0.08 ug/L 0.006 ug/L	1010-SWMST131-F 1010-SWMST274A-F 1010-SWMST274B-F 1010-ER-SD-02-U 1010-ER-RS-01-U 1010-ER-RS-02-U 1010-ER-SD-03-U
ICB/CCB	Chromium Cobalt Silver Thallium	0.04 ug/L 0.005 ug/L 0.013 ug/L 0.004 ug/L	1010-SWMST131-F 1010-SWMST274A-F 1010-SWMST274B-F 1010-ER-SD-02-U 1010-ER-RS-01-U 1010-ER-RS-02-U 1010-ER-SD-03-U
PB (prep blank)	Cobalt	0.004 mg/Kg	All soil and sediment samples in SDG K1011007
ICB/CCB	Cobalt	0.008 ug/L	All soil and sediment samples in SDG K1011007
ICB/CCB	Thallium	0.007 ug/L	1010-MST067-SD-001-1 1010-MST067-RS-001-1 1010-MST067-RS-002 1010-MST131-SD-001 1010-MST131-SD-002
ICB/CCB	Thallium	0.006 ug/L	1010-MST131-RS-001 1010-MST131-RS-002 1010-MST274A-SD-001 1010-MST274A-RS-001 1010-MST274A-RS-002 1010-MST274B-SD-001 1010-MST274B-RS-001 1010-MST274B-RS-002

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-SWMST131-F	Thallium	0.005 ug/L	0.005U ug/L
1010-SWMST274A-F	Thallium	0.004 ug/L	0.004U ug/L
1010-SWMST274B-F	Chromium Thallium	0.39 ug/L 0.004 ug/L	0.39J+ ug/L 0.004U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-ER-RS-01-U	Thallium	0.004 ug/L	0.004U ug/L
1010-ER-SD-03-U	Thallium	0.002 ug/L	0.002U ug/L

Samples 1010-ER-SD-02-U, 1010-ER-RS-01-U, 1010-ER-RS-02-U, and 1010-ER-SD-03-U were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-SD-02-U	9/30/10	Cadmium Chromium Cobalt Copper Nickel Uranium Vanadium	0.008 ug/L 0.43 ug/L 0.051 ug/L 0.68 ug/L 0.09 ug/L 0.018 ug/L 0.09 ug/L	No associated samples in this SDG
1010-ER-RS-01-U	10/1/10	Cadmium Chromium Cobalt Copper Nickel Thallium Uranium Vanadium	0.030 ug/L 0.59 ug/L 0.096 ug/L 1.04 ug/L 0.96 ug/L 0.004 ug/L 0.025 ug/L 0.23 ug/L	No associated samples in this SDG
1010-ER-RS-02-U	10/2/10	Cadmium Chromium Cobalt Copper Nickel Uranium Vanadium	0.008 ug/L 0.44 ug/L 0.070 ug/L 0.78 ug/L 2.09 ug/L 0.009 ug/L 0.07 ug/L	1010-MST131-RS-001 1010-MST131-RS-002 1010-MST274A-RS-001 1010-MST274A-RS-002 1010-MST274B-RS-001 1010-MST274B-RS-002
1010-ER-SD-03-U	10/3/10	Cadmium Chromium Cobalt Copper Nickel Thallium Uranium Vanadium	0.024 ug/L 0.52 ug/L 0.071 ug/L 0.79 ug/L 0.47 ug/L 0.002 ug/L 0.020 ug/L 0.15 ug/L	1010-MST067-SD-001-1

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediments and soils with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-MST067-SD-001-1MS/MSD (All sediment samples in SDG K1011007)	Cadmium Selenium	183 (75-125) 139 (75-125)	186.0 (75-125) 141.0 (75-125)	- -	J+ (all detects) J+ (all detects)	A

IX. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met, with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1010-SWMP016-UL	Nickel	14 (≤10)	1010-SWMST131-F 1010-SWMST274A-F 1010-SWMST274B-F 1010-ER-SD-02-U 1010-ER-RS-01-U 1010-ER-RS-02-U 1010-ER-SD-03-U	J (all detects) UJ (all non-detects)	A
1010-MST067-SD-001-1L	Cadmium Selenium	11 (≤10) 13 (≤10)	All sediment samples in SDG K1011007	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011007

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011007	1010-MST067-SD-001-1 1010-MST131-SD-001 1010-MST131-SD-002 1010-MST274A-SD-001 1010-MST274B-SD-001	Cadmium Selenium	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
K1011007	1010-SWMST131-F 1010-SWMST274A-F 1010-SWMST274B-F 1010-ER-SD-02-U 1010-ER-RS-01-U 1010-ER-RS-02-U 1010-ER-SD-03-U	Nickel	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18
K1011007	1010-MST067-SD-001-1 1010-MST131-SD-001 1010-MST131-SD-002 1010-MST274A-SD-001 1010-MST274B-SD-001	Cadmium Selenium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG K1011007

SDG	Sample	Analyte	Modified Final Concentration	A or P	Reason Code
K1011007	1010-SWMST131-F	Thallium	0.005U ug/L	A	10
K1011007	1010-SWMST274A-F	Thallium	0.004U ug/L	A	10
K1011007	1010-SWMST274B-F	Chromium Thallium	0.39J+ ug/L 0.004U ug/L	A	10
K1011007	1010-ER-RS-01-U	Thallium	0.004U ug/L	A	10
K1011007	1010-ER-SD-03-U	Thallium	0.002U ug/L	A	10

Mercury – Field Blank Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

LDC #: 24471E4b

SDG #: K1011007

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-1-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

METHOD: Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: ~~10/13/10~~ 9/30 - 10/3/10
II.	Calibration / ICP MS Tune	A/A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB = 20, 21, 22, 23

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil/water

1	1010-MST067-SD-001-1 sed	11	1010-MST274B-SD-001 sed	21	1010-ER-RS-01-U W	31	PBW
2	1010-MST067-RS-001-1 S	12	1010-MST274B-RS-001 S	22	1010-ER-RS-02-U	32	PBS
3	1010-MST067-RS-002 S	13	1010-MST274B-RS-002	23	1010-ER-SD-03-U	33	
4	1010-MST131-SD-001 sed	14	1010-SWMST131-F W	24	1010-MST067-SD-001-1MS sed	34	
5	1010-MST131-SD-002	15	1010-SWMST131-U	25	1010-MST067-SD-001-1MSD	35	
6	1010-MST131-RS-001 S	16	1010-SWMST274A-F	26		36	
7	1010-MST131-RS-002 S	17	1010-SWMST274A-U	27		37	
8	1010-MST274A-SD-001 sed	18	1010-SWMST274B-F	28		38	
9	1010-MST274A-RS-001 S	19	1010-SWMST274B-U	29		39	
10	1010-MST274A-RS-002 S	20	1010-ER-SD-02-U	30		40	

Notes:

LDC #: 24471B4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
14,16,18		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
15,17,19		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
20-23		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
1-13		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
2C:24,25		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,

Comments: Mercury by CVAA if performed

LDC #: 24471E4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer:
2nd Reviewer:

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 5xdil

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 14, 16, 18, 20-23 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	14	16	18	21	23					
Cr		0.08	0.04	0.4			0.39 J+							
Co		0.006	0.005	0.03										
Ag			0.013	0.065										
Tl			0.004	0.02	0.005	0.004	0.004	0.004	0.002					

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All Sediment and Soil

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co	0.004		0.008	0.02										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-5

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Tl			0.007	0.0175										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 6-13

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Tl			0.006	0.015										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471E4b

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 3
Reviewer: CR
2nd Reviewer: h

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 9/30/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Analyte	Blank ID	Sample Identification										
	20	Action Level	No Qualifiers									
Cd	0.008	0.0008										
Cr	0.43	0.043										
Co	0.051	0.0051										
Cu	0.68	0.068										
Ni	0.09	0.009										
U	0.018	0.0018										
V	0.09	0.009										

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/1/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Analyte	Blank ID	Sample Identification										
	21	Action Level	No Qualifiers									
Cd	0.030	0.003										
Cr	0.59	0.059										
Co	0.096	0.0096										
Cu	1.04	0.104										
Ni	0.96	0.096										
Tl	0.004	0.0004										
U	0.025	0.0025										
V	0.23	0.023										

LDC #: 24471E4b

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 2 of 2
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/2/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 6, 7, 9, 10, 12, 13

Analyte	Blank ID	Sample Identification										
	22	Action Level	No Qualifiers									
Cd	0.008	0.0008										
Cr	0.44	0.044										
Co	0.070	0.007										
Cu	0.78	0.078										
Ni	2.09	0.209										
U	0.009	0.0009										
V	0.07	0.007										

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/3/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1

Analyte	Blank ID	Sample Identification										
	23	Action Level	No Qualifiers									
Cd	0.024	0.0024										
Cr	0.52	0.052										
Co	0.071	0.0071										
Cu	0.79	0.079										
Ni	0.47	0.047										
Tl	0.002	0.0002										
U	0.020	0.002										
V	0.15	0.015										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24471E4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	J, UJ/A Qualifications
	24125	sed	Cd	183	186.0		All Sed	~~J~~ ~~UJ/A~~ (16)
			Se	139	141.0		↓	↓ ↓

Comments:

MSD.4SW

LDC #: 24471E4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A — If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y (N) N/A — Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A — Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:
Y N (N/A) — Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		1010-SWMSP016-U	W	Ni	14	~~All Water~~	J /UJ/A (18)
		SDG: K1011005)				14,16,18, 20-23	
		1	Sed	Cd	11	All Sediment	J /UJ /A (18)
				Se	13	↓	↓

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011129

Sample Identification	Collection Date	Laboratory Identification
1010-MST093A-SD-001-1	10/04/10	K1011129-001
1010-MST093A-SD-001-2	10/04/10	K1011129-002
1010-MST093A-RS-001-1	10/04/10	K1011129-003
1010-MST093A-RS-001-2	10/04/10	K1011129-004
1010-MST093A-RS-002-1	10/04/10	K1011129-005
1010-MST093A-RS-002-2	10/04/10	K1011129-006
1010-MST093B-SD-001	10/04/10	K1011129-007
1010-MST093B-RS-001	10/04/10	K1011129-008
1010-MST093B-RS-002	10/04/10	K1011129-009
1010-MST095-SD-001	10/04/10	K1011129-010
1010-MST095-RS-001	10/04/10	K1011129-011
1010-MST095-RS-002	10/04/10	K1011129-012
1010-MST089-SD-001	10/05/10	K1011129-013
1010-MST089-RS-001	10/05/10	K1011129-014
1010-MST089-RS-002	10/05/10	K1011129-015
1010-MST092-SD-001	10/04/10	K1011129-016
1010-MST092-RS-001	10/04/10	K1011129-017
1010-MST092-RS-002	10/04/10	K1011129-018
1010-MST092-RS-001MS	10/04/10	K1011129-017MS
1010-MST092-RS-001MSD	10/04/10	K1011129-017MSD

Introduction

This data review covers 14 soil samples and 6 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Arsenic, Cadmium, Cobalt, Selenium, Silver, Uranium, and Thallium.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Cadmium Cobalt	0.004 mg/Kg 0.002 mg/Kg	All samples in SDG K1011129

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Cobalt	0.003 ug/L	All samples in SDG K1011129
ICB/CCB	Thallium	0.010 ug/L	1010-MST095-RS-002 1010-MST089-SD-001 1010-MST089-RS-001 1010-MST089-RS-002 1010-MST092-SD-001 1010-MST092-RS-002
ICB/CCB	Thallium	0.008 ug/L	1010-MST093A-SD-001-1 1010-MST093A-SD-001-2 1010-MST093A-RS-001-1 1010-MST093A-RS-001-2 1010-MST093A-RS-002-1 1010-MST093A-RS-002-2 1010-MST093B-SD-001 1010-MST093B-RS-001 1010-MST093B-RS-002 1010-MST095-SD-001 1010-MST095-RS-001 1010-MST092-RS-001

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified.

Samples 1010-ER-RS-03-U and 1010-ER-RS-04-U (both from SDG K1011130) were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-RS-03-U	10/4/10	Cadmium Cobalt Silver Thallium Uranium	0.008 ug/L 0.071 ug/L 0.020 ug/L 0.004 ug/L 0.011 ug/L	1010-MST093A-RS-001-1 1010-MST093A-RS-001-2 1010-MST093A-RS-002-1 1010-MST093A-RS-002-2 1010-MST093B-RS-001 1010-MST093B-RS-002 1010-MST095-RS-001 1010-MST095-RS-002 1010-MST092-RS-001 1010-MST092-RS-002
1010-ER-RS-04-U	10/5/10	Cadmium Cobalt Silver Thallium Uranium	0.012 ug/L 0.132 ug/L 0.008 ug/L 0.002 ug/L 0.018 ug/L	1010-MST089-RS-001 1010-MST089-RS-002

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediments and soils.

IX. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met, with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1010-MST092-RS-001L	Cobalt	33 (≤10)	All soil samples in SDG K1011129	J (all detects) UJ (all non-detects)	A

Arsenic and Selenium results were outside the QC limits; data were not qualified since the concentration was less than 50 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011129

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011129	1010-MST093A-RS-001-2 1010-MST093A-RS-002-1 1010-MST093A-RS-002-2 1010-MST093B-RS-001 1010-MST093B-RS-002 1010-MST095-RS-001 1010-MST095-RS-002 1010-MST089-RS-001 1010-MST089-RS-002 1010-MST092-RS-001 1010-MST092-RS-002	Cobalt	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

Mercury – Field Blank Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

LDC #: 24471F4b

SDG #: K1011129

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/4-5/10
II.	Calibration / ICP MS Tune	A/A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB=1010-ER-RS-03-U, 1010-ER-RS-04-U (SDG: K1011130)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil

1	1010-MST093A-SD-001-1 sed	11	1010-MST095-RS-001 S	21		31	PB3S
2	1010-MST093A-SD-001-2 ↓	12	1010-MST095-RS-002 ↓	22		32	
3	1010-MST093A-RS-001-1 S	13	1010-MST089-SD-001 sed	23		33	
4	1010-MST093A-RS-001-2	14	1010-MST089-RS-001 S	24		34	
5	1010-MST093A-RS-002-1	15	1010-MST089-RS-002 ↓	25		35	
6	1010-MST093A-RS-002-2 ↓	16	1010-MST092-SD-001 sed	26		36	
7	1010-MST093B-SD-001 sed	17	1010-MST092-RS-001 S	27		37	
8	1010-MST093B-RS-001 S	18	1010-MST092-RS-002	28		38	
9	1010-MST093B-RS-002 ↓	19	1010-MST092-RS-001MS	29		39	
10	1010-MST095-SD-001 sed	20	1010-MST092-RS-001MSD ↓	30		40	

Notes:

LDC #: 24471F4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-18		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
QC19,20		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,

Comments: Mercury by CVAA if performed

LDC #: 24471F4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: CG
2nd Reviewer:

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 100x x 5xdil
Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Cd	0.004			0.02										
Co	0.002		0.003	0.01										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 12-16, 18 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Tl			0.010	0.025										

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-11, 17 Reason Code: 10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Tl			0.008	0.02										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471F4b

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: ( ) of
Reviewer: CR
2nd Reviewer: h

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/4/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 3-6, 8, 9, 11, 12, 17, 18

Analyte	Blank ID	Sample Identification										
	1010-ER-RS-03-U	Action Level										
Cd	0.008	0.0008										
Co	0.071	0.0071										
Ag	0.020	0.002										
Tl	0.004	0.0004										
U	0.011	0.0011										

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/5/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 14, 15

Analyte	Blank ID	Sample Identification										
	1010-ER-RS-04-U	Action Level	No Qualifiers									
Cd	0.012	0.0012										
Co	0.132	0.0132										
Ag	0.008	0.0008										
Tl	0.002	0.0002										
U	0.018	0.0018										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24471F4a

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		17	Soil	Co	33	All Soil	J/UJ/A (18)
			1	As	28	↓	NO QUAL (<50xMDL)
				Se	24		

Comments:

SDILICPMS.wpd

Report# 24471G4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment/Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011130

Sample Identification	Collection Date	Laboratory Identification
1010-MST272-SD-001	10/05/10	K1011130-001
1010-MST272-RS-001	10/05/10	K1011130-002
1010-MST272-RS-002	10/05/10	K1011130-003
1010-MST273-SD-001	10/05/10	K1011130-004
1010-MST273-RS-001	10/05/10	K1011130-005
1010-MST273-RS-002	10/05/10	K1011130-006
1010-ER-RS-03-U	10/04/10	K1011130-007
1010-ER-RS-04-U	10/05/10	K1011130-008
1010-B -SW-01	10/05/10	K1011130-009
1010-MST272-SD-001MS	10/05/10	K1011130-001MS
1010-MST272-SD-001MSD	10/05/10	K1011130-001MSD
1010-B -SW-01MS	10/05/10	K1011130-009MS
1010-B -SW-01MSD	10/05/10	K1011130-009MSD

Introduction

This data review covers 4 soil samples, 4 sediment samples and 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Arsenic, Cadmium, Chromium, Cobalt, Copper, Nickel, Selenium, Silver, Uranium, Thallium, and Vanadium.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Cobalt Thallium	0.005 mg/Kg 0.006 mg/Kg	All soil and sediment samples in SDG K1011130

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Cobalt Cadmium Thallium Uranium	0.012 ug/L 0.012 ug/L 0.017 ug/L 0.017 ug/L	All soil and sediment samples in SDG K1011130
PB (prep blank)	Chromium Vanadium	0.10 ug/L 0.03 ug/L	All water samples in SDG K1011130
ICB/CCB	Cadmium Cobalt Silver Thallium Uranium	0.004 ug/L 0.005 ug/L 0.019 ug/L 0.004 ug/L 0.003 ug/L	All water samples in SDG K1011130

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1010-ER-RS-03-U	Cadmium Silver Thallium Uranium Vanadium	0.008 ug/L 0.020 ug/L 0.004 ug/L 0.011 ug/L 0.06 ug/L	0.008U ug/L 0.020U ug/L 0.004U ug/L 0.011U ug/L 0.06U ug/L
1010-ER-RS-04-U	Chromium Cadmium Silver Thallium Vanadium	0.25 ug/L 0.012 ug/L 0.008 ug/L 0.002 ug/L 0.13 ug/L	0.25J+ ug/L 0.012U ug/L 0.008U ug/L 0.002U ug/L 0.13U ug/L
1010-B -SW-01	Chromium Silver Uranium Vanadium	0.30 ug/L 0.007 ug/L 0.008 ug/L 0.08 ug/L	0.30J+ ug/L 0.007U ug/L 0.008U ug/L 0.08U ug/L

Samples 1010-ER-RS-03-U and w1010-ER-RS-04-U were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-ER-RS-03-U	10/4/10	Cadmium Chromium Cobalt Copper Nickel Silver Thallium Uranium Zinc	0.008 ug/L 0.71 ug/L 0.071 ug/L 1.09 ug/L 0.34 ug/L 0.020 ug/L 0.004 ug/L 0.011 ug/L 0.06 ug/L	No associated samples in this SDG
1010-B -SW-01	10/5/10	Cadmium Chromium Cobalt Copper Nickel Silver Thallium Uranium Vanadium	0.012 ug/L 0.25 ug/L 0.132 ug/L 0.94 ug/L 0.19 ug/L 0.008 ug/L 0.002 ug/L 0.018 ug/L 0.13 ug/L	All soil samples in SDG K1011130

Sample 1010-B-SW-01 was identified as a source blank. No metal contaminants were found in this blank with the following exceptions:

Source Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1010-B-SW-01	10/5/10	Chromium Cobalt Copper Nickel Silver Uranium Vanadium	0.30 ug/L 0.066 ug/L 0.75 ug/L 0.04 ug/L 0.007 ug/L 0.008 ug/L 0.08 ug/L	No associated samples in this SDG

Sample concentrations were compared to concentrations detected in the field blanks. No samples were qualified.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples and standard reference material samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediments and soils.

IX. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met, with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1010-MST272-SD-001L	Arsenic Cadmium Cobalt	33 (≤10) 14 (≤10) 29 (≤10)	All sediment samples in SDG K1011130	J (all detects) UJ (all non-detects)	A

Cobalt, Selenium, Nickel, Silver, Uranium, and Vanadium results were outside the QC limits; data were not qualified since the concentration was less than 50 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011130

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011130	1010-MST272-SD-001 1010-MST273-SD-001	Arsenic Cadmium Cobalt	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG K1011130

SDG	Sample	Analyte	Modified Final Concentration	A or P	Reason Code
K1011130	1010-ER-RS-03-U	Cadmium Silver Thallium Uranium	0.008U ug/L 0.020U ug/L 0.004U ug/L 0.011U ug/L	A	10
K1011130	1010-ER-RS-03-U	Vanadium	0.06U ug/L	A	11
K1011130	1010-ER-RS-04-U	Cadmium Silver Thallium	0.012U ug/L 0.008U ug/L 0.002U ug/L	A	10
K1011130	1010-ER-RS-04-U	Chromium Vanadium	0.25J+ ug/L 0.13U ug/L	A	11
K1011130	1010-B -SW-01	Silver Uranium	0.007U ug/L 0.008U ug/L	A	10
K1011130	1010-B -SW-01	Chromium Vanadium	0.30J+ ug/L 0.08U ug/L	A	11

Mercury – Field Blank Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

LDC #: 24471G4b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

SDG #: K1011130

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: OR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/5/10, 10/4/10
II.	Calibration / ICP MS Tune	A/A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB = 7, 8, Source Blk = 9

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil/water

1	1010-MST272-SD-001 sed	11	1010-MST272-SD-001MSD sed	21	PBW	31	
2	1010-MST272-RS-001 S	12	1010-B -SW-01MS W	22	PBS	32	
3	1010-MST272-RS-002 ↓	13	1010-B -SW-01MSD ↓	23		33	
4	1010-MST273-SD-001 sed	14		24		34	
5	1010-MST273-RS-001 S	15		25		35	
6	1010-MST273-RS-002 ↓	16		26		36	
7	1010-ER-RS-03-U W	17		27		37	
8	1010-ER-RS-04-U	18		28		38	
9	1010-B -SW-01 ↓	19		29		39	
10	1010-MST272-SD-001MS sed	20		30		40	

Notes:

LDC #: 24471G4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-6		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
7-9		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
QC: 10,11		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
12,13		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, U
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-,

Comments: Mercury by CVAA if performed

LDC #: 24471G4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: 100x x 5xdil
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: All Sediment and Soil

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Co	0.005		0.012	0.03										
Cd			0.012	0.03										
Tl	0.006		0.017	0.0425										
U			0.017	0.0425										

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All Water Reason Code: Cr and V = 11. Cd, Ag, Tl, U=10

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	7	8	9							
Cr		0.10		0.5		0.25 J+	0.30 J+							
Cd			0.004	0.02	0.008	0.012								
Co			0.005	0.025										
Ag			0.019	0.095	0.020	0.008	0.007							
Tl			0.004	0.02	0.004	0.002								
U			0.003	0.015	0.011		0.008							
V		0.03		0.15	0.06	0.13	0.08							

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471G4b

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/4/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Analyte	Blank ID	Sample Identification											
	7	Action Level											
Cd	0.008	0.0008											
Cr	0.71	0.071											
Co	0.071	0.0071											
Cu	1.09	0.109											
Ni	0.34	0.034											
Ag	0.020	0.002											
Tl	0.004	0.0004											
U	0.011	0.0011											
V	0.06	0.006											

LDC #: 24471G4b

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 10/5/10 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All ~~Sediments~~ Soil

Analyte	Blank ID	Sample Identification										
	8	Action Level	No Qualifiers									
Cd	0.012	0.0012										
Cr	0.25	0.025										
Co	0.132	0.0132										
Cu	0.94	0.094										
Ni	0.19	0.019										
Ag	0.008	0.0008										
Tl	0.002	0.0002										
U	0.018	0.0018										
V	0.13	0.013										

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 10/5/10 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Source Blk Associated Samples: None

Analyte	Blank ID	Sample Identification										
	9	Action Level										
Cr	0.30	0.3										
Co	0.066	0.066										
Cu	0.75	0.75										
Ni	0.04	0.04										
Ag	0.007	0.007										
U	0.008	0.008										
V	0.08	0.08										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 24471G4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		1	sed	As	33	All Sediment	J/UJ/A (18)
				Cd	14		
				Co	29		
				Se	29		No Qual (<50xMDL)
		9	w	Ni	100	All Water	No Qual (<50x MDL
				As	100		
				U			
				V			

Comments:

SDILICPMS.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Sediment/Water

Parameters: Mercury by CVAA EPA Method 7471A and 7470A

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1010867

Sample Identification	Collection Date	Laboratory Identification
1010-MSP018-SD-002	09/29/10	K1010867-004
1010-MSP018-SD-003	09/29/10	K1010867-005
1010-MSP017-SD-001	09/29/10	K1010867-008
1010-MSP017-SD-002	09/29/10	K1010867-009
1010-MSP017-SD-003	09/29/10	K1010867-010
1010-MSP017-SD-004	09/29/10	K1010867-011
1010-MSP031-SD-001-1	09/28/10	K1010867-012
1010-MSP031-SD-001-2	09/28/10	K1010867-013
1010-MSP031-SD-002	09/28/10	K1010867-014
1010-MSP031-SD-003	09/28/10	K1010867-015
1010-MSP015-SD-001	09/30/10	K1010867-018
1010-MSP015-SD-002	09/30/10	K1010867-019
1010-MSP015-SD-003	09/30/10	K1010867-020
1010-MSP015-SD-004	09/30/10	K1010867-021
1010-MSP014-SD-001-1	09/29/10	K1010867-024
1010-MSP014-SD-001-2	09/29/10	K1010867-025
1010-MSP014-SD-002	09/29/10	K1010867-026
1010-MSP014-SD-003	09/29/10	K1010867-027
1010-MSP014-SD-004	09/29/10	K1010867-028
1010-MSP014-SD-005	09/29/10	K1010867-029
1010-MSP023-SD-001	09/28/10	K1010867-031
1010-MSP023-SD-002	09/28/10	K1010867-032
1010-MSP023-SD-003	09/28/10	K1010867-033
1010-MSP023-SD-004	09/28/10	K1010867-034
1010-SWMSP018-F	09/29/10	K1010867-001

1010-SWMSP017-F	09/29/10	K1010867-006
1010-SWMSP015-F	09/30/10	K1010867-016
1010-SWMSP014-F	09/29/10	K1010867-022
1010-ER-SW-01-U	09/29/10	K1010867-030
1010-ER-SD-01-U	09/28/10	K1010867-035
1010-MSP018-SD-001MS	09/29/10	K1010867-003MS
1010-MSP018-SD-001MSD	09/29/10	K1010867-003MSD
1010-MSP018-SD-001	09/29/10	K1010867-003
1010-ER-SW-01-UMS	09/29/10	K1010867-030MS
1010-ER-SW-01-UDUP	09/29/10	K1010867-030DUP

Introduction

This data review covers 27 sediment samples and 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- EPA SW 846 Methods 7471A and 7470A for Mercury.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Mercury	0.02 ug/L	1010-ER-SD-01-U

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified.

Samples 1010-ER-SW-01-U and 1010-ER-SD-01-U were identified as equipment blanks. No mercury was found in these blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

Mercury - Field Blank Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

LDC #: 24471A4c

SDG #: K1010867

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-11-10

Page: 1 of 1

Reviewer: OR

2nd Reviewer: W

METHOD: Mercury (EPA SW846 Method ~~7000~~) 7471A

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/28-30/10
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	A	DUP
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	EB=29,30

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment / water

1	1010-MSP018-SD-002	S	11	1010-MSP015-SD-001	S	21	1010-MSP023-SD-001	S	31	1010-MSP018-SD-001MS	S
2	1010-MSP018-SD-003		12	1010-MSP015-SD-002		22	1010-MSP023-SD-002		32	1010-MSP018-SD-001MSD	S
3	1010-MSP017-SD-001		13	1010-MSP015-SD-003		23	1010-MSP023-SD-003		33	1010-MSP018-SD-001	↓
4	1010-MSP017-SD-002		14	1010-MSP015-SD-004		24	1010-MSP023-SD-004		34	(#29) MS	W
5	1010-MSP017-SD-003		15	1010-MSP014-SD-001-1		25	1010-SWMSP018-F	W	35	(#29) DUP	↓
6	1010-MSP017-SD-004		16	1010-MSP014-SD-001-2		26	1010-SWMSP017-F		36		
7	1010-MSP031-SD-001-1		17	1010-MSP014-SD-002		27	1010-SWMSP015-F		37		
8	1010-MSP031-SD-001-2		18	1010-MSP014-SD-003		28	1010-SWMSP014-F		38		
9	1010-MSP031-SD-002		19	1010-MSP014-SD-004		29	1010-ER-SW-01-U		39		
10	1010-MSP031-SD-003	↓	20	1010-MSP014-SD-005	↓	30	1010-ER-SD-01-U	↓	40		

Notes:

LDC #: 24471A4

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: NA
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 30

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Hg			0.02	0.1										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 13, 2010

Matrix: Sediment/Water

Parameters: Mercury by CVAA EPA Methods 7471A and 7470A

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011004

Sample Identification	Collection Date	Laboratory Identification
1010-MSP021-SD-001	10/02/10	K1011004-003
1010-MSP021-SD-002-1	10/02/10	K1011004-004
1010-MSP021-SD-003	10/02/10	K1011004-006
1010-MSP021-SD-004	10/02/10	K1011004-007
1010-MSP020-SD-001	10/02/10	K1011004-016
1010-MSP020-SD-002	10/02/10	K1011004-017
1010-MSP020-SD-003	10/02/10	K1011004-018
1010-MSP020-SD-004	10/02/10	K1011004-019
1010-MSP020-SD-005	10/02/10	K1011004-020
1010-SWMSP021-F-01	10/02/10	K1011004-001
1010-SWMSP021-F-2	10/02/10	K1011004-008
1010-SWMSP020-F	10/02/10	K1011004-014
1010-SWMSP021-F-01MS	10/02/10	K1011004-001MS
1010-SWMSP021-F-01MSD	10/02/10	K1011004-001MSD
1010-MSP020-SD-005MS	10/02/10	K1011004-020MS
1010-MSP020-SD-005MSD	10/02/10	K1011004-020MSD
1010-MSP020-SD-005DUP	10/02/10	K1011004-020DUP

Introduction

This data review covers 12 sediment samples and 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- EPA SW 846 Methods 7471A and 7470A for Mercury.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Mercury	0.06 ug/L	All water samples in SDG K1011004

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

Mercury - Field Blank Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

LDC #: 24471B4c

SDG #: K1011004

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 12-13-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

METHOD: Mercury (EPA SW846 Method ~~7000~~ 7471A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/2/10
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment / water

1	1010-MSP021-SD-001 S	11	1010-SWMSP021-F-01 W	21	PBW	31	
2	1010-MSP021-SD-002-1	12	1010-SWMSP021-F-2	22	PBS	32	
3	1010-MSP021-SD-002-2	13	1010-SWMSP020-F	23		33	
4	1010-MSP021-SD-003	14	1010-SWMSP021-F-01MS	24		34	
5	1010-MSP021-SD-004	15	1010-SWMSP021-F-01MSD	25		35	
6	1010-MSP020-SD-001	16	1010-MSP020-SD-005MS S	26		36	
7	1010-MSP020-SD-002	17	1010-MSP020-SD-005MSD	27		37	
8	1010-MSP020-SD-003	18		28		38	
9	1010-MSP020-SD-004	19		29		39	
10	1010-MSP020-SD-005	20		30		40	

Notes:

LDC #: 26671B4C

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: V

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?			✓	
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 24471B4C

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysis have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?			✓	
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 24471B4c

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: CR
2nd Reviewer: CR

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

Soil preparation factor applied: NA
Associated Samples: All Water

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Hg			0.06											

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471B4c

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: CB
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
	ICP/MS (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	5.10	5.00	102	102	Y
	ICP (Continuing calibration)						
CCV5	~~ICP/MS~~ CVAA (Continuing calibration)	Hg	4.70	5.00	94	94	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24471B4c

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ mg/kg	True / D / SDR ~~(units)~~ mg/kg	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
N	ICP interference check						
LCS	Laboratory control sample	Hg	5.10 ug/L	5 ug/L	102	102	Y
16	Matrix spike	Hg	(SSR-SR) 0.452	0.49	92.2	92.2	↓
16/17	Duplicate	↓	0.600	0.609	1.5	1.5	↓
N	ICP serial dilution						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24473B4c

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Hg were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

1: Hg = (50mL)(2.8µg/L/1000) / (0.5g) = 0.196 mg/kg

10: Hg = 50mL(1.5µg/L/1000) / (0.5g) = 0.147 mg/kg

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	1	Hg	0.195	0.196	Y
	10	Hg	0.148	0.147	Y

Note:

RECALC.4SW

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment/Water

Parameters: Mercury by CVAA EPA Methods 7471A and 7470A

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011005

Sample Identification	Collection Date	Laboratory Identification
1010-MSP016-SD-001	09/30/10	K1011005-003
1010-MSP016-SD-002	09/30/10	K1011005-004
1010-MSP016-SD-003	09/30/10	K1011005-005
1010-MSP016-SD-004-1	09/30/10	K1011005-006
1010-MSP016-SD-004-2	09/30/10	K1011005-007
1010-MST053-SD-001	10/03/10	K1011005-010
1010-MST053-SD-002	10/03/10	K1011005-011
1010-MST053-RS-001	10/03/10	K1011005-012
1010-MST053-RS-002	10/03/10	K1011005-013
1010-MST275B-SD-001	10/01/10	K1011005-016
1010-MST275B-RS-001	10/01/10	K1011005-017
1010-MST275B-RS-002	10/01/10	K1011005-018
1010-MST275A-SD-001	10/01/10	K1011005-021
1010-MST275A-RS-001	10/01/10	K1011005-022
1010-MST275A-RS-002	10/01/10	K1011005-023
1010-SWMSP016-F	09/30/10	K1011005-001
1010-SWMST053-F	10/03/10	K1011005-008
1010-SWMST275B-F	10/01/10	K1011005-014
1010-SWMST275A-F	10/01/10	K1011005-019
1010-MSP016-SD-003MS	09/30/10	K1011005-005MS
1010-MSP016-SD-003MSD	09/30/10	K1011005-005MSD

Introduction

This data review covers 6 soil samples, 11 sediment samples, and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- EPA SW 846 Methods 7471A and 7470A for Mercury.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Mercury	0.02 ug/L	All water samples in SDG K1011005

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified.

Samples 1010-ER-SD-02-U, 1010-ER-RS-01-U, and 1010-ER-SD-03-U (all from SDG K1011007) were identified as equipment blanks. No mercury was found in these blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

Mercury - Field Blank Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

LDC #: 24471C4c

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

SDG #: K1011005

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: CR

2nd Reviewer: ✓

METHOD: Mercury (EPA SW846 Method ~~7000~~) 747/A /7470A

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/30 - 10/3/10
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	✓
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	EB=1010-ER-SD-02-U, 1010-ER-RS-01-U, 1010-ER-SD-03-U (SDG: K1011007)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil/water

1	1010-MSP016-SD-001	Sed	11	1010-MST275B-RS-001	S	21	1010-MSP016-SD-003MSD	Sed	
2	1010-MSP016-SD-002	↓	12	1010-MST275B-RS-002	↓	22		32	
3	1010-MSP016-SD-003		13	1010-MST275A-SD-001	Sed	23		33	
4	1010-MSP016-SD-004-1		14	1010-MST275A-RS-001	S	24		34	
5	1010-MSP016-SD-004-2		15	1010-MST275A-RS-002	↓	25		35	
6	1010-MST053-SD-001		16	1010-SWMSP016-F	W	26		36	
7	1010-MST053-SD-002	↓	17	1010-SWMST053-F		27		37	
8	1010-MST053-RS-001	S	18	1010-SWMST275B-F		28		38	
9	1010-MST053-RS-002	↓	19	1010-SWMST275A-F	↓	29		39	
10	1010-MST275B-SD-001	Sed	20	1010-MSP016-SD-003MS	Sed	30		40	

Notes:

LDC #: 24471C4c

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: 2nd Reviewer:

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

Soil preparation factor applied: NA
Associated Samples: All Water

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Hg			0.02	0.1										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment/Water

Parameters: Mercury by CVAA EPA Methods 7471A and 7470A

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011006

Sample Identification	Collection Date	Laboratory Identification
1010-MST277A-SD-001	10/03/10	K1011006-001
1010-MST277A-RS-001	10/03/10	K1011006-002
1010-MST277A-RS-002	10/03/10	K1011006-003
1010-MST277B-SD-001	10/03/10	K1011006-004
1010-MST277B-RS-001	10/03/10	K1011006-005
1010-MST277B-RS-002	10/03/10	K1011006-006
1010-MST066-SD-001-1	10/03/10	K1011006-011
1010-MST066-SD-001-2	10/03/10	K1011006-012
1010-MST066-RS-001-1	10/03/10	K1011006-013
1010-MST066-RS-001-2	10/03/10	K1011006-014
1010-MST066-RS-002	10/03/10	K1011006-015
1010-SWMST066-F-1	10/03/10	K1011006-007
1010-SWMST066-F-2	10/03/10	K1011006-009
1010-MST277A-RS-001MS	10/03/10	K1011006-002MS
1010-MST277A-RS-001MSD	10/03/10	K1011006-002MSD

Introduction

This data review covers 9 soil samples, 4 sediment samples, and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- EPA SW 846 Methods 7471A and 7470A for Mercury.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Mercury	0.02 ug/L	All water samples in SDG K1011006

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified.

Sample 1010-ER-SD-03-U (from SDG K1011007) was identified as an equipment blank. No mercury was found in this blank.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

Mercury - Field Blank Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

LDC #: 24471D4c

VALIDATION COMPLETENESS WORKSHEET

Date: 12-13-10

SDG #: K1011006

Level III

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Mercury (EPA SW846 Method ~~7000~~) 7471A / 7470A

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/3/10
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	EB=1010-ER-SD03-U (K1011007)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil/water

1	1010-MST277A-SD-001	sed	11	1010-MST066-RS-002	S	21		31	QBW
2	1010-MST277A-RS-001	S	12	1010-SWMST066-F-1	W	22		32	PMS
3	1010-MST277A-RS-002	↓	13	1010-SWMST066-F-2	↓	23		33	
4	1010-MST277B-SD-001	sed	14	1010-MST277A-RS-001MS	S	24		34	
5	1010-MST277B-RS-001	S	15	1010-MST277A-RS-001MSD	↓	25		35	
6	1010-MST277B-RS-002	↓	16			26		36	
7	1010-MST066-SD-001-1	sed	17			27		37	
8	1010-MST066-SD-001-2	↓	18			28		38	
9	1010-MST066-RS-001-1	S	19			29		39	
10	1010-MST066-RS-001-2	↓	20			30		40	

Notes:

LDC #: 24471D4c

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

Soil preparation factor applied: NA
Associated Samples: All Water

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Hg			0.02	0.1										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment/Water

Parameters: Mercury by CVAA EPA Methods 7471A and 7470A

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011007

Sample Identification	Collection Date	Laboratory Identification
1010-MST067-SD-001-1	10/03/10	K1011007-001
1010-MST067-RS-001-1	10/03/10	K1011007-002
1010-MST067-RS-002	10/03/10	K1011007-003
1010-MST131-SD-001	10/02/10	K1011007-006
1010-MST131-SD-002	10/02/10	K1011007-007
1010-MST131-RS-001	10/02/10	K1011007-008
1010-MST131-RS-002	10/02/10	K1011007-009
1010-MST274A-SD-001	10/02/10	K1011007-012
1010-MST274A-RS-001	10/02/10	K1011007-013
1010-MST274A-RS-002	10/02/10	K1011007-014
1010-MST274B-SD-001	10/02/10	K1011007-017
1010-MST274B-RS-001	10/02/10	K1011007-018
1010-MST274B-RS-002	10/02/10	K1011007-019
1010-SWMST131-F	10/02/10	K1011007-004
1010-SWMST274A-F	10/01/10	K1011007-010
1010-SWMST274B-F	10/01/10	K1011007-015
1010-ER-SD-02-U	9/30/10	K1011007-020
1010-ER-RS-01-U	10/01/10	K1011007-021
1010-ER-RS-02-U	10/02/10	K1011007-022
1010-ER-SD-03-U	10/03/10	K1011007-023

Introduction

This data review covers 8 soil samples, 5 sediment samples, and 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- EPA SW 846 Methods 7471A and 7470A for Mercury.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Mercury	0.06 ug/L	All water samples in SDG K1011007

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified.

Samples 1010-ER-SD-02-U, 1010-ER-RS-01-U, 1010-ER-RS-02-U, and 1010-ER-SD-03-U were identified as equipment blanks. No mercury was found in these blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges with the following exceptions:

Spike ID (Associated Samples)	Analyte	LCS (%R) (Limits)	Flag	A or P
LCS-SRM (All soil and sediment samples in SDG K1011007)	Mercury	45.9 (71-128)	J- (all detects) UJ (all non-detects)	P

All samples in the batch for the analytes having %Rs outside control limits were qualified as summarized above.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011007

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011007	1010-MST067-SD-001-1 1010-MST067-RS-001-1 1010-MST067-RS-002 1010-MST131-SD-001 1010-MST131-SD-002 1010-MST131-RS-001 1010-MST131-RS-002 1010-MST274A-SD-001 1010-MST274A-RS-001 1010-MST274A-RS-002 1010-MST274B-SD-001 1010-MST274B-RS-001 1010-MST274B-RS-002	Mercury	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)	13

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

Mercury - Field Blank Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

LDC #: 24471E4c

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-11-10

SDG #: K1011007

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: OR

2nd Reviewer: [illegible]

METHOD: Mercury (EPA SW846 Method 7000) 7470A/7471A

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: ~~10/1-3/10~~ 9/30-10/3/10
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS/D (SDG: K1011004, K1011130)
VI.	Duplicate Sample Analysis	A	Dup ↓
VII.	Laboratory Control Samples (LCS)	SW	LCS, SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	EB=17, 18, 19, 20

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil/water

1	1010-MST067-SD-001-1 sed	11	1010-MST274B-SD-001 sed	21		31	
2	1010-MST067-RS-001-1 S	12	1010-MST274B-RS-001 S	22		32	
3	1010-MST067-RS-002 ↓	13	1010-MST274B-RS-002 ↓	23		33	
4	1010-MST131-SD-001 sed	14	1010-SWMST131-F W	24		34	
5	1010-MST131-SD-002 ↓	15	1010-SWMST274A-F	25		35	
6	1010-MST131-RS-001 S	16	1010-SWMST274B-F	26		36	
7	1010-MST131-RS-002 ↓	17	1010-ER-SD-02-U	27		37	
8	1010-MST274A-SD-001 sed	18	1010-ER-RS-01-U	28		38	
9	1010-MST274A-RS-001 S	19	1010-ER-RS-02-U	29		39	
10	1010-MST274A-RS-002 ↓	20	1010-ER-SD-03-U ↓	30		40	

Notes:

LDC #: 24471E4c

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: CR
2nd Reviewer: L

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: NA
Sample Concentration units, unless otherwise noted: ____ Associated Samples: All Water

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Hg			0.06	0.3										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 24471E4RC
SDG #: —

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010B/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a laboratory control sample (LCS) analyzed for each matrix in this SDG?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	LCS/LCSD ID	Matrix	Analyte	LCS %R (limits)	~~LCSD %R (limits)~~	RPD (limits)	Associated Samples	Qualifications
		LCS-SRM	Solid	Hg	45.9 (71-128)			All Sediment + Soil	J-/UJ/P (13)

Comments:

LCSD.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment

Parameters: Mercury by CVAA EPA Method 7471A

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011129

Sample Identification	Collection Date	Laboratory Identification
1010-MST093A-SD-001-1	10/04/10	K1011129-001
1010-MST093A-SD-001-2	10/04/10	K1011129-002
1010-MST093A-RS-001-1	10/04/10	K1011129-003
1010-MST093A-RS-001-2	10/04/10	K1011129-004
1010-MST093A-RS-002-1	10/04/10	K1011129-005
1010-MST093A-RS-002-2	10/04/10	K1011129-006
1010-MST093B-SD-001	10/04/10	K1011129-007
1010-MST093B-RS-001	10/04/10	K1011129-008
1010-MST093B-RS-002	10/04/10	K1011129-009
1010-MST095-SD-001	10/04/10	K1011129-010
1010-MST095-RS-001	10/04/10	K1011129-011
1010-MST095-RS-002	10/04/10	K1011129-012
1010-MST089-SD-001	10/05/10	K1011129-013
1010-MST089-RS-001	10/05/10	K1011129-014
1010-MST089-RS-002	10/05/10	K1011129-015
1010-MST092-SD-001	10/04/10	K1011129-016
1010-MST092-RS-001	10/04/10	K1011129-017
1010-MST092-RS-002	10/04/10	K1011129-018
1010-MST092-RS-001MS	10/04/10	K1011129-017MS
1010-MST092-RS-001MSD	10/04/10	K1011129-017MSD

Introduction

This data review covers 14 soil samples and 6 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- EPA SW 846 Methods 7471A for Mercury.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature..

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks.

Samples 1010-ER-RS-03-U and 1010-ER-RS-04-U (both from SDG K1011130) were identified as equipment blanks. No mercury was found in these blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

Mercury - Field Blank Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

LDC #: 24471F4c

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-16

SDG #: K1011129

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Mercury (EPA SW846 Method ~~7000~~ 7471A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/4-5/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	EB: 1010-ER-RS-03-U, 1010-ER-RS-04-U (CR1011130)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil

1	1010-MST093A-SD-001-1 sed	11	1010-MST095-RS-001 S	21		31	PBS
2	1010-MST093A-SD-001-2 ↓	12	1010-MST095-RS-002 ↓	22		32	
3	1010-MST093A-RS-001-1 S	13	1010-MST089-SD-001 sed	23		33	
4	1010-MST093A-RS-001-2	14	1010-MST089-RS-001 S	24		34	
5	1010-MST093A-RS-002-1	15	1010-MST089-RS-002 ↓	25		35	
6	1010-MST093A-RS-002-2 ↓	16	1010-MST092-SD-001 sed	26		36	
7	1010-MST093B-SD-001 sed	17	1010-MST092-RS-001 S	27		37	
8	1010-MST093B-RS-001 S	18	1010-MST092-RS-002	28		38	
9	1010-MST093B-RS-002 ↓	19	1010-MST092-RS-001MS	29		39	
10	1010-MST095-SD-001 sed	20	1010-MST092-RS-001MSD ↓	30		40	

Notes:

Report# 24471G4c

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment/Water

Parameters: Mercury by CVAA EPA Methods 7471A and 7470A

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011130

Sample Identification	Collection Date	Laboratory Identification
1010-MST272-SD-001	10/05/10	K1011130-001
1010-MST272-RS-001	10/05/10	K1011130-002
1010-MST272-RS-002	10/05/10	K1011130-003
1010-MST273-SD-001	10/05/10	K1011130-004
1010-MST273-RS-001	10/05/10	K1011130-005
1010-MST273-RS-002	10/05/10	K1011130-006
1010-ER-RS-03-U	10/04/10	K1011130-007
1010-ER-RS-04-U	10/05/10	K1011130-008
1010-B -SW-01	10/05/10	K1011130-009
1010-MST272-SD-001MS	10/05/10	K1011130-001MS
1010-MST272-SD-001MSD	10/05/10	K1011130-001MSD
1010-B -SW-01MS	10/05/10	K1011130-009MS
1010-B -SW-01MSD	10/05/10	K1011130-009MSD

Introduction

This data review covers 4 soil samples, 4 sediment samples, and 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- EPA SW 846 Methods 7471A and 7470A for Mercury.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Mercury	0.06 ug/L	All water samples in SDG K1011130

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified.

Samples 1010-ER-RS-03-U and 1010-ER-RS-04-U were identified as equipment blanks. No mercury was found in these blanks.

Sample 1010-B -SW-01 was identified as a source blank. No mercury was found in this blank.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% and results of standard reference material were within expected ranges.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

Mercury - Field Blank Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

LDC #: 24471G4c

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

SDG #: K1011130

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Mercury (EPA SW846 Method ~~7000~~ 7471A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/5/10, 10/4/10
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS, LCS-SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	~~Not req~~
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	ND	EB= 7,8, Source Blk=9

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil/water

1	1010-MST272-SD-001 sed	11	1010-MST272-SD-001MSD sed	21	PBW	31	
2	1010-MST272-RS-001 S	12	1010-B -SW-01MS W	22	PBS	32	
3	1010-MST272-RS-002 ↓	13	1010-B -SW-01MSD ↓	23		33	
4	1010-MST273-SD-001 sed	14		24		34	
5	1010-MST273-RS-001 S	15		25		35	
6	1010-MST273-RS-002 ↓	16		26		36	
7	1010-ER-RS-03-U W	17		27		37	
8	1010-ER-RS-04-U ↓	18		28		38	
9	1010-B -SW-01 ↓	19		29		39	
10	1010-MST272-SD-001MS sed	20		30		40	

Notes:

LDC #: 24471G4c

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 6 of 6
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: NA
Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: All Water

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Hg			0.06	0.3										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2008

Matrix: Sediment

Parameters: SEM Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1010867

Sample Identification	Collection Date	Laboratory Identification
1010-MSP018-SD-002	09/29/10	K1010867-004
1010-MSP018-SD-003	09/29/10	K1010867-005
1010-MSP017-SD-001	09/29/10	K1010867-008
1010-MSP017-SD-002	09/29/10	K1010867-009
1010-MSP017-SD-003	09/29/10	K1010867-010
1010-MSP017-SD-004	09/29/10	K1010867-011
1010-MSP031-SD-001-1	09/28/10	K1010867-012
1010-MSP031-SD-001-2	09/28/10	K1010867-013
1010-MSP031-SD-002	09/28/10	K1010867-014
1010-MSP031-SD-003	09/28/10	K1010867-015
1010-MSP015-SD-001	09/30/10	K1010867-018
1010-MSP015-SD-002	09/30/10	K1010867-019
1010-MSP015-SD-003	09/30/10	K1010867-020
1010-MSP015-SD-004	09/30/10	K1010867-021
1010-MSP014-SD-001-1	09/29/10	K1010867-024
1010-MSP014-SD-001-2	09/29/10	K1010867-025
1010-MSP014-SD-002	09/29/10	K1010867-026
1010-MSP014-SD-003	09/29/10	K1010867-027
1010-MSP014-SD-004	09/29/10	K1010867-028
1010-MSP014-SD-005	09/29/10	K1010867-029
1010-MSP023-SD-001	09/28/10	K1010867-031
1010-MSP023-SD-002	09/28/10	K1010867-032
1010-MSP023-SD-003	09/28/10	K1010867-033
1010-MSP023-SD-004	09/28/10	K1010867-034
1010-MSP018-SD-001MS	09/29/10	K1010867-003MS
1010-MSP018-SD-001MSD	09/29/10	K1010867-003MSD

1010-MSP018-SD-001DUP	09/29/10	K1010867-003DUP
1010-MSP018-SD-001	09/29/10	K1010867-003
1010-MSP031-SD-001-1MS	09/28/10	K1010867-012MS
1010-MSP031-SD-001-1MSD	09/28/10	K1010867-012MSD

Introduction

This data review covers 30 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Cadmium, Copper, Lead, Nickel, and Zinc as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met with the exception of Copper and Zinc. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% .

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1010-MSP031-SD-001-1MS/MSD (1010-MSP031-SD-001-1 1010-MSP031-SD-001-2)	Nickel	73 (75-125)	-	-	J- (all detects) UJ (all non-detects)	A

Nickel and Zinc results were outside the QC limits; results were not qualified since the original sample (1010-MSP018-SD-001) was greater than 4X the spike amount.

Zinc results were outside the QC limits; results were not qualified since the original sample (1010-MSP031-SD-001-1) was greater than 4X the spike amount.

Zinc results were outside the QC limits; results were not qualified since the original sample (1010-MSP016-SD-003) was greater than 4X the spike amount.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1010-MSP031-SD-001-1L	Cadmium Nickel Zinc	11.5 (≤10) 10.2 (≤10) 11.9 (≤10)	1010-MSP031-SD-001-1 1010-MSP031-SD-001-2	J (all detects) UJ (all non-detects)	A
1010-MSP016-SD-003L	Cadmium	11.1 (≤10)	1010-MSP015-SD-001 1010-MSP015-SD-004 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-005	J (all detects) UJ (all non-detects)	A

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1010867

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1010867	1010-MSP031-SD-001-1 1010-MSP031-SD-001-2	Nickel	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
K1010867	1010-MSP031-SD-001-1 1010-MSP031-SD-001-2	Cadmium Nickel Zinc	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18
K1010867	1010-MSP015-SD-001 1010-MSP015-SD-004 1010-MSP014-SD-002 1010-MSP014-SD-003 1010-MSP014-SD-005	Cadmium	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

Metals – Field Blank Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

LDC #: 24471A4d

SDG #: K1010867

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-1-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

METHOD: SEM Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/28-30/10
II.	Calibration	SW	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	A	DUP
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1 N	1010-MSP018-SD-002	11 N	1010-MSP015-SD-001	21 N	1010-MSP023-SD-001	31	PBW1
2	1010-MSP018-SD-003	12 N	1010-MSP015-SD-002	22	1010-MSP023-SD-002	32	2
3	1010-MSP017-SD-001	13 N	1010-MSP015-SD-003	23	1010-MSP023-SD-003	33	3
4	1010-MSP017-SD-002	14 N	1010-MSP015-SD-004	24 N	1010-MSP023-SD-004	34	
5	1010-MSP017-SD-003	15 N	1010-MSP014-SD-001-1	25	1010-MSP018-SD-001MS	35	
6 N	1010-MSP017-SD-004	16 N	1010-MSP014-SD-001-2	26	1010-MSP018-SD-001MSD	36	
7	1010-MSP031-SD-001-1	17 N	1010-MSP014-SD-002	27	1010-MSP018-SD-001DUP	37	
8	1010-MSP031-SD-001-2	18 N	1010-MSP014-SD-003	28	1010-MSP018-SD-001	38	
9 N	1010-MSP031-SD-002	19 N	1010-MSP014-SD-004	29	(X7) MS	39	
10 N	1010-MSP031-SD-003	20 N	1010-MSP014-SD-005	30	↓ MSD	40	

Notes:

LDC #: 24471A4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-24,28		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
QC:2527		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,

Comments: Mercury by CVAA if performed

LDC #: 24472A4

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	10/22/10	CRDL (18:23)	Cu	56 (70-130)	7,8	No Qual (>2xRL)
	10/25/10	CRDL (12:51)	Zn	47	2-6,9,10,12,13,15,16,19,21-24	
	10/27/10	CRDL (16:04)	Cu	69	11,14,17,18,20	

Comments:

CAL.4SW

LDC #: 24471A4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1	25/26	Soil	Ni	134	130		1-6,9,10,12,13,15,16,19,21-24	No Qual (>4x)
			Zn	-178	-53		↓	↓
2	29/30	S	Ni	73			7,8	J/UJ/A (4x)
			Zn	33	40		↓	No Qual (>4x)
	~~K1011005-005~~							
3	1010-MSP016SO-003 (SDG: K1011005)		Zn	69	70		11,14,17,18,20	No Qual (>4x)

Comments:

MSD.4SW

LDC #: 24471A4d

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		7	S	Cd	11.5	7,8	J (UJ/A C18)
				Ni	10.2	↓	↓
				Zn	11.9	↓	↓
		1010-MSP016-SD003	S	Cd	11.1	11,14,17,18,20	↓
		(SDG: R1011005)					

Comments:

SDILICPMS.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2008

Matrix: Sediment

Parameters: SEM Metals by ICP SW 846 Method 6010B

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011004

Sample Identification	Collection Date	Laboratory Identification
1010-MSP021-SD-001	10/02/10	K1011004-003
1010-MSP021-SD-002-1	10/02/10	K1011004-004
1010-MSP021-SD-002-2	10/02/10	K1011004-005
1010-MSP021-SD-003	10/02/10	K1011004-006
1010-MSP021-SD-004	10/02/10	K1011004-007
1010-MSP020-SD-001	10/02/10	K1011004-016
1010-MSP020-SD-002	10/02/10	K1011004-017
1010-MSP020-SD-003	10/02/10	K1011004-018
1010-MSP020-SD-004	10/02/10	K1011004-019
1010-MSP020-SD-005	10/02/10	K1011004-020
1010-MSP020-SD-005MS	10/02/10	K1011004-020MS
1010-MSP020-SD-005MSD	10/02/10	K1011004-020MSD
1010-MSP020-SD-005DUP	10/02/10	K1011004-020DUP

Introduction

This data review covers 13 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Cadmium, Copper, Lead, Nickel, and Zinc as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met with the exception of Zinc. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% .

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

Metals – Field Blank Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

LDC #: 24471B4d

SDG #: K1011004

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 12-13-10

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: SEM Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/2/10
II.	Calibration	SW	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	A	DUP
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	1010-MSP021-SD-001	11	1010-MSP020-SD-005MS	21	PBS	31	
2	1010-MSP021-SD-002-1	12	1010-MSP020-SD-005MSD	22		32	
3	1010-MSP021-SD-002-2	13	1010-MSP020-SD-005DUP	23		33	
4	1010-MSP021-SD-003	14		24		34	
5	1010-MSP021-SD-004	15		25		35	
6	1010-MSP020-SD-001	16		26		36	
7	1010-MSP020-SD-002	17		27		37	
8	1010-MSP020-SD-003	18		28		38	
9	1010-MSP020-SD-004	19		29		39	
10	1010-MSP020-SD-005	20		30		40	

Notes:

LDC #: 24471B4d

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 24471B4d

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 44471B4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
QC-11-13		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,

Comments: Mercury by CVAA if performed

LDC #: 24471B4d

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?
Y N N/A Are all correlation coefficients ≥0.995?
Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	10/25/10	CRDL (12:51)	Zn	47 (70-130)	All	No Qual (< 2xRL)

Comments:

LDC #: 24471B4d

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CS
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{Found}{True} \times 100$$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found ~~(ug/L)~~ umol/L	True ~~(ug/L)~~ umol/L	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Cu	10.04	9.83	102	102	Y
	ICP/MS (Initial calibration)						
	CVAA (Initial calibration)						
CCV10	ICP (Continuing calibration)	Ni	8.70	8.52	102	102	Y
	ICP/MS (Continuing calibration)						
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24471B6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (~~units~~ umol/g)	True / D / SDR (~~units~~ umol/g)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Cd	9 umol/L	9 umol/L	100	100	Y
LCS	Laboratory control sample	Cu	9.570	9.830	97	97	
11	Matrix spike	Mn	(SSR-SR) 0.197	0.209	94	94	
13	Duplicate	Zn	1.426	1.214	16.1	16.1	
10	ICP serial dilution	Zn	144.7 umol/L	136.6 umol/g	5.6	5.6	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24471B4d

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: V

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for _____ were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation: $\frac{3.755 \mu mol/L (100mL)}{10g(1000)} = 0.0376 \mu mol/g$

#	Sample ID	Analyte	Reported Concentration (µmol/g)	Calculated Concentration (µmol/g)	Acceptable (Y/N)
	1	Cd	0.0375	0.0375	Y
		Cu	0.0916	0.0916	
		Pb	0.012	0.012	
		Ni	0.338	0.338	
		Zn	2.560	2.560	

Note: _____

RECALC.4SW

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2008

Matrix: Sediment

Parameters: SEM Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011005

Sample Identification	Collection Date	Laboratory Identification
1010-MSP016-SD-001	09/30/10	K1011005-003
1010-MSP016-SD-002	09/30/10	K1011005-004
1010-MSP016-SD-003	09/30/10	K1011005-005
1010-MSP016-SD-004-1	09/30/10	K1011005-006
1010-MSP016-SD-004-2	09/30/10	K1011005-007
1010-MST053-SD-001	10/03/10	K1011005-010
1010-MST053-SD-002	10/03/10	K1011005-011
1010-MST275B-SD-001	10/01/10	K1011005-016
1010-MST275A-SD-001	10/01/10	K1011005-021
1010-MSP016-SD-003MS	09/30/10	K1011005-005MS
1010-MSP016-SD-003MSD	09/30/10	K1011005-005MSD
1010-MSP016-SD-003DUP	09/30/10	K1011005-005DUP

Introduction

This data review covers 12 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Cadmium, Copper, Lead, Nickel, and Zinc as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met with the exception of Copper and Zinc. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% .

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

Zinc results were outside the QC limits; results were not qualified since the original sample (1010-MSP016-SD-003) was greater than 4X the spike amount.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1010-MSP016-SD-003L	Cadmium	16.1 (≤10)	1010-MSP016-SD-001 1010-MSP016-SD-002	J (all detects) UJ (all non-detects)	A
	Nickel	13.7 (≤10)	1010-MSP016-SD-003 1010-MSP016-SD-004-1 1010-MSP016-SD-004-2 1010-MST275B-SD-001 1010-MST275A-SD-001	J (all detects) UJ (all non-detects)	

Cadmium results were outside the QC limits; since there were no associated samples in this SDG data were not reported by the laboratory.

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011005

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
K1011005	1010-MSP016-SD-001 1010-MSP016-SD-002 1010-MSP016-SD-003 1010-MSP016-SD-004-1 1010-MSP016-SD-004-2 1010-MST275B-SD-001 1010-MST275A-SD-001	Cadmium Nickel	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

Metals – Field Blank Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

LDC #: 24471C4d

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

SDG #: K1011005

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: SEM Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/30 - 10/3/10
II.	Calibration	SW	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/D
VI.	Duplicate Sample Analysis	A	DUP
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Sediment

1	1010-MSP016-SD-001	11	1010-MSP016-SD-003MSD	21	PBS1	31	
2	1010-MSP016-SD-002	12	1010-MSP016-SD-003DUP	22	PBS2	32	
3	1010-MSP016-SD-003	13		23	PBS3	33	
4	1010-MSP016-SD-004-1	14		24		34	
5	1010-MSP016-SD-004-2	15		25		35	
6	3 1010-MST053-SD-001	16		26		36	
7	2 1010-MST053-SD-002	17		27		37	
8	3 1010-MST275B-SD-001	18		28		38	
9	1010-MST275A-SD-001	19		29		39	
10	1010-MSP016-SD-003MS	20		30		40	

Notes:

LDC #: 24407C4Q

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-9		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
QC: 10-12		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 24471C4d

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	10/25/10	CRDL (12:51)	Zn	47 (70-130)	1-6, 8, 9	No Qual (>2xRL)
	10/27/10	CRDL (16:04)	Cu	69	7	

Comments:

CAL.4SW

LDC #: 24471C4d

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	10/11	sed	Zn	69	70		1-5,8,9	NOQ(2a) (>4x)

Comments:

MSD.4SW

LDC #: 24471C4d

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		3	SEM	Cd	16.1	1-5,8,9	J/UJ/A (18)
				Ni	13.7	↓	↓
				Cd	11.1	None	No Qual (not reported)

Comments:

SDILICPMS.wpd

Report# 24471D4d

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2008

Matrix: Sediment

Parameters: SEM Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011006

Sample Identification	Collection Date	Laboratory Identification
1010-MST277A-SD-001	10/03/10	K1011006-001
1010-MST277B-SD-001	10/03/10	K1011006-004
1010-MST066-SD-001-1	10/03/10	K1011006-011
1010-MST066-SD-001-2	10/03/10	K1011006-012

Introduction

This data review covers 4 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Cadmium, Copper, Lead, Nickel, and Zinc as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met with the exception of Copper. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% .

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

Metals – Field Blank Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

LDC #: 24471D4d

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

SDG #: K1011006

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: SEM Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/3/10
II.	Calibration	SW	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D (SDG: IS1011130)
VI.	Duplicate Sample Analysis	A	DUP ↓
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	Not performed
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	1010-MST277A-SD-001	11	GR35	21		31	
2	1010-MST277B-SD-001	12		22		32	
3	1010-MST066-SD-001-1	13		23		33	
4	1010-MST066-SD-001-2	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 24471D4d

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [signature]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL) (circled on row 1-4: Cd, Cu, Pb, Ni, Zn)
1-4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ____

Comments: Mercury by CVAA if performed

LDC #: 24471D40

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 2
Reviewer: JZ
2nd Reviewer: h

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	10/27/10	CRDL(16:04)	Cu	69 (70-130)	All	No Qual (>2xRL)

Comments:

CAL.4SW

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 13, 2008

Matrix: Sediment

Parameters: SEM Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011007

Sample Identification	Collection Date	Laboratory Identification
1010-MST067-SD-001-1	10/03/10	K1011007-001
1010-MST131-SD-001	10/02/10	K1011007-006
1010-MST131-SD-002	10/02/10	K1011007-007
1010-MST274A-SD-001	10/02/10	K1011007-012
1010-MST274B-SD-001	10/02/10	K1011007-017

Introduction

This data review covers 5 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Cadmium, Copper, Lead, Nickel, and Zinc as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met with the exception of Copper and Zinc. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% .

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

Metals – Field Blank Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

LDC #: 24471E4d **VALIDATION COMPLETENESS WORKSHEET** Date: 12-12-0
SDG #: K1011007 Level III Page: 1 of 1
Laboratory: Columbia Analytical Services Reviewer: OR
2nd Reviewer: ✓

METHOD: SEM Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/2-3/10
II.	Calibration	SW	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D (SDG#: K1011004, K1011130)
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	1010-MST067-SD-001-1	11	RBS	21		31	
2	1010-MST131-SD-001	12		22		32	
3	1010-MST131-SD-002	13		23		33	
4	1010-MST274A-SD-001	14		24		34	
5	1010-MST274B-SD-001	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: [illegible]

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-5		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 24471E4d

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?
Y N N/A Are all correlation coefficients ≥0.995?
Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	10/25/10	CRDL (12:51)	Zn	47 (70-130)	2-5	No Qual (> 2xRL)
	10/27/10	CRDL (16:04)	Cu	69	1	

Comments:

CAL.4SW

Report# 24471F4d

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2008

Matrix: Sediment

Parameters: SEM Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011129

Sample Identification	Collection Date	Laboratory Identification
1010-MST093A-SD-001-1	10/04/10	K1011129-001
1010-MST093A-SD-001-2	10/04/10	K1011129-002
1010-MST093B-SD-001	10/04/10	K1011129-007
1010-MST095-SD-001	10/04/10	K1011129-010
1010-MST089-SD-001	10/05/10	K1011129-013
1010-MST092-SD-001	10/04/10	K1011129-016

Introduction

This data review covers 6 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Cadmium, Copper, Lead, Nickel, and Zinc as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met with the exception of Copper. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% .

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

Lead results were outside the QC limits; data were not qualified since the concentration was less than 50 times the MDLs.

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

Metals – Field Blank Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

LDC #: 24471F4d

SDG #: K1011129

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: SEM Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/4-5/10
II.	Calibration	SW	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D (K1011130)
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	SW	(K1011130)
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	1010-MST093A-SD-001-1	11	PBS	21		31	
2	1010-MST093A-SD-001-2	12		22		32	
3	1010-MST093B-SD-001	13		23		33	
4	1010-MST095-SD-001	14		24		34	
5	1010-MST089-SD-001	15		25		35	
6	1010-MST092-SD-001	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 24411+49

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-6		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 44471F4

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?
Y N N/A Are all correlation coefficients ≥0.995?
Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	10/27/10	CRDL(16:04)	Cu	69 (70-130)	All	No Qual (>2xRL)

Comments:

CAL.4SW

LDC #: 26471F4d

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: h

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		1010-MST272-SD-001 S (KD11130)		Pb	100	All	No Qual (CRDL x MDL)

Comments:

SDILICPMS.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2008

Matrix: Sediment

Parameters: SEM Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011130

Sample Identification	Collection Date	Laboratory Identification
1010-MST272-SD-001	10/05/10	K1011130-001
1010-MST273-SD-001	10/05/10	K1011130-004
1010-MST272-SD-001MS	10/05/10	K1011130-001MS
1010-MST272-SD-001MSD	10/05/10	K1011130-001MSD
1010-MST272-SD-001DUP	10/05/10	K1011130-001DUP

Introduction

This data review covers 5 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Cadmium, Copper, Lead, Nickel, and Zinc as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water, sediment, and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met with the exception of Copper. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% .

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment and soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments and soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

Lead results were outside the QC limits; data were not qualified since the concentration was less than 50 times the MDLs.

IX. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

Metals – Field Blank Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

LDC #: 24471G4d

SDG #: K1011130

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: SEM Metals (EPA SW846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/5/10
II.	Calibration	SW	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	A	DUP
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	1010-MST272-SD-001	11	PBS	21		31	
2	1010-MST273-SD-001	12		22		32	
3	1010-MST272-SD-001MS	13		23		33	
4	1010-MST272-SD-001MSD	14		24		34	
5	1010-MST272-SD-001DUP	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28476G9

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
0035		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ____

Comments: Mercury by CVAA if performed

LDC #: 44416 49

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	10/27/10	CRDL (1604)	Cu	~~[illegible]~~ 69 (70-130)	All	No Qual (>2xRL)

Comments:

CAL.4SW

LDC #: 24471G4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CC
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		1	Sed	Pb	100	All	No Qual (<50X MDL)

Comments:

SDILICPMS.wpd

Report# 24471A4e

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 13, 2010

Matrix: Sediment

Parameters: SEM Mercury by CVAA EPA Method 7470A

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1010867

Sample Identification	Collection Date	Laboratory Identification
1010-MSP018-SD-001	09/29/10	K1010867-003
1010-MSP018-SD-002	09/29/10	K1010867-004
1010-MSP018-SD-003	09/29/10	K1010867-005
1010-MSP017-SD-001	09/29/10	K1010867-008
1010-MSP017-SD-002	09/29/10	K1010867-009
1010-MSP017-SD-003	09/29/10	K1010867-010
1010-MSP017-SD-004	09/29/10	K1010867-011
1010-MSP031-SD-001-1	09/28/10	K1010867-012
1010-MSP031-SD-001-2	09/28/10	K1010867-013
1010-MSP031-SD-002	09/28/10	K1010867-014
1010-MSP031-SD-003	09/28/10	K1010867-015
1010-MSP015-SD-001	09/30/10	K1010867-018
1010-MSP015-SD-002	09/30/10	K1010867-019
1010-MSP015-SD-003	09/30/10	K1010867-020
1010-MSP015-SD-004	09/30/10	K1010867-021
1010-MSP014-SD-001-1	09/29/10	K1010867-024
1010-MSP014-SD-001-2	09/29/10	K1010867-025
1010-MSP014-SD-002	09/29/10	K1010867-026
1010-MSP014-SD-003	09/29/10	K1010867-027
1010-MSP014-SD-004	09/29/10	K1010867-028
1010-MSP014-SD-005	09/29/10	K1010867-029
1010-MSP023-SD-001	09/28/10	K1010867-031
1010-MSP023-SD-002	09/28/10	K1010867-032
1010-MSP023-SD-003	09/28/10	K1010867-033
1010-MSP023-SD-004	09/28/10	K1010867-034

1010-MSP018-SD-001MS	09/29/10	K1010867-003MS
1010-MSP018-SD-001MSD	09/29/10	K1010867-003MSD
1010-MSP018-SD-001DUP	09/29/10	K1010867-003DUP

Introduction

This data review covers 28 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method EPA SW 846 7470A Mercury as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment or soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in dupicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

Mercury – Field Blank Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

LDC #: 24471A4e

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-1-10

SDG #: K1010867

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: SEM Mercury (EPA SW846 Method ~~7000~~ 7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/28-30/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	⊥
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	1010-MSP018-SD-002	11	1010-MSP015-SD-001	21	1010-MSP023-SD-001	31	
2	1010-MSP018-SD-003	12	1010-MSP015-SD-002	22	1010-MSP023-SD-002	32	
3	1010-MSP017-SD-001	13	1010-MSP015-SD-003	23	1010-MSP023-SD-003	33	
4	1010-MSP017-SD-002	14	1010-MSP015-SD-004	24	1010-MSP023-SD-004	34	
5	1010-MSP017-SD-003	15	1010-MSP014-SD-001-1	25	1010-MSP018-SD-001MS	35	
6	1010-MSP017-SD-004	16	1010-MSP014-SD-001-2	26	1010-MSP018-SD-001MSD	36	
7	1010-MSP031-SD-001-1	17	1010-MSP014-SD-002	27	1010-MSP018-SD-001DUP	37	
8	1010-MSP031-SD-001-2	18	1010-MSP014-SD-003	28	1010-MSP018-SD-001	38	
9	1010-MSP031-SD-002	19	1010-MSP014-SD-004	29		39	
10	1010-MSP031-SD-003	20	1010-MSP014-SD-005	30		40	

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Sediment

Parameters: SEM Mercury by CVAA EPA Method 7470A

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011004

Sample Identification	Collection Date	Laboratory Identification
1010-MSP021-SD-001	10/02/10	K1011004-003
1010-MSP021-SD-002-1	10/02/10	K1011004-004
1010-MSP021-SD-002-2	10/02/10	K1011004-005
1010-MSP021-SD-003	10/02/10	K1011004-006
1010-MSP021-SD-004	10/02/10	K1011004-007
1010-MSP020-SD-001	10/02/10	K1011004-016
1010-MSP020-SD-002	10/02/10	K1011004-017
1010-MSP020-SD-003	10/02/10	K1011004-018
1010-MSP020-SD-004	10/02/10	K1011004-019
1010-MSP020-SD-005	10/02/10	K1011004-020
1010-MSP020-SD-005MS	10/02/10	K1011004-020MS
1010-MSP020-SD-005DUP	10/02/10	K1011004-020DUP

Introduction

This data review covers 12 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method EPA SW 846 7470A Mercury as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment or soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in dupicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

Mercury – Field Blank Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

LDC #: 24471B4e

SDG #: K1011004

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 12-13-10

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: SEM Mercury (EPA SW846 Method ~~7000~~ 7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/2/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS
VI.	Duplicate Sample Analysis	A	DUP
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Sediment

1	1010-MSP021-SD-001	11	1010-MSP020-SD-005MS	21	PBS	31	
2	1010-MSP021-SD-002-1	12	1010-MSP020-SD-005DUP	22		32	
3	1010-MSP021-SD-002-2	13		23		33	
4	1010-MSP021-SD-003	14		24		34	
5	1010-MSP021-SD-004	15		25		35	
6	1010-MSP020-SD-001	16		26		36	
7	1010-MSP020-SD-002	17		27		37	
8	1010-MSP020-SD-003	18		28		38	
9	1010-MSP020-SD-004	19		29		39	
10	1010-MSP020-SD-005	20		30		40	

Notes:

LDC #: 24471B4e

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?			✓	
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 24071B4e

VALIDATION FINDINGS CHECKLIST

Reviewer: aR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?			✓	
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 2447B4c

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CS
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
	ICP/MS (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	26.00	24.9	104	104	Y
	ICP (Continuing calibration)						
	ICP/MS (Continuing calibration)						
CCV6	CVAA (Continuing calibration)	Hg	23.80	24.9	96	96	Y
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24471B4/e

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ µmol/g	True / D / SDR ~~(units)~~ µmol/g	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
N	ICP interference check						
LCS	Laboratory control sample	Hg	0.0984 µmol/L	0.0996 µmol/L	84	84	Y
11	Matrix spike	Hg	(SSR-SR) 0.00087	0.00098	89	89	↓
12	Duplicate	↓	ND	ND	—	—	↓
N	ICP serial dilution						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24472B34e

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: QR
2nd reviewer: ✓

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for _____ were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

Recalculation:

All Non-Detect

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)

Note: _____

RECALC.4SW

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Sediment

Parameters: SEM Mercury by CVAA EPA Method 7470A

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011005

Sample Identification	Collection Date	Laboratory Identification
1010-MSP016-SD-001	09/30/10	K1011005-003
1010-MSP016-SD-002	09/30/10	K1011005-004
1010-MSP016-SD-003	09/30/10	K1011005-005
1010-MSP016-SD-004-1	09/30/10	K1011005-006
1010-MSP016-SD-004-2	09/30/10	K1011005-007
1010-MST053-SD-001	10/03/10	K1011005-010
1010-MST053-SD-002	10/03/10	K1011005-011
1010-MST275B-SD-001	10/01/10	K1011005-016
1010-MST275A-SD-001	10/01/10	K1011005-021
1010-MSP016-SD-003MS	09/30/10	K1011005-005MS
1010-MSP016-SD-003MSD	09/30/10	K1011005-005MSD
1010-MSP016-SD-003DUP	09/30/10	K1011005-005DUP

Introduction

This data review covers 12 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method EPA SW 846 7470A Mercury as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment or soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in dupicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

Mercury – Field Blank Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

LDC #: 24471C4e **VALIDATION COMPLETENESS WORKSHEET** Date: 12-13-10

SDG #: K1011005 Level III Page: 1 of 1

Laboratory: Columbia Analytical Services Reviewer: CR

2nd Reviewer: [illegible]

METHOD: SEM Mercury (EPA SW846 Method ~~7000~~ 7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/30 - 10/3/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS/D
VI.	Duplicate Sample Analysis	A	DUP
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	1010-MSP016-SD-001	11	1010-MSP016-SD-003MSD	21	PBS	31	
2	1010-MSP016-SD-002	12	1010-MSP016-SD-003DUP	22		32	
3	1010-MSP016-SD-003	13		23		33	
4	1010-MSP016-SD-004-1	14		24		34	
5	1010-MSP016-SD-004-2	15		25		35	
6	1010-MST053-SD-001	16		26		36	
7	1010-MST053-SD-002	17		27		37	
8	1010-MST275B-SD-001	18		28		38	
9	1010-MST275A-SD-001	19		29		39	
10	1010-MSP016-SD-003MS	20		30		40	

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Sediment

Parameters: SEM Mercury by CVAA EPA Method 7470A

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011006

Sample Identification	Collection Date	Laboratory Identification
1010-MST277A-SD-001	10/03/10	K1011006-001
1010-MST277B-SD-001	10/03/10	K1011006-004
1010-MST066-SD-001-1	10/03/10	K1011006-011
1010-MST066-SD-001-2	10/03/10	K1011006-012

Introduction

This data review covers 4 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method EPA SW 846 7470A Mercury as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment or soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in dupicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

Mercury – Field Blank Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

LDC #: 24471D4e

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

SDG #: K1011006

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: CR

2nd Reviewer: IA

METHOD: SEM Mercury (EPA SW846 Method ~~7000~~ 7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/13/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS (K1011130)
VI.	Duplicate Sample Analysis	A	DP ↓
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	1010-MST277A-SD-001	11		21	PBS	31	
2	1010-MST277B-SD-001	12		22		32	
3	1010-MST066-SD-001-1	13		23		33	
4	1010-MST066-SD-001-2	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Sediment

Parameters: SEM Mercury by CVAA EPA Method 7470A

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011007

Sample Identification	Collection Date	Laboratory Identification
1010-MST067-SD-001-1	10/03/10	K1011007-001
1010-MST131-SD-001	10/02/10	K1011007-006
1010-MST131-SD-002	10/02/10	K1011007-007
1010-MST274A-SD-001	10/02/10	K1011007-012
1010-MST274B-SD-001	10/02/10	K1011007-017

Introduction

This data review covers 5 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method EPA SW 846 7470A Mercury as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment or soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in dupicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

Mercury – Field Blank Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

LDC #: 24471E4e

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-1-10

SDG #: K1011007

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer:

2nd Reviewer:

METHOD: SEM Mercury (EPA SW846 Method ~~7000~~ 7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/2-3/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS/D (SDG: K1011130, K1011004)
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	1010-MST067-SD-001-1	11		21	PBS	31	
2	1010-MST131-SD-001	12		22		32	
3	1010-MST131-SD-002	13		23		33	
4	1010-MST274A-SD-001	14		24		34	
5	1010-MST274B-SD-001	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

Report# 24471F4e

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Sediment

Parameters: SEM Mercury by CVAA EPA Method 7470A

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011129

Sample Identification	Collection Date	Laboratory Identification
1010-MST093A-SD-001-1	10/04/10	K1011129-001
1010-MST093A-SD-001-2	10/04/10	K1011129-002
1010-MST093B-SD-001	10/04/10	K1011129-007
1010-MST095-SD-001	10/04/10	K1011129-010
1010-MST089-SD-001	10/05/10	K1011129-013
1010-MST092-SD-001	10/04/10	K1011129-016

Introduction

This data review covers 6 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method EPA SW 846 7470A Mercury as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment or soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in dupicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

Mercury – Field Blank Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

LDC #: 24471F4e

SDG #: K1011129

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

Page: 1 of 1

Reviewer: OR

2nd Reviewer: ✓

METHOD: SEM Mercury (EPA SW846 Method ~~7000~~) 7470A

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/4-5/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS (K1011130)
VI.	Duplicate Sample Analysis	A	DUP ↓
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not required utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	1010-MST093A-SD-001-1	11	PBS	21		31	
2	1010-MST093A-SD-001-2	12		22		32	
3	1010-MST093B-SD-001	13		23		33	
4	1010-MST095-SD-001	14		24		34	
5	1010-MST089-SD-001	15		25		35	
6	1010-MST092-SD-001	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Sediment

Parameters: SEM Mercury by CVAA EPA Method 7470A

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011130

Sample Identification	Collection Date	Laboratory Identification
1010-MST272-SD-001	10/05/10	K1011130-001
1010-MST273-SD-001	10/05/10	K1011130-004
1010-MST272-SD-001MS	10/05/10	K1011130-001MS
1010-MST272-SD-001DUP	10/05/10	K1011130-001DUP

Introduction

This data review covers 4 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method EPA SW 846 7470A Mercury as Simultaneously Extracted Metals (SEM).

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provide for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections preformed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for sediment or soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediment and soil.

VII. Field Duplicates

Field duplicate samples were collected in dupicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

Mercury – Field Blank Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

LDC #: 24471G4e

SDG #: K1011130

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: SEM Mercury (EPA SW846 Method 7000)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/5/10
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	Not required
V.	Matrix Spike Analysis	A	MS
VI.	Duplicate Sample Analysis	A	DUP
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	↓
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	1010-MST272-SD-001	11	QBS	21		31	
2	1010-MST273-SD-001	12		22		32	
3	1010-MST272-SD-001MS	13		23		33	
4	1010-MST272-SD-001DUP	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

Monsanto, P4 Production LLC
Data Verification Reports
LDC #24471

Wet Chemistry

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 13, 2010

Matrix: Sediment

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1010867

Sample Identification	Collection Date	Laboratory Sample Identification
1010-MSP018-SD-001	09/29/10	K1010867-003
1010-MSP018-SD-002	09/29/10	K1010867-004
1010-MSP018-SD-003	09/29/10	K1010867-005
1010-MSP017-SD-001	09/29/10	K1010867-008
1010-MSP017-SD-002	09/29/10	K1010867-009
1010-MSP017-SD-003	09/29/10	K1010867-010
1010-MSP017-SD-004	09/29/10	K1010867-011
1010-MSP031-SD-001-1	09/28/10	K1010867-012
1010-MSP031-SD-001-2	09/28/10	K1010867-013
1010-MSP031-SD-002	09/28/10	K1010867-014
1010-MSP031-SD-003	09/28/10	K1010867-015
1010-MSP015-SD-001	09/30/10	K1010867-018
1010-MSP015-SD-002	09/30/10	K1010867-019
1010-MSP015-SD-003	09/30/10	K1010867-020
1010-MSP015-SD-004	09/30/10	K1010867-021
1010-MSP014-SD-001-1	09/29/10	K1010867-024
1010-MSP014-SD-001-2	09/29/10	K1010867-025
1010-MSP014-SD-002	09/29/10	K1010867-026
1010-MSP014-SD-003	09/29/10	K1010867-027
1010-MSP014-SD-004	09/29/10	K1010867-028
1010-MSP014-SD-005	09/29/10	K1010867-029
1010-MSP023-SD-001	09/28/10	K1010867-031
1010-MSP023-SD-002	09/28/10	K1010867-032
1010-MSP023-SD-003	09/28/10	K1010867-033
1010-MSP023-SD-004	09/28/10	K1010867-034
1010-MSP018-SD-001MS	09/29/10	K1010867-003MS
1010-MSP018-SD-001MSD	09/29/10	K1010867-003MSD

1010-MSP018-SD-001DUP	09/29/10	K1010867-003DUP
1010-MSP031-SD-001-1DUP	09/28/10	41010867-012DUP

Introduction

This data review covers 29 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the Methods noted below:

- Method 821/R-91-100 for Acid Volatile Sulfide and Walkley/Black Method for Total Organic Carbon.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 5 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

The absolute value of the contaminant concentrations found in the initial, continuing and preparation blanks were less than the reporting limit (RL).

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within QC limits of 80-120% were within QC limits of 20% .

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of <20% for water or < 35% for sediment or soil. For low level results, <5 x RL, a difference of <1 x RL is allowed for water and <2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% sediments or soils).

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

Wet Chemistry – Field Blank Data Qualification Summary - SDG K1010867

No Sample Data Qualified in this SDG

LDC #: 24471A6

SDG #: K1010867

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-10-10

Page: 1 of 1

Reviewer: OR

2nd Reviewer: [illegible]

METHOD: (Analyte) Acid Volatile Sulfide (Method 821/R-91-100), TOC (Walkley/Black)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/28-29/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment

1	1010-MSP018-SD-002	11	1010-MSP015-SD-001	21	1010-MSP023-SD-001	31	PBS
2	1010-MSP018-SD-003	12	1010-MSP015-SD-002	22	1010-MSP023-SD-002	32	PBS
3	1010-MSP017-SD-001	13	1010-MSP015-SD-003	23	1010-MSP023-SD-003	33	
4	1010-MSP017-SD-002	14	1010-MSP015-SD-004	24	1010-MSP023-SD-004	34	~~letter~~
5	1010-MSP017-SD-003	15	1010-MSP014-SD-001-1	25	1010-MSP018-SD-001MS	35	1010-MSP018-SD-001
6	1010-MSP017-SD-004	16	1010-MSP014-SD-001-2	26	1010-MSP018-SD-001MSD	36	
7	1010-MSP031-SD-001-1	17	1010-MSP014-SD-002	27	1010-MSP018-SD-001DUP	37	
8	1010-MSP031-SD-001-2	18	1010-MSP014-SD-003	~~28~~	~~1010-MSP031-SD-001-1MS~~	38	
9	1010-MSP031-SD-002	19	1010-MSP014-SD-004	~~29~~	~~1010-MSP031-SD-001-1MSD~~	~~39~~	
10	1010-MSP031-SD-003	20	1010-MSP014-SD-005	30	1010-MSP031-SD-001-1DUP	40	

Notes:

LDC #: 24471A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-24,35		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (AVS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
25		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 (AVS)
26		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 (AVS)
27		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (AVS)
~~28~~		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
~~29~~		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
30		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Sediment

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011004

Sample Identification	Collection Date	Laboratory Sample Identification
1010-MSP021-SD-001	10/02/10	K1011004-003
1010-MSP021-SD-002-1	10/02/10	K1011004-004
1010-MSP021-SD-002-2	10/02/10	K1011004-005
1010-MSP021-SD-003	10/02/10	K1011004-006
1010-MSP021-SD-004	10/02/10	K1011004-007
1010-MSP020-SD-001	10/02/10	K1011004-016
1010-MSP020-SD-002	10/02/10	K1011004-017
1010-MSP020-SD-003	10/02/10	K1011004-018
1010-MSP020-SD-004	10/02/10	K1011004-019
1010-MSP020-SD-005	10/02/10	K1011004-020
1010-MSP020-SD-005MS	10/02/10	K1011004-020MS
1010-MSP020-SD-005MSD	10/02/10	K1011004-020MSD
1010-MSP020-SD-005DUP	10/02/10	K1011004-020DUP

Introduction

This data review covers 13 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the Methods noted below:

- Method 821/R-91-100 for Acid Volatile Sulfide and Walkley/Black Method for Total Organic Carbon.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 5 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

The absolute value of the contaminant concentrations found in the initial, continuing and preparation blanks were less than the reporting limit (RL).

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within QC limits of 80-120% were within QC limits of 20% .

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of <20% for water or < 35% for sediment or soil. For low level results, <5 x RL, a difference of <1 x RL is allowed for water and <2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% sediments or soils).

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

Wet Chemistry – Field Blank Data Qualification Summary - SDG K1011004

No Sample Data Qualified in this SDG

LDC #: 24471B6

SDG #: K1011004

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 12-13-10

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) Acid Volatile Sulfide (Method 821/R-91-100), TOC (Walkley/Black)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/2/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	Dup
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	A	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Sediment

1	1010-MSP021-SD-001	11	1010-MSP020-SD-005MS	21	PBS	31	
2	1010-MSP021-SD-002-1	12	1010-MSP020-SD-005MSD	22		32	
3	1010-MSP021-SD-002-2	13	1010-MSP020-SD-005DUP	23		33	
4	1010-MSP021-SD-003	14		24		34	
5	1010-MSP021-SD-004	15		25		35	
6	1010-MSP020-SD-001	16		26		36	
7	1010-MSP020-SD-002	17		27		37	
8	1010-MSP020-SD-003	18		28		38	
9	1010-MSP020-SD-004	19		29		39	
10	1010-MSP020-SD-005	20		30		40	

Notes:

LDC #: 24471B6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: V

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)	✓			
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 24471B6

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 24471B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-10		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (AVS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC:11		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 (AVS)
12		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 (AVS)
13		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (AVS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC #: 24478B6

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics, Method see comm

The correlation coefficient (r) for the calibration of AVS was recalculated.Calibration date: 10/14/10

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ug/l)	Absorbance ~~Height~~	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	AVS	s1	0	0.0002	*0.9993*	0.9993	Y
		s2	0.05	0.0362			
		s3	0.5	0.37870			
		s4	1	0.75060			
		s5	1.5	1.09760			
		s6	2	1.41760			
		s7	2.5	1.73660			
Calibration verification		ICV	1.98	Found (mg/L) 2.16	109	—	
Calibration verification		CCV1	1.98	1.97	100	100	
Calibration verification		CCV2		1.97			

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24471B5

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: SR
2nd Reviewer: h

METHOD: Inorganics, Method See cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	TOC	~~94~~ 0.31	0.33	94	94	Y
11	Matrix spike sample	AVS	(SSR-SR) 11.719	11.9	98	98	↓
13	Duplicate sample	AVS	0.081	0.078	4	3	↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 24471B6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for AVS reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$$\frac{\left(\frac{\text{Abs} - \text{Intercept}}{\text{Slope}}\right)(\text{DF})(\text{Vol})}{(\text{Wt})(32.065)}$$

Recalculation:

$$\frac{\left(\frac{0.343 - 0.0199}{0.7079}\right)(2)(40\text{mL})}{10.0038\text{g}(32.065)} = 0.114\ \text{umol/g}$$

#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
	1	AVS (umol/g)	0.114	0.114	Y
		TOC (%)	2.16	2.16	↓

Note:

RECALC.6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011005

Sample Identification	Collection Date	Laboratory Sample Identification
1010-MSP016-SD-001	09/30/10	K1011005-003
1010-MSP016-SD-002	09/30/10	K1011005-004
1010-MSP016-SD-003	09/30/10	K1011005-005
1010-MSP016-SD-004-1	09/30/10	K1011005-006
1010-MSP016-SD-004-2	09/30/10	K1011005-007
1010-MST053-SD-001	10/03/10	K1011005-010
1010-MST053-SD-002	10/03/10	K1011005-011
1010-MST053-RS-001	10/03/10	K1011005-012
1010-MST053-RS-002	10/03/10	K1011005-013
1010-MST275B-SD-001	10/01/10	K1011005-016
1010-MST275B-RS-001	10/01/10	K1011005-017
1010-MST275B-RS-002	10/01/10	K1011005-018
1010-MST275A-SD-001	10/01/10	K1011005-021
1010-MST275A-RS-001	10/01/10	K1011005-022
1010-MST275A-RS-002	10/01/10	K1011005-023
1010-MSP016-SD-003DUP	09/30/10	K1011005-005DUP
1010-MSP016-SD-003MS	09/30/10	K1011005-005MS
1010-MSP016-SD-003MSD	09/30/10	K1011005-005MSD

Introduction

This data review covers 6 soil samples and 12 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the Methods noted below:

- Method 821/R-91-100 for Acid Volatile Sulfide and Walkley/Black Method for Total Organic Carbon.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 5 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

The absolute value of the contaminant concentrations found in the initial, continuing and preparation blanks were less than the reporting limit (RL).

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within QC limits of 80-120% were within QC limits of 20% .

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of <20% for water or < 35% for sediment or soil. For low level results, <5 x RL, a difference of <1 x RL is allowed for water and <2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% sediments or soils).

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

Wet Chemistry – Field Blank Data Qualification Summary - SDG K1011005

No Sample Data Qualified in this SDG

LDC #: 24471C6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-13-10
SDG #: K1011005 Level III Page: 1 of 1
Laboratory: Columbia Analytical Services Reviewer: CR
2nd Reviewer: V

METHOD: (Analyte) Acid Volatile Sulfide (Method 821/R-91-100), TOC (Walkley/Black)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/30 - 10/3/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil

1	1010-MSP016-SD-001 sed	11	1010-MST275B-RS-001 S	21	PBS	31	
2	1010-MSP016-SD-002	12	1010-MST275B-RS-002	22		32	
3	1010-MSP016-SD-003	13	1010-MST275A-SD-001 sed	23		33	
4	1010-MSP016-SD-004-1	14	1010-MST275A-RS-001 S	24		34	
5	1010-MSP016-SD-004-2	15	1010-MST275A-RS-002	25		35	
6	1010-MST053-SD-001	16	1010-MSP016-SD-003DUP sed	26		36	
7	1010-MST053-SD-002	17	MS	27		37	
8	1010-MST053-RS-001 S	18	MSD	28		38	
9	1010-MST053-RS-002	19		29		39	
10	1010-MST275B-SD-001 sed	20		30		40	

Notes:

LDC #: 24471C6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: W

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-15		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 ~~18~~ AVS
1-7, 10, 13		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 AVS
QC: 16-18		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 AVS
↓16		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011006

Sample Identification	Collection Date	Laboratory Sample Identification
1010-MST277A-SD-001	10/03/10	K1011006-001
1010-MST277A-RS-001	10/03/10	K1011006-002
1010-MST277A-RS-002	10/03/10	K1011006-003
1010-MST277B-SD-001	10/03/10	K1011006-004
1010-MST277B-RS-001	10/03/10	K1011006-005
1010-MST277B-RS-002	10/03/10	K1011006-006
1010-MST066-SD-001-1	10/03/10	K1011006-011
1010-MST066-SD-001-2	10/03/10	K1011006-012
1010-MST066-RS-001-1	10/03/10	K1011006-013
1010-MST066-RS-001-2	10/03/10	K1011006-014
1010-MST066-RS-002	10/03/10	K1011006-015
1010-MST066-RS-002DUP	10/03/10	K1011006-015DUP

Introduction

This data review covers 8 soil samples and 4 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the Methods noted below:

- Method 821/R-91-100 for Acid Volatile Sulfide and Walkley/Black Method for Total Organic Carbon.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 5 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

The absolute value of the contaminant concentrations found in the initial, continuing and preparation blanks were less than the reporting limit (RL).

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within QC limits of 80-120% were within QC limits of 20% .

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of <20% for water or < 35% for sediment or soil. For low level results, <5 x RL, a difference of <1 x RL is allowed for water and <2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% sediments or soils).

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

Wet Chemistry – Field Blank Data Qualification Summary - SDG K1011006

No Sample Data Qualified in this SDG

LDC #: 24471D6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-13-10

SDG #: K1011006 Level III Page: 1 of 1

Laboratory: Columbia Analytical Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) Acid Volatile Sulfide (Method 821/R-91-100), TOC (Walkley/Black)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/13/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D (SDG: K1011130)
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil

1	1010-MST277A-SD-001 sed	11	1010-MST066-RS-002 S	21	PBS	31	
2	1010-MST277A-RS-001 S	12	1010-MST066-RS-002DUP S	22		32	
3	1010-MST277A-RS-002 ↓	13		23		33	
4	1010-MST277B-SD-001 sed	14		24		34	
5	1010-MST277B-RS-001 S	15		25		35	
6	1010-MST277B-RS-002 ↓	16		26		36	
7	1010-MST066-SD-001-1 sed	17		27		37	
8	1010-MST066-SD-001-2 ↓	18		28		38	
9	1010-MST066-RS-001-1 S	19		29		39	
10	1010-MST066-RS-001-2 S	20		30		40	

Notes:

LDC #: 2447D6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: W

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1,4,7,8		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (AVS)
2,3,5,6,9-11		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC: 12		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011007

Sample Identification	Collection Date	Laboratory Sample Identification
1010-MST067-SD-001-1	10/03/10	K1011007-001
1010-MST067-RS-001-1	10/03/10	K1011007-002
1010-MST067-RS-002	10/03/10	K1011007-003
1010-MST131-SD-001	10/02/10	K1011007-006
1010-MST131-SD-002	10/02/10	K1011007-007
1010-MST131-RS-001	10/02/10	K1011007-008
1010-MST131-RS-002	10/02/10	K1011007-009
1010-MST274A-SD-001	10/02/10	K1011007-012
1010-MST274A-RS-001	10/02/10	K1011007-013
1010-MST274A-RS-002	10/02/10	K1011007-014
1010-MST274B-SD-001	10/02/10	K1011007-017
1010-MST274B-RS-001	10/02/10	K1011007-018
1010-MST274B-RS-002	10/02/10	K1011007-019
1010-MST131-SD-002DUP	10/02/10	K1011007-007DUP

Introduction

This data review covers 8 soil samples and 6 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the Methods noted below:

- Method 821/R-91-100 for Acid Volatile Sulfide and Walkley/Black Method for Total Organic Carbon.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 5 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

The absolute value of the contaminant concentrations found in the initial, continuing and preparation blanks were less than the reporting limit (RL).

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within QC limits of 80-120% were within QC limits of 20% .

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of <20% for water or < 35% for sediment or soil. For low level results, <5 x RL, a difference of <1 x RL is allowed for water and <2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% sediments or soils).

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

Wet Chemistry – Field Blank Data Qualification Summary - SDG K1011007

No Sample Data Qualified in this SDG

LDC #: 24471E6

SDG #: K1011007

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-11-10

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: (Analyte) Acid Volatile Sulfide (Method 821/R-91-100), TOC (Walkley/Black)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/2-3/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	~~N~~ A	~~Not performed~~ MS (non-client)
V	Duplicates	A	DLP
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil

1	1010-MST067-SD-001-1 sed	11	1010-MST274B-SD-001 sed	21	PBS	31	
2	1010-MST067-RS-001-1 S	12	1010-MST274B-RS-001 S	22		32	
3	1010-MST067-RS-002 ↓	13	1010-MST274B-RS-002 ↓	23		33	
4	1010-MST131-SD-001 sed	14	1010-MST131-SD-002DUP sed	24		34	
5	1010-MST131-SD-002 ↓	15		25		35	
6	1010-MST131-RS-001 S	16		26		36	
7	1010-MST131-RS-002 ↓	17		27		37	
8	1010-MST274A-SD-001 sed	18		28		38	
9	1010-MST274A-RS-001 S	19		29		39	
10	1010-MST274A-RS-002 ↓	20		30		40	

Notes:

LDC #: 24477186

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1,4,5,8,11		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 (AVS)
1-13		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC:14		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011129

Sample Identification	Collection Date	Laboratory Sample Identification
1010-MST093A-SD-001-1	10/04/10	K1011129-001
1010-MST093A-SD-001-2	10/04/10	K1011129-002
1010-MST093A-RS-001-1	10/04/10	K1011129-003
1010-MST093A-RS-001-2	10/04/10	K1011129-004
1010-MST093A-RS-002-1	10/04/10	K1011129-005
1010-MST093A-RS-002-2	10/04/10	K1011129-006
1010-MST093B-SD-001	10/04/10	K1011129-007
1010-MST093B-RS-001	10/04/10	K1011129-008
1010-MST093B-RS-002	10/04/10	K1011129-009
1010-MST095-SD-001	10/04/10	K1011129-010
1010-MST095-RS-001	10/04/10	K1011129-011
1010-MST095-RS-002	10/04/10	K1011129-012
1010-MST089-SD-001	10/05/10	K1011129-013
1010-MST089-RS-001	10/05/10	K1011129-014
1010-MST089-RS-002	10/05/10	K1011129-015
1010-MST092-SD-001	10/04/10	K1011129-016
1010-MST092-RS-001	10/04/10	K1011129-017
1010-MST092-RS-002	10/04/10	K1011129-018
1010-MST092-RS-001DUP	10/04/10	K1011129-017DUP

Introduction

This data review covers 13 soil samples and 6 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the Methods noted below:

- Method 821/R-91-100 for Acid Volatile Sulfide and Walkley/Black Method for Total Organic Carbon.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 5 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

The absolute value of the contaminant concentrations found in the initial, continuing and preparation blanks were less than the reporting limit (RL).

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within QC limits of 80-120% were within QC limits of 20% .

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of <20% for water or < 35% for sediment or soil. For low level results, <5 x RL, a difference of <1 x RL is allowed for water and <2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% sediments or soils).

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

Wet Chemistry – Field Blank Data Qualification Summary - SDG K1011129

No Sample Data Qualified in this SDG

LDC #: 24471F6

SDG #: K1011129

Laboratory: Columbia Analytical Services

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 2-13-10

Page: 1 of 1

Reviewer: OR

2nd Reviewer: [illegible]

METHOD: (Analyte) Acid Volatile Sulfide (Method 821/R-91-100), TOC (Walkley/Black)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/4-5/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D (SDG: K1011130)
V	Duplicates	A	DUP
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks		

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil

1	1010-MST093A-SD-001-1 sed	11	1010-MST095-RS-001 S	21		31	
2	1010-MST093A-SD-001-2	12	1010-MST095-RS-002	22		32	
3	1010-MST093A-RS-001-1 S	13	1010-MST089-SD-001 sed	23		33	
4	1010-MST093A-RS-001-2	14	1010-MST089-RS-001 S	24		34	
5	1010-MST093A-RS-002-1	15	1010-MST089-RS-002	25		35	
6	1010-MST093A-RS-002-2	16	1010-MST092-SD-001 sed	26		36	
7	1010-MST093B-SD-001 sed	17	1010-MST092-RS-001 S	27		37	
8	1010-MST093B-RS-001 S	18	1010-MST092-RS-002	28		38	
9	1010-MST093B-RS-002	19	1010-MST092-RS-001DUP	29		39	
10	1010-MST095-SD-001 sed	20		30		40	

Notes:

LDC #: 24471F6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1,2,7,10,13,16		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 AVS
1-18		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC: [illegible]		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
1-19		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 AVS
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: December 21, 2010

Matrix: Soil/Sediment

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K1011130

Sample Identification	Collection Date	Laboratory Sample Identification
1010-MST272-SD-001	10/05/10	K1011130-001
1010-MST272-RS-001	10/05/10	K1011130-002
1010-MST272-RS-002	10/05/10	K1011130-003
1010-MST273-SD-001	10/05/10	K1011130-004
1010-MST273-RS-001	10/05/10	K1011130-005
1010-MST273-RS-002	10/05/10	K1011130-006
1010-MST272-SD-001MS	10/05/10	K1011130-001MS
1010-MST272-SD-001MSD	10/05/10	K1011130-001MSD
1010-MST272-SD-001DUP	10/05/10	K1011130-001DUP

Introduction

This data review covers 4 soil samples and 5 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the Methods noted below:

- Method 821/R-91-100 for Acid Volatile Sulfide and Walkley/Black Method for Total Organic Carbon.

This review follows the specific guidance specified in the Supplemental Sediment and Riparian Soil, Field Sampling Plan and Quality Assurance Project Plan (MWH, 2010) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Duplicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 5 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

The absolute value of the contaminant concentrations found in the initial, continuing and preparation blanks were less than the reporting limit (RL).

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within QC limits of 80-120% were within QC limits of 20% .

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of <20% for water or < 35% for sediment or soil. For low level results, <5 x RL, a difference of <1 x RL is allowed for water and <2 x RL for sediments or soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% sediments or soils).

VII. Field Duplicates

Field duplicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the duplicate samples is used as the final value for the field location. Results of field duplicate samples or other project samples were not qualified based on the precision of field duplicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

Wet Chemistry – Field Blank Data Qualification Summary - SDG K1011130

No Sample Data Qualified in this SDG

LDC #: 24471G6

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 12-13-10

SDG #: K1011130

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: (Analyte) Acid Volatile Sulfide (Method 821/R-91-100), TOC (Walkley/Black)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/5/10
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/D
V	Duplicates	A	Dup
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: sediment/soil

1	1010-MST272-SD-001 sed	11		21	PBS	31	
2	1010-MST272-RS-001 S	12		22		32	
3	1010-MST272-RS-002 ↓	13		23		33	
4	1010-MST273-SD-001 sed	14		24		34	
5	1010-MST273-RS-001 S	15		25		35	
6	1010-MST273-RS-002 ↓	16		26		36	
7	1010-MST272-SD-001MS sed	17		27		37	
8	1010-MST272-SD-001MSD	18		28		38	
9	1010-MST272-SD-001DUP ↓	19		29		39	
10		20		30		40	

Notes:

LDC #: 2447166

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: V

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1,4		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (AVS)
2,3,5,6		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
QC:7		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 (AVS)
8		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 (AVS)
9		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ClO_4 (AVS)
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

MWH Americas, Inc.
2890 East Cottonwood Parkway Suite 300
Salt Lake City, UT 84121
ATTN: Ms. Betty VanPelt

August 6, 2012

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. VanPelt,

Enclosed are the final verification reports for the fractions listed below. These SDGs were received on July 18th & 19th, 2012. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 28023:

SDG #	Fraction
304605 L12050376, L12050377, L12050381 L12050384, L12050425, L12050426 L12050491, L12050495, L12050563 L12050573, L12050574, L12050575 L12050576, L12050490	Gross Alpha & Gross Beta, Gas Flow Proportional Counting System, Metals, Wet Chemistry

The data verification was performed under Stage 2B & 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Data Validation Technical Memorandum, MWH 2009, to the project SAP, April 2004
- USEPA Contract Laboratory Program National Functional Giodelines for Inorganic Data Review, October 2004, as applicable to the method stated above
- QAPP Addendum, MWH 2009, to the project SAP, April 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

90/10

LDC #28023 (MWH Americas, Inc.-Walnut Creek / Monsanto,P4 Production LLC) Project #1010076.011601

LDC	SDG#	DATE REC'D	(3) DATE DUE	Cd (6020)		Se (6020)		(3) Metals (6020)		(5) Metals (6010B)		(6) Metals (6010B)		(14) Metals (6020A)		(3) Metals (6010B)		(6) Metals (6020)		Hg (7470A)		Alk (310.2)		Cl (300.0)		SO_4 (300.0)		NO3/ NO2-N (353.2)		Diss Hard (2340B)		TDS (160.1)		TSS (160.2)		Gross α&β (900.0)	
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	304605	07/18/12	08/08/12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0
B	L12050376	07/18/12	08/08/12	-	-			-	-	2	0	2	0	2	0	-	-	-	-	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	-	-
C	L12050377	07/18/12	08/08/12	-	-	-	-	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0	-	-	-	-	2	0	-	-	-	-
D	L12050381	07/18/12	08/08/12	8	0	8	0	-	-	-	-	-	-	-	-	8	0	-	-	-	-	-	-	-	-	8	0	-	-	8	0	8	0	-	-	-	-
E	L12050384	07/18/12	08/08/12	-	-	-	-	3	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	0	-	-	-	-	3	0	-	-	-	-
F	L12050425	07/18/12	08/08/12	-	-	-	-	3	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	0	-	-	-	-	3	0	-	-	-	-
G	L12050426	07/18/12	08/08/12	8	0	8	0	-	-	-	-	-	-	-	-	8	0	-	-	-	-	-	-	-	-	8	0	-	-	6	0	8	0	-	-	-	-
G	L12050426	07/18/12	08/08/12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0	-	-	-	-	-	-
H	L12050491	07/18/12	08/08/12	-	-	-	-	13	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	0	-	-	-	-	8	0	-	-	-	-
H	L12050491	07/18/12	08/08/12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	0	-	-	-	-	7	0	-	-	-	-
I	L12050495	07/18/12	08/08/12	-	-	-	-	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	-	-	-	-	1	0	-	-	-	-
J	L12050563	07/18/12	08/08/12	-	-	-	-	-	-	2	0	-	-	-	-	2	0	2	0	-	-	2	0	2	0	2	0	2	0	2	0	2	0	2	0	-	-
K	L12050573	07/18/12	08/08/12	-	-	-	-	10	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	0	-	-	-	-	10	0	-	-	-	-
L	L12050574	07/18/12	08/08/12	-	-	-	-	5	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	0	-	-	-	-	5	0	-	-	-	-
M	L12050575	07/18/12	08/08/12	-	-	-	-	5	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	0	-	-	-	-	5	0	-	-	-	-
N	L12050576	07/18/12	08/08/12	-	-	-	-	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0	-	-	-	-	2	0	-	-	-	-
O	L12050490	07/19/12	08/08/12	17	0	17	0	-	-	-	-	-	-	-	-	17	0	-	-	-	-	-	-	-	-	21	0	-	-	21	0	21	0	-	-	-	-
O	L12050490	07/19/12	08/08/12	4	0	4	0	-	-	-	-	-	-	-	-	4	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	A/LR			37	0	37	0	44	0	4	0	2	0	2	0	39	0	2	0	2	0	4	0	4	0	87	0	4	0	41	0	87	0	4	0	2	402

Shaded cells indicate Level III validation (all other cells are ADR review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

Report# 28023A22

Data Validation Company Name
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: August 3, 2012

Matrix: Water

Parameters: Gross Alpha and Gross Beta by Method 900.0
Gas Flow Proportional Counting System (GFPC)

Validation Level: Stage 4

Laboratory: GEL Laboratories, LLC

Sample Delivery Group (SDG): 304605

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMPW019-1-U	5/16/12	304605001
1205GWMPW019-2-U	5/16/12	304605002

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA Methods noted below:

- SW 846 Method 9310/EPA Method 900.0: Gross Alpha and Gross Beta.

This review follows the specific guidance in the Data Validation Technical Memorandum (MWH, 2009) to the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 - not applicable to this method -
6 Initial Calibration
7 -not applicable to this method-
8 Continuing Calibration Verification
9 - not applicable to this method -
10 - not applicable to this method -
11 Laboratory or Preparation Blank
12 - not applicable to this method -
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 - not applicable to this method –
19 - not applicable to this method -
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
24 Result is less than the MDC
25 Result is less than two times the error

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

_X__ Signatures on chain(s) and all samples accounted for
_X__ Gross alpha and beta: preserved with nitric acid to pH < 2; 6-month holding time (if preserved)

A total of two groundwater samples were collected on May 26, 2012 in preserved containers. Samples were shipped and arrived at the laboratory on May 17, 2012. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on May 29, 2012, 13 days from collection to analysis.

II. Instrument Calibration

_X___ Confirm dates of calibration, detectors IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards
_X___ Confirm matrix used in geometry standard
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Calibration points including efficiencies for each detector
_X___ Background checks performed at the time of initial calibration
_X___ Self absorption curves for each detector, covering an appropriate range of residue masses
_X___ Alpha-beta cross talk values and voltage plateaus (if needed)
_X___ Certificates for NBS- or NIST-traceable standards
_X___ Review standard preparation and dilution logs for accuracy

Initial calibration data were within all required criteria.

III. Calibration Verification

_NA__ Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits
_X___ Routine (daily, weekly, monthly) background checks for each detector
_X___ Daily efficiency checks for each detector
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Confirm detector IDs and geometries used in analysis
_X___ Check if sample residues are within the range of the self absorption curve

Calibration verification data were within all required criteria.

IV. Target Compound Identification and Quantitation

_X___ Confirm all samples less than MDC are qualified not detected (U)
_X___ Less than two times the uncertainty (2 sigma error) were reported by the laboratory as not detected

Sample results that were reported as values less than the MDC were qualified as not detected at the MDC (flagged U). Sample results that were less than two times the error were qualified as not detected at the MDC (flagged U) or qualified as not detected at the reported concentration (flagged U). The following results were qualified:

Field Sample Identification	Laboratory Sample ID	Parameter	Result (pCi/L)	MDC (pCi/L)	2*Error	Data Validation Result	Reason Code
1205GWMPW019-1-U	304605001	Gross Alpha	5.97	3.84	3.72	5.97U	25
1205GWMPW019-2-U	304605002	Gross Alpha	5.16	3.03	3.04	5.16U	25
1205GWMPW019-2-U	304605002	Gross Beta	6.05	4.60	3.15	6.05U	25

V. Blanks

_X___ Confirm method blank results < MDC
If method blank result is ≥ MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤ 5X the concentration of the method blank, then U at detected value.

Gross Alpha and Gross Beta were not detected in the method blank above their MDCs.

VI. Laboratory Duplicates

_X___ Confirm laboratory duplicate analyzed for each batch or for every 20 samples
_X___ Confirm that the DER ≤ 1.42 or RPD ≤ 20
Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2\ \text{sigma error}^2_{\text{Sample}}] + [2\ \text{sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

__NA_ If DER > 1.42, qualify sample J
__NA_ If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

The DUP results were within all required criteria.

VII. Laboratory Control Samples

_X___ Must be analyzed for each batch or for every 20 samples
_X___ Compare %R for Gross Alpha with lab control limits (75-125%)
_X___ Compare %R for Gross Beta with lab control limits (75-125%)

Recoveries for Gross Alpha and Gross Beta in each laboratory control sample were within control limits.

VIII. Matrix Spike Samples

_X___ Must be analyzed for each batch or for every 20 samples
_X___ Compare %R for Gross Alpha with lab control limits (65-135%)
_X___ Compare %R for Gross Beta with lab control limits (65-135%)

Recoveries for Gross Alpha and Gross Beta in each matrix spike sample were within control limits.

IX. Equipment and Water Blank Samples

No field blanks were identified in this SDG.

X. Overall Assessment of Data

With the following exceptions, all quality control data associated with the field samples were within control limits. All other field results are usable as reported by the laboratory.

Summary of Qualified Data:

Field Sample Identification	Laboratory Sample ID	Parameter	Result (pCi/L)	Data Validation Result/Flag	A or P	Reason Code
1205GWMPW019-1-U	304605001	Gross Alpha	5.97	5.97U	-	25
1205GWMPW019-2-U	304605002	Gross Alpha	5.16	5.16U	-	25
1205GWMPW019-2-U	304605002	Gross Beta	6.05	6.05U	-	25

LDC #: 28023A22 (3) **VALIDATION COMPLETENESS WORKSHEET** Date: 7-26-12
SDG #: 304605 Level IV Page: 1 of 1
Laboratory: GEL Laboratories LLC Reviewer: CL
2nd Reviewer: [illegible]

METHOD: Gross Alpha & Beta (EPA SW 846 Method ~~900.0~~ 9310 / EPA 900.0)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/16/12
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Blanks	A	
V.	Matrix Spike/(Matrix Spike) Duplicates	A/A	MS/D, Dup
VI.	Laboratory control samples	A	LCS
VII.	Minimum detectable activity (MDA)	A	
VIII.	Sample result verification	SW	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMPW019-1-U	11		21		31	
2	1205GWMPW019-2-U	12		22		32	
3	1205GWMPW019-1-UMS	13		23		33	
4	1205GWMPW019-1-UMSD	14		24		34	
5	1205GWMPW019-1-UDUP	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

✓ Signatures on chain(s) and all samples accounted for

✓ Gross alpha and beta: preserved with nitric acid to ph < 2; 6-month holding time (if preserved)

A total of 2 groundwater samples were collected on 5/16/12 in preserved containers. Samples were shipped and arrived at the laboratory on 5/17/12. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on 5/29/12, 13 days from collection to analysis.

II. Instrument Calibration

✓ Confirm dates of calibration, detector IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards

✓ Confirm matrix used in geometry standard

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

✓ Calibration points including efficiencies fo reach detector

✓ Background checks performed at the time of initial calibration

✓ Self absorption curves for each detector, covering an appropriate range of residue masses

✓ Alpha-beta cross talk values and voltage plateaus (if needed)

✓ Certificates for NBS- or NIST-traceable standards

✓ Review standard preparation and dilution logs for accuracy

III. Calibration Verification

NA Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits

✓ Routine (daily, weekly, monthly) background checks for each detector

✓ Daily efficiency checks for each detector

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

✓ Confirm defector IDs and geometries used in analysis

✓ Check if sample residues are within the range of the self absorption curve

IV. Target Compound Identification and Quantitation

✓ Confirm all samples less than MDC are quailed non detected (U)

✓ Less than two times the uncertainly (2 sigma error)were reported by the laboratory as non detected

V. Blanks

✓ Confirm method blank results < MDC
If method blank result is ≥MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤5X the concentration of the method blank, then U at detected value.

VI. Laboratory Duplicates

✓ Confirm laboratory duplicate analyzed for each batch or for every 20 samples
✓ Confirm that the DER ≤ 1.42 or RPD ≤ 20
Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2\ \text{sigma error}^2_{\text{Sample}}] + [2\ \text{sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

NA If DER > 1.42, qualify sample J
NA If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

VII. Laboratory Control Samples

✓ Must be analyzed for each batch or for every 20 samples
✓ Compare %R for Gross Alpha with lab control limits (75-125%)
✓ Compare %R for Gross Beta with lab control limits (75-125%)

VIII. Matrix Spike Samples

✓ Must be analyzed for each batch or for every 20 samples
✓ Compare %R for Gross Alpha with lab control limits (65-135%)
✓ Compare %R for Gross Beta with lab control limits (65-135%)

LDC #: 28022A22

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: ✓

Method: Radiochemistry (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
II. Calibration				
Were all instruments and detectors calibration as required?	✓			
Were NIST traceable standards used for all calibrations?	✓			
Was the check source identified by activity and radionuclide?	✓			
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?	✓			
III. Blanks				
Were blank analyses performed as required?	✓			
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spikes and Duplicates				
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Was a duplicate sample anaylzed at the required frequency of 5% in this SDG?	✓			
Were all duplicate sample duplicate error rations (DER) ≤1.42?.	✓			
V. Laboratory control samples				
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%	✓			
VI. Sample Chemical/Carrier Recovery				
Was a tracer/carrier added to each sample?			✓	
Were tracer/carrier recoveries within the QC limits?			✓	
VII. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
VIII. Sample Result Verification				
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were the Minimum Detectable Activities (MDA) < RL?	✓			

LDC #: 28022A22

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
IX. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
X. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XI. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 28022A22
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: L

METHOD: Radiochemistry, Method See Cover

#	Sample ID	Parameter	Result (~~unit~~) pCi/L	MDC (~~unit~~) pCi/L	2x Error (Unit)	Findings	Qualifications
	1	Gross α	5.97	3.84	3.72	Detected result < 2x 2σ	5.97 U2S
	2	Gross α	5.16	3.03	3.04	↓	5.16 U2S
		Gross β	6.05	4.60	3.15	↓	6.05 U2S

Comments: α = Gross alpha
β = Gross Beta
2σ = 2 sigma error

LDC #: 28024A22

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Radiochemistry (Method: see cover)

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = activity of each analyte measured in the analysis of the sample. True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample activity D = Duplicate sample activity

Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	Recalculated %R or RPD	Reported %R or RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Gross α	146	120	122	121	Y
3	Matrix spike sample	↓	246.03	241	102	102	↓
5 ~~Gross β~~	Duplicate RPD	Gross β	ND	ND	0	0	↓
	Chemical recovery						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.35

LDC #: 28022A02

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: OR
2nd reviewer: ✓

METHOD: Radiochemistry (Method: See cover)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?

Analyte results for Gross β reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$$\frac{(\text{cpm} - \text{background})}{2.22 \times E \times SA \times \text{Vol}}$$

E = Counter Efficiency
SA = Self-absorbance factor
Vol = Volume of sample

Recalculation:

$$\frac{(0.6207 - (17\text{cts}/60\text{min}))\,0.04106}{2.22(0.1L)(0.4536)} = 6.048\ \text{pCi/L}$$

#	Sample ID	Analyte	Reported Concentration (pCi/L)	Calculated Concentration (pCi/L)	Acceptable (Y/N)
	2	Gross α	5.16	5.16	Y
		Gross β	6.05	6.05	↓

Note:

Report# 28023B4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 26, 2012

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050376

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMOW037-1-U	05/09/12	L12050376-01
1205GWMMOW037-1-F	05/09/12	L12050376-02
1205GWMMOW037-2-U	05/09/12	L12050376-03
1205GWMMOW037-2-F	05/09/12	L12050376-04

Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Aluminum, Barium, Beryllium, Calcium, Iron, Magnesium, Molybdenum, Potassium, Sodium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium results were outside the QC limits; results were not qualified since the original sample (L12050342-01) was greater than 4X the spike amount and is a non-client sample.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Potassium, Sodium, and Barium results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L12050351-04 and L12050342-07) is representative of client's sample matrix.

Vanadium results were outside the QC limits; data were not qualified since the original sample (L12050342-07) concentration was less than 50 times the MDLs and is a non-client sample.

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050376

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050376

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050376

No Sample Data Qualified in this SDG

LDC #: 28023B4a

SDG #: L12050376

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 7-26-12

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/9/12
II.	ICP/MS Tune	N	Not utilized
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	~~ES~~ MS/D (non-client)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	SW	(non-client)
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Water

1	1205GWMMOW037-1-U	11		21		31	
2	1205GWMMOW037-1-F	12		22		32	
3	1205GWMMOW037-2-U	13		23		33	
4	1205GWMMOW037-2-F	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: (6 metals)

LDC #: 28603B4a

VALIDATION FINDINGS CHECKLIST

Page: 1 of
Reviewer: GR
2nd Reviewer: ✓

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 28023B4a

VALIDATION FINDINGS CHECKLIST

Page: 2 of 4
Reviewer: ek
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 08063157A

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,3		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
2,4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U

Comments: Mercury by CVAA if performed

LDC #: 25602 3B4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	L1205034 2-01	W	Ca	156	247		All	No Qual (74x, non-client)

Comments:

MSD.4SW

LDC #: 28023B4a

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		L1205035I-04	W	~~K~~	~~16.40~~ ~~GR~~ STAY	All	No Qual (non-client)
				~~Na~~	~~10.0~~ ~~GR~~ STAY		
				V	215.00		(<50xMDL)
		L1205034Z-07	W	Ba	10.20	All	

Comments:

SDILICPMS.wpd

LDC #: 28023B4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Ba	~~10.~~ 1.01	10	101	101	Y
	ICP/MS (Initial calibration)						
	CVAA (Initial calibration)						
CCV	ICP (Continuing calibration)	Fe	4.05	4	101	101	Y
	ICP/MS (Continuing calibration)						
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28023B4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	V	0.253	0.250	101	101	Y
LCS	Laboratory control sample	Al	4.98	5	99.6	99.7	↓
N	Matrix spike		(SSR-SR)				
N	Duplicate						
N	ICP serial dilution						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28023B34

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CB
2nd reviewer: ✓

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Fe were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

Raw Data = 0.184 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Al	0.209	0.209	✓
		Ba	0.0158	0.0158	↓
		Fe	0.184	0.184	↓

Note:

RECALC.4SW

Report# 28023B4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 26, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050376

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMOW037-1-U	05/09/12	L12050376-01
1205GWMMOW037-2-U	05/09/12	L12050376-03

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Antimony, Arsenic, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Nickel, Selenium, Silver, Thallium, Uranium, and Zinc.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Zinc results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L12050384-02) is representative of client's sample matrix.

Arsenic results were outside the QC limits; data were not qualified since the original sample (L12050384-02) concentration was less than 50 times the MDLs and is a non-client sample.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050376

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050376

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050376

No Sample Data Qualified in this SDG

LDC #: 28023B4b

SDG #: L12050376

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 7-26-12

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/9/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D (non-client)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	SW	(non-client)
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Water

1	1205GWMMOW037-1-U	11		21		31	
2	1205GWMMOW037-2-U	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28023B34b

VALIDATION FINDINGS CHECKLIST

Page: 1 of
Reviewer: CR
2nd Reviewer: ✓

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 28023B4b

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: ER
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: [illegible]

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: L

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U,

Comments: Mercury by CVAA if performed

LDC #: 28023B4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: QR
2nd Reviewer: ✓

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A — If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y (N) N/A — Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A — Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:
(Y) N N/A — Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		L12050384-02	W	Zn (2x)	22.50	All	No Qual (non-client)
						↓	↓
		L12050384-02	W	As	54.40		(<50x MDL, nonclient)
				Zn (1x)	35.50	↓	↓ (nonclient

Comments:

SDILICPMS.wpd

LDC #: 28023046

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: h

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{Found}{True} \times 100$$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Ni	50.2	50	100	100	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Tl	47.9	50	95.8	95.7	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28023B46

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Ni	93.9	100	93.9	93.9	Y
LCS	Laboratory control sample	Se	0.0596	0.0625	95.4	95.4	Y
N	Matrix spike		(SSR-SR)				
N	Duplicate						
N	ICP serial dilution						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 25602B4b

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for As were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{100mL\ (0.2269\ ug/L)}{40mL\ (1000)} = 0.000567\ mg/L$$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	As	0.000567	0.000567	Y
		Cr	0.00192	0.00192	
		Mn	0.0221	0.0221	
		Ni	0.00208	0.00208	
		Se	0.0188	0.0188	
		U	0.00107	0.00107	✓

Note:

RECALC.4SW

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 26, 2012

Matrix: Water

Parameters: Mercury by CVAA EPA SW 846 Method 7470A

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050376

Sample Identification	Collection Date	Laboratory Identification
1205GWMMOW037-1-U	05/09/12	L12050376-01
1205GWMMOW037-2-U	05/09/12	L12050376-03

Introduction

This data review covers 2 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 7470A: Mercury.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days) were met.

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 4 standard curve produced a correlation coefficient of >0.995. The frequency and analysis criteria (80-120%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No mercury was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120%.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted.

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Mercury - Data Qualification Summary - SDG L12050376

No Sample Data Qualified in this SDG

Mercury - Laboratory Blank Data Qualification Summary - SDG L12050376

No Sample Data Qualified in this SDG

Mercury - Field Blank Data Qualification Summary - SDG L12050376

No Sample Data Qualified in this SDG

LDC #: 28023B4c

SDG #: L12050376

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 7-26-12

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Mercury (EPA SW 846 Method 7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/9/12
III.	Calibration	A	
IV.	Blanks	A	
VI.	Matrix Spike Analysis	A	MS (non-client)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMMOW037-1-U	11		21		31	
2	1205GWMMOW037-2-U	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28005134C

VALIDATION FINDINGS CHECKLIST

Page: 1 of 1
Reviewer: GR
2nd Reviewer: V

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?			✓	
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 28023B4C

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?			✓	
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 28023B4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
	ICP/MS (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	2.09	2	105	105	Y
	ICP (Continuing calibration)						
	ICP/MS (Continuing calibration)						
CCV	CVAA (Continuing calibration)	Hg	0.00199	0.002	99.5	99.5	Y
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28230K

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
N	ICP interference check						
LCS	Laboratory control sample	Hg	0.00424	0.004	106	106	Y
N	Matrix spike		(SSR-SR)				
N	Duplicate						
N	ICP serial dilution						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28023B1c

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: N

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for _____ were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

Recalculation:

Non Detect

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)

Note: _____

RECALC.4SW

Report# 28023B6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 27, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050376

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMOW037-1-U	05/09/12	L12050376-01
1205GWMMOW037-1-F	05/09/12	L12050376-02
1205GWMMOW037-2-U	05/09/12	L12050376-03
1205GWMMOW037-2-F	05/09/12	L12050376-04
1205GWMMOW037-1-UDUP	05/09/12	L12050376-01DUP

Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 310.2 for Alkalinity, EPA Method 300.0 for Chloride and Sulfate, EPA Method 353.2 for Nitrate/Nitrite as Nitrogen, Standard Method 2340B for Dissolved Hardness, EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids, and EPA Method 160.2 and Standard Method 2540D for Total Suspended Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 353.2, 14 days for method 310.2, 7 days for method 160.1 and 160.2, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
5/15/12	CCV (13:35)	Nitrate/Nitrite as N	89.75 (90-110)	1205GWMMOW037-1-F 1205GWMMOW037-2-F	J- (all detects) UJ (all nondetects)	P

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks. with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Alkalinity	17.7 mg/L	1205GWMMOW037-1-F 1205GWMMOW037-2-F

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050376

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
L12050376	1205GWMMOW037-1-F 1205GWMMOW037-2-F	Nitrate/Nitrite as N	J- (all detects) UJ (all nondetects)	P	Continuing calibration (%R) (8)

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050376

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050376

No Sample Data Qualified in this SDG

LDC #: 28023B6

SDG #: L12050376

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 7-26-12

Page: 1 of 1

Reviewer: OL

2nd Reviewer: ✓

METHOD: Alkalinity (EPA Method 310.2), Chloride, Sulfate (EPA Method 300.0), Nitrate Nitrite as Nitrogen (EPA Method 353.2), Dissolved Hardness (SM2340B), Total Dissolved Solids (~~WPA~~ EPA Method 160.1)/SM2540C, Total Suspended Solids (EPA Method 160.2)/SM2540C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/9/12
II	Initial calibration	A	
III.	Calibration verification	SW	
IV	Blanks	~~A~~ SW	
V	Matrix Spike/Matrix Spike Duplicates	~~A~~ A	MS/D (non-client)
VI.	Duplicates	SW	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMMOW037-1-U	11		21		31	
2	1205GWMMOW037-1-F	12		22		32	
3	1205GWMMOW037-2-U	13		23		33	
4	1205GWMMOW037-2-F	14		24		34	
5	(M1) DUP	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28023B6

VALIDATION FINDINGS CHECKLIST

Reviewer: OR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	AOR	✓		
Were titrant checks performed as required? (Level IV only)	✓			
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓	AOR		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.		✓		
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 28023B6

VALIDATION FINDINGS CHECKLIST

Reviewer: AR
2nd Reviewer: VW

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓	✓	
Target analytes were detected in the field blanks.				

LDC #: 25023B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
2,4	pH TDS Cl F NO_3/NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 Hardness
1,3	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 TSS
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC-5	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 TSS
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 28023B6

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 6 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% ?
Y N N/A Are all correlation coefficients ≥0.995 ?

LEVEL IV/D ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recaluculation Worksheet for recalulations.
Y N N/A Was a balance check conducted prior to the TDS analysis.?
Y N N/A Was the titrant normality checked?

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
	5/15/12	CCV (13:35)	NO_3/NO_2N	89.75	2,4	J-/UJ/P (8)

Comments:

LDC #: 28023B6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CZ
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** 2, 4

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No Qualifiers									
Alkalinity		17.7	88.5										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 28023B6

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Page: 1 of 1
Reviewer: 02
2nd Reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water and ≤ 35% for soil samples (≤ 10% for Method 300.0)? If no, see qualificatic below. A control limit of ±CRDL (±2X CRDL for soil) was used for samples that were ≤5X the CRDL, including when only one of the duplicate sample value were ≤5X the CRDL. If field blanks were used for laboratory duplicates, see overall assessment.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Duplicate ID	Matrix	Analyte	RPD (Limits)	Associated Samples	Qualifications
		5	W	TSS	25 (≤20)	1,3	No Qual (OK by difference)

Comments:

LDC #: 28023B2

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CL
2nd Reviewer: 1

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of NO3/NO2-N was recalculated. Calibration date: 5/15/12

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	NO3/NO2-N	s1	0.0	-0.003	0.9999	0.9999	Y
		s2	0.04	0.0125			
		s3	0.1	0.0295			
		s4	0.5	0.151			
		s5	1	0.3039			
		s6	2	0.6165			
Calibration verification		CCV	1.5	1.346	89.73	89.75	
Calibration verification	Cl		8	7.7405	96.8	96.8	
Calibration verification	SO4		40	38.3547	95.9	95.9	

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28023R6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: 9R
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Cl	7.71	8	96.4	96.4	Y
	Matrix spike sample		(SSR-SR)				
S	Duplicate sample	TSS	3.50	4.50	25	25	Y

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 28023S26

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: QR
2nd reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for Cl reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$y = 0.1482x - 0.0023$

Recalculation:

$\frac{1.049 + 0.0023}{0.1482} = 7.09$ mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	2	Cl	7.09	7.09	Y
		SO_4	25.1	25.1	
		Alk	183	183	
		Hardness	216	216	
		NO_3/NO_2-N	2.44	2.44	

Note:

RECALC.6

Report# 28023C4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 27, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050377

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW035-U	05/09/12	L12050377-01
1205GWMMW026-U	05/09/12	L12050377-03

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050377

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050377

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050377

No Sample Data Qualified in this SDG

LDC #: 28023C4D

SDG #: L12050377

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7/26/12

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method ~~6010B~~ 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/9/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D (L1205038-4)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Water

1	1205GWMMW035-U	11		21		31	
2	1205GWMMW026-U	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: (3 metals)

LDC #: [illegible]

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____

Comments: Mercury by CVAA if performed

Report# 28023C6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050377

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW035-U	05/09/12	L12050377-01
1205GWMMW035-F	05/09/12	L12050377-02
1205GWMMW026-U	05/09/12	L12050377-03
1205GWMMW026-F	05/09/12	L12050377-04

Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, and EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, and 7 days for methods 160.1 and 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050377

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050377

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050377

No Sample Data Qualified in this SDG

LDC #: 28023C6
SDG #: L12050377
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 7-26-12
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), Total Dissolved Solids (EPA Method 160.1) / SM2540C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/9/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	~~A~~ N	r
VI.	Duplicates	A	D(p (L12050384)
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMMW035-U	11		21		31	
2	1205GWMMW035-F	12		22		32	
3	1205GWMMW026-U	13		23		33	
4	1205GWMMW026-F	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28002366

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
2,4	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
1,2	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

Report# 28023D4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050381

Sample Identification	Collection Date	Laboratory Sample Identification
1205SWMST069-F	05/08/12	L12050381-01
1205SWMST045-1-F	05/09/12	L12050381-03
1205SWMST045-2-F	05/09/12	L12050381-05
1205SWMST044-F	05/09/12	L12050381-07
1205SWMST063-F	05/09/12	L12050381-09
1205SWMST063-F-MS	05/09/12	L12050381-11
1205SWMST063-F-MSD	05/09/12	L12050381-13
1205SWMST057-F	05/09/12	L12050381-15
1205ER-SW-01-F	05/09/12	L12050381-17
1205-SW-01-F	05/09/12	L12050381-19

Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium, Magnesium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Sample 1205ER-SW-01-F was identified as an equipment blank. No metal contaminants were found with the following exceptions:

Equipment Blank ID	Analyte	Concentration (mg/L)
1205ER-SW-01-F	Calcium	0.101

Sample 1205-SW-01-F was identified as a source blank. No metal contaminants were found.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>1X blank contaminants) than the concentrations found in the associated field blanks.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium results were outside the QC limits; results were not qualified since the original sample (1205SWMST063-F) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050381

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050381

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050381

No Sample Data Qualified in this SDG

LDC #: 28023D4a

SDG #: L12050381

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-26-12

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Dissolved Metals (EPA SW 846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/9/12
II.	ICP/MS Tune	N	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	EB=9 *; SB=10

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; * ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205SWMST069-F	11		21		31	
2	1205SWMST045-1-F	12		22		32	
3	1205SWMST045-2-F	13		23		33	
4	1205SWMST044-F	14		24		34	
5	1205SWMST063-F	15		25		35	
6	1205SWMST063-F-MS	16		26		36	
7	1205SWMST063-F-MSD	17		27		37	
8	1205SWMST057-F	18		28		38	
9	1205ER-SW-01-F	19		29		39	
10	1205-SW-01-F	20		30		40	

Notes: (3 metals)

LDC #: 28023D4G

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: QR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10 1-5,8-10		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
QC: 6,7		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 28023D4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: µg/L **Associated sample units:** µg/L
Sampling date: 5/9/12 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1-8

Analyte	Blank ID	Sample Identification											
	9	Action Limit	No Qualifiers										
Ca	0.101	0.101											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 28023D4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: a
2nd Reviewer: h

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	6/7	W	Ca	139			All	No Qual (>4x)

Comments:

Report# 28023D4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050381

Sample Identification	Collection Date	Laboratory Sample Identification
1205SWMST069-F	05/08/12	L12050381-01
1205SWMST069-U	05/08/12	L12050381-02
1205SWMST045-1-F	05/09/12	L12050381-03
1205SWMST045-1-U	05/09/12	L12050381-04
1205SWMST045-2-F	05/09/12	L12050381-05
1205SWMST045-2-U	05/09/12	L12050381-06
1205SWMST044-F	05/09/12	L12050381-07
1205SWMST044-U	05/09/12	L12050381-08
1205SWMST063-F	05/09/12	L12050381-09
1205SWMST063-U	05/09/12	L12050381-10
1205SWMST063-F-MS	05/09/12	L12050381-11
1205SWMST063-U-MS	05/09/12	L12050381-12
1205SWMST063-F-MSD	05/09/12	L12050381-13
1205SWMST063-U-MSD	05/09/12	L12050381-14
1205SWMST057-F	05/09/12	L12050381-15
1205SWMST057-U	05/09/12	L12050381-16
1205ER-SW-01-F	05/09/12	L12050381-17
1205ER-SW-01-U	05/09/12	L12050381-18
1205-SW-01-F	05/09/12	L12050381-19
1205-SW-01-U	05/09/12	L12050381-20

Introduction

This data review covers 20 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1205ER-SW-01-F and 1205ER-SW-01-U were identified as equipment blanks. No metal contaminants were found.

Samples 1205-SW-01-F and 1205-SW-01-U were identified as source blanks. No metal contaminants were found.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1205SWMST063-U-MS/MSD (1205SWMST069-U 1205SWMST045-1-U 1205SWMST045-2-U 1205SWMST044-U 1205SWMST063-U 1205SWMST057-U 1205ER-SW-01-U 1205-SW-01-U)	Selenium	128 (75-125)	-	-	J+ (all detects)	A

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Selenium results were outside the QC limits; results were not reported since the original sample (1205SWMST069-U) was reported from a different dilution.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050381

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12050381	1205SWMST069-U 1205SWMST045-1-U 1205SWMST045-2-U 1205SWMST044-U 1205SWMST063-U 1205SWMST057-U 1205ER-SW-01-U 1205-SW-01-U	Selenium	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R)	16

Metals - Laboratory Blank Data Qualification Summary - SDG L12050381

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050381

No Sample Data Qualified in this SDG

LDC #: 28023D4b

SDG #: L12050381

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-26-12

Page: 1 of 1

Reviewer: CL

2nd Reviewer: W

METHOD: Metals (EPA SW 846 Method ~~6010B~~/6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/9/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	ND	EB=17,18 SB=19,20

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205SWMST069-F	11	1205SWMST063-F-MS	21		31	
2	1205SWMST069-U	12	1205SWMST063-U-MS	22		32	
3	1205SWMST045-1-F	13	1205SWMST063-F-MSD	23		33	
4	1205SWMST045-1-U	14	1205SWMST063-U-MSD	24		34	
5	1205SWMST045-2-F	15	1205SWMST057-F	25		35	
6	1205SWMST045-2-U	16	1205SWMST057-U	26		36	
7	1205SWMST044-F	17	1205ER-SW-01-F	27		37	
8	1205SWMST044-U	18	1205ER-SW-01-U	28		38	
9	1205SWMST063-F	19	1205-SW-01-F	29		39	
10	1205SWMST063-U	20	1205-SW-01-U	30		40	

Notes: ~~Samples appended with F were analyzed as dissolved.~~

LDC #: 28023D4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: QR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,3,5,7,9, ~~11~~,~~13~~,15,17,19		Al, Sb, As, Ba, Be, (Cd), Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
2,4,6,8,10, ~~12~~,~~14~~,16,18,20		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC 11,13		Al, Sb, As, Ba, Be, (Cd), Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
12,14		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, (Cd), Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 26023D4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	12/14	W	Se	128			3,4,6,8,10,16,18,20	J+ det A (16)

Comments:

MSD.4SW

LDC #: 28023D4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: AR
2nd Reviewer: L

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?

Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?

Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		2	W	Se (2x)	15.20		No Qual (Not reported from 2x concentration)

Comments:

Report# 28023D6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050381

Sample Identification	Collection Date	Laboratory Sample Identification
1205SWMST069-F	05/08/12	L12050381-01
1205SWMST069-U	05/08/12	L12050381-02
1205SWMST045-1-F	05/09/12	L12050381-03
1205SWMST045-1-U	05/09/12	L12050381-04
1205SWMST045-2-F	05/09/12	L12050381-05
1205SWMST045-2-U	05/09/12	L12050381-06
1205SWMST044-F	05/09/12	L12050381-07
1205SWMST044-U	05/09/12	L12050381-08
1205SWMST063-F	05/09/12	L12050381-09
1205SWMST063-U	05/09/12	L12050381-10
1205SWMST063-F-MS	05/09/12	L12050381-11
1205SWMST063-U-MS	05/09/12	L12050381-12
1205SWMST063-F-MSD	05/09/12	L12050381-13
1205SWMST063-U-MSD	05/09/12	L12050381-14
1205SWMST057-F	05/09/12	L12050381-15
1205SWMST057-U	05/09/12	L12050381-16
1205ER-SW-01-F	05/09/12	L12050381-17
1205ER-SW-01-U	05/09/12	L12050381-18
1205-SW-01-F	05/09/12	L12050381-19
1205-SW-01-U	05/09/12	L12050381-20
1205SWMST063-UDUP	05/09/12	L12050381-10DUP

Introduction

This data review covers 21 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, Standard Method 2340B for Dissolved Hardness, and EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

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J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

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2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 6 months for method 2340B, and 7 days for methods 160.1 and 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1205ER-SW-01-F and 1205ER-SW-01-U were identified as equipment blanks. No contaminant concentrations were found.

Samples 1205-SW-01-F and 1205-SW-01-U were identified as source blanks. No contaminant concentrations were found with the following exceptions:

Source Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1205-SW-01-U	5/9/12	Total dissolved solids	72.0 mg/L	1205ER-SW-01-U

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>1X blank contaminants) than the concentrations found in the associated field blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1205SWMST063-F-MS/MSD (1205SWMST069-F 1205SWMST045-1-F 1205SWMST045-2-F 1205SWMST044-F 1205SWMST063-F 1205SWMST057-F 1205ER-SW-01-F 1205-SW-01-F)	Sulfate	114 (90-110)	114 (90-110)	-	J+ (all detects)	A

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050381

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12050381	1205SWMST069-F 1205SWMST045-1-F 1205SWMST045-2-F 1205SWMST044-F 1205SWMST063-F 1205SWMST057-F 1205ER-SW-01-F 1205-SW-01-F	Sulfate	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R)	16

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050381

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050381

No Sample Data Qualified in this SDG

LDC #: 28023D6
SDG #: L1205037781
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 7-26-12
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Sulfate (EPA Method 300.0), Dissolved Hardness(SM2340B), Total Dissolved Solids (EPA Method 160.1/SM2540C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/9/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	~~A~~ SW	MS/D
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	SW	EB= 17,18 SB=19,20

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205SWMST069-F	11	1205SWMST063-F-MS	21	(~~11~~ 10) DUP	31	
2	1205SWMST069-U	12	1205SWMST063-U-MS	22		32	
3	1205SWMST045-1-F	13	1205SWMST063-F-MSD	23		33	
4	1205SWMST045-1-U	14	1205SWMST063-U-MSD	24		34	
5	1205SWMST045-2-F	15	1205SWMST057-F	25		35	
6	1205SWMST045-2-U	16	1205SWMST057-U	26		36	
7	1205SWMST044-F	17	1205ER-SW-01-F	27		37	
8	1205SWMST044-U	18	1205ER-SW-01-U	28		38	
9	1205SWMST063-F	19	1205-SW-01-F	29		39	
10	1205SWMST063-U	20	1205-SW-01-U	30		40	

Notes:

LDC #: 28023D6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter
1,3,5,7,9, ~~11,13~~,15,17,19	pH TDS Cl F NO_3 NO_2 (SO4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 (Hardness)
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
2,4,6,8,10,12, ~~14~~,16,18,20	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC 2,12,14	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
11,13	pH TDS Cl F NO_3 NO_2 (SO4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 (Hardness)
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 28023D6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 5/9/12 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: SB Associated Samples: 18

Analyte	Blank ID	Action Limit	Sample Identification							
	20		No Qualifiers							
TDS	72.0	72.0								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 28023D6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CL
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125~~ 90-110? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	11/13	W	SO4	114	114		13,5,7,9,15,17,19	J+dot/A (6)

Comments:

MSD.6

Report# 28023E4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 27, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050384

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW009U	05/08/12	L12050384-02
1205GWMMW036U	05/08/12	L12050384-04
1205GWMMW036UMS	05/08/12	L12050384-06
1205GWMMW036UMSD	05/08/12	L12050384-08
1205GWMMW027U	05/08/12	L12050384-10

Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050384

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050384

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050384

No Sample Data Qualified in this SDG

LDC #: 28023E4b

SDG #: L12050384

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 7/26/12

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/8/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMMW009U	11		21		31	
2	1205GWMMW036U	12		22		32	
3	1205GWMMW036UMS	13		23		33	
4	1205GWMMW036UMSD	14		24		34	
5	1205GWMMW027U	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28023E4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: 9B
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1935		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
QC:3,4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___

Comments: Mercury by CVAA if performed

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: August 2, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050384

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW009F	05/08/12	L12050384-01
1205GWMMW009U	05/08/12	L12050384-02
1205GWMMW036F	05/08/12	L12050384-03
1205GWMMW036U	05/08/12	L12050384-04
1205GWMMW036FMS	05/08/12	L12050384-05
1205GWMMW036UMS	05/08/12	L12050384-06
1205GWMMW036FMSD	05/08/12	L12050384-07
1205GWMMW036UMSD	05/08/12	L12050384-08
1205GWMMW027F	05/08/12	L12050384-09
1205GWMMW027U	05/08/12	L12050384-10
1205GWMMW036UDUP	05/08/12	L12050384-04DUP

Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, and EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, and 7 days for methods 160.1 and 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1205GWMMW036FMS/MSD (1205GWMMW009F 1205GWMMW036F 1205GWMMW027F)	Sulfate	113 (90-110)	113 (90-110)	-	J+ (all detects)	A

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050384

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12050384	1205GWMMW009F 1205GWMMW036F 1205GWMMW027F	Sulfate	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R)	16

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050384

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050384

No Sample Data Qualified in this SDG

LDC #: 28023E6
SDG #: L12050384
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level ~~IV~~ III

Date: 7-26-12
Page: 1 of 1
Reviewer: CL
2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), Total Dissolved Solids (EPA Method 160.1)/SM2540C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/8/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	~~A~~ SW	MS/D
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	~~A~~ N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water

1	1205GWMMW009F	11	(~~x~~ 4) DUP	21		31	
2	1205GWMMW009U	12		22		32	
3	1205GWMMW036F	13		23		33	
4	1205GWMMW036U	14		24		34	
5	1205GWMMW036FMS	15		25		35	
6	1205GWMMW036UMS	16		26		36	
7	1205GWMMW036FMSD	17		27		37	
8	1205GWMMW036UMSD	18		28		38	
9	1205GWMMW027F	19		29		39	
10	1205GWMMW027U	20		30		40	

Notes:

LDC #: 28023E6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter
1,3,9	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
2,4,10	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC: 5,7	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
11,6,8	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 28236G

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125~~ 90-110? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	5/7	W	SO4	113	113		1,3,9	J+det/A (16)

Comments:

Report# 28023F4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 27, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050425

Sample Identification	Collection Date	Laboratory Sample Identification
125GWMMW021-U	05/10/12	L12050425-01
125GWMMW006-U	05/10/12	L12050425-03
125GWMMW020-U	05/10/12	L12050425-05

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050425

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050425

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050425

No Sample Data Qualified in this SDG

LDC #: 28023F4b

SDG #: L12050425

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-26-12

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method ~~6010B~~ 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/10/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D (L12050490)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	(L12050490)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	125GWMMW021-U	11		21		31	
2	125GWMMW006-U	12		22		32	
3	125GWMMW020-U	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: [illegible]

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
F3		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____

Comments: Mercury by CVAA if performed

Report# 28023F6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050425

Sample Identification	Collection Date	Laboratory Sample Identification
125GWMMW021-U	05/10/12	L12050425-01
125GWMMW021-F	05/10/12	L12050425-02
125GWMMW006-U	05/10/12	L12050425-03
125GWMMW006-F	05/10/12	L12050425-04
125GWMMW020-U	05/10/12	L12050425-05
125GWMMW020-F	05/10/12	L12050425-06
125GWMMW021-UDUP	05/10/12	L12050425-01DUP

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, and EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, and 7 days for methods 160.1 and 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050425

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050425

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050425

No Sample Data Qualified in this SDG

LDC #: 28023F6
SDG #: L12050425
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 7-26-12
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), Total Dissolved Solids (EPA Method 160.1)/SM2540C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/10/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS/D (L12050384)
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	125GWMMW021-U	11		21		31	
2	125GWMMW021-F	12		22		32	
3	125GWMMW006-U	13		23		33	
4	125GWMMW006-F	14		24		34	
5	125GWMMW020-U	15		25		35	
6	125GWMMW020-F	16		26		36	
7	(~~X~~ 1) DUP	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28023F6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter
2,4,6	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
1,3,5	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
a:7	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

Report# 28023G4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050426

Sample Identification	Collection Date	Laboratory Sample Identification
1205SWMST226-F	05/10/12	L12050426-01
1205SWMST048-F	05/10/12	L12050426-03
1205SWMST050-F	05/10/12	L12050426-05
1205SWMST093-F	05/10/12	L12050426-07
1205SWMST095-F	05/10/12	L12050426-09
1205SWMSG006-F	05/10/12	L12050426-11
1205SWMST096-F	05/10/12	L12050426-13
1205-ER-SW-02-F	05/10/12	L12050426-15

Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium, Magnesium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Sample 1205-ER-SW-02-F was identified as an equipment blank. No metal contaminants were found with the following exceptions:

Equipment Blank ID	Analyte	Concentration (mg/L)
1205-ER-SW-02-F	Calcium Vanadium	0.154 0.00543

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>1X blank contaminants) than the concentrations found in the associated field blanks.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Magnesium results were outside the QC limits; results were not qualified since the original sample (L12050415-02) was greater than 4X the spike amount and is a non-client sample.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050426

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050426

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050426

No Sample Data Qualified in this SDG

LDC #: 28023G4a

SDG #: L12050426

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7/26/12

Page: 4 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Dissolved Metals (EPA SW 846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/10/12
II.	ICP/MS Tune	N	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D (non-client)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	(non client)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	EB=9

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205SWMST226-F	11		21		31	
2	1205SWMST048-F	12		22		32	
3	1205SWMST050-F	13		23		33	
4	1205SWMST093-F	14		24		34	
5	1205SWMST095-F	15		25		35	
6	1205SWMSG006-F	16		26		36	
~~7~~	~~1205SWMSG006-F~~	17		27		37	
8	1205SWMST096-F	18		28		38	
9	1205-ER-SW-02-F	19		29		39	
10		20		30		40	

Notes:

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-9		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___

Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U

Comments: Mercury by CVAA if performed

LDC #: 28023G4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 5/10/12 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1-8

Analyte	Blank ID	Sample Identification											
	9	Action Limit	No Qualifiers										
Ca	0.154	0.154											
V	0.00543	0.00543											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 28023646

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	L12050415-02	W	Mg	288	202		All	No Qual (non-dient, >4x)

Comments:

MSD.4SW

Report# 28023G4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050426

Sample Identification	Collection Date	Laboratory Sample Identification
1205SWMST226-F	05/10/12	L12050426-01
1205SWMST226-U	05/10/12	L12050426-02
1205SWMST048-F	05/10/12	L12050426-03
1205SWMST048-U	05/10/12	L12050426-04
1205SWMST050-F	05/10/12	L12050426-05
1205SWMST050-U	05/10/12	L12050426-06
1205SWMST093-F	05/10/12	L12050426-07
1205SWMST093-U	05/10/12	L12050426-08
1205SWMST095-F	05/10/12	L12050426-09
1205SWMST095-U	05/10/12	L12050426-10
1205SWMSG006-F	05/10/12	L12050426-11
1205SWMSG006-U	05/10/12	L12050426-12
1205SWMST096-F	05/10/12	L12050426-13
1205SWMST096-U	05/10/12	L12050426-14
1205-ER-SW-02-F	05/10/12	L12050426-15
1205-ER-SW-02-U	05/10/12	L12050426-16
1205SWMST226-FMS	05/10/12	L12050426-01MS
1205SWMST226-FMSD	05/10/12	L12050426-01MSD

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1205-ER-SW-02-F and 1205-ER-SW-02-U were identified as equipment blanks. No metal contaminants were found.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Selenium results were outside the QC limits; data were not qualified since the original sample (1205SWMST226-U) concentration was less than 50 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050426

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050426

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050426

No Sample Data Qualified in this SDG

LDC #: 28023G4b

SDG #: L12050426

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-26-12

Page: 1 of 1

Reviewer: OL

2nd Reviewer: W

METHOD: Metals (EPA SW 846 Method ~~6010~~B/6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/10/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	ND	EB=15,16

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205SWMST226-F	11	1205SWMSG006-F	21		31	
2	1205SWMST226-U	12	1205SWMSG006-U	22		32	
3	1205SWMST048-F	13	1205SWMST096-F	23		33	
4	1205SWMST048-U	14	1205SWMST096-U	24		34	
5	1205SWMST050-F	15	1205-ER-SW-02-F	25		35	
6	1205SWMST050-U	16	1205-ER-SW-02-U	26		36	
7	1205SWMST093-F	17	(~~X~~1) MS	27		37	
8	1205SWMST093-U	18	MSD)	28		38	
9	1205SWMST095-F	19		29		39	
10	1205SWMST095-U	20		30		40	

Notes: ~~Samples appended with F were~~ analyzed as dissolved.

LDC #: 28023 64

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: QR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,3,5,7,9, 11,13,15		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
2,4,6,8,10, 12,14,16		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC: 17,18		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 28025645

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		2	W	Se	12.30		No Qual (<50x MDL)

Comments:

SDILICPMS.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: August 2, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050426

Sample Identification	Collection Date	Laboratory Sample Identification
1205SWMST226-F**	05/10/12	L12050426-01**
1205SWMST226-U	05/10/12	L12050426-02
1205SWMST048-F**	05/10/12	L12050426-03**
1205SWMST048-U	05/10/12	L12050426-04
1205SWMST050-F	05/10/12	L12050426-05
1205SWMST050-U	05/10/12	L12050426-06
1205SWMST093-F	05/10/12	L12050426-07
1205SWMST093-U	05/10/12	L12050426-08
1205SWMST095-F	05/10/12	L12050426-09
1205SWMST095-U	05/10/12	L12050426-10
1205SWMSG006-F	05/10/12	L12050426-11
1205SWMSG006-U	05/10/12	L12050426-12
1205SWMST096-F	05/10/12	L12050426-13
1205SWMST096-U	05/10/12	L12050426-14
1205-ER-SW-02-F	05/10/12	L12050426-15
1205-ER-SW-02-U	05/10/12	L12050426-16

**Indicates sample underwent Stage 4 review for Hardness only

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, Standard Method 2340B for Dissolved Hardness, and EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 7 days for methods 160.1 and 2540C, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1205-ER-SW-02-F and 1205-ER-SW-02-U were identified as equipment blanks. No contaminant concentrations were found.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage IV review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050426

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050426

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050426

No Sample Data Qualified in this SDG

LDC #: 28023G6
SDG #: L12050426
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III /IV

Date: 7-26-12
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Sulfate (EPA Method 300.0), Dissolved Hardness(SM2340B), Total Dissolved Solids (EPA Method 160.1)/SM2540C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/10/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	
VI.	Duplicates	A	D/P (L12050425)
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	Not reviewed for level III
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	ND	EB=15,16

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water ** Level 4 for hardness only

1	1205SWMST226-F**	11	1205SWMSG006-F	21		31	
2	1205SWMST226-U	12	1205SWMSG006-U	22		32	
3	1205SWMST048-F**	13	1205SWMST096-F	23		33	
4	1205SWMST048-U	14	1205SWMST096-U	24		34	
5	1205SWMST050-F	15	1205-ER-SW-02-F	25		35	
6	1205SWMST050-U	16	1205-ER-SW-02-U	26		36	
7	1205SWMST093-F	17		27		37	
8	1205SWMST093-U	18		28		38	
9	1205SWMST095-F	19		29		39	
10	1205SWMST095-U	20		30		40	

Notes:

LDC #: 28023366

VALIDATION FINDINGS CHECKLIST

Reviewer: QR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.			✓	
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?			✓	
Was an LCS analyzed per extraction batch?			✓	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?			✓	
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 28023 G6

VALIDATION FINDINGS CHECKLIST

Reviewer: AR
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 2802366

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter
1,3,5,7,9,11,13,15	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 Hardness
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
2,4,6,8,10,12,14,16	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 28023366

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: QR
2nd reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for Hardness reported with a positive detect were recalculated and verified using the following equation:

Concentration = Ca(2.497) + Mg(4.118)

Recalculation: 2.497(50.3) + 4.118(10.2) = 167.6 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Hardness	167	168	Y

Note:

Report# 28023H4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 27, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050491

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW007U	05/13/12	L12050491-01
1205GWMMW007UMS	05/13/12	L12050491-03
1205GWMMW007UMSD	05/13/12	L12050491-05
1205GWMMW011U	05/13/12	L12050491-07
1205GWMMW028-1-U	05/13/12	L12050491-09
1205GWMMW028-2-U	05/13/12	L12050491-11
1205GWMMW023U	05/13/12	L12050491-13
1205GWMMW027U	05/13/12	L12050491-15
1205GWMMW017U	05/13/12	L12050491-17
1205GWMMW028U	05/13/12	L12050491-19
1205GWMBW085U	05/12/12	L12050491-21
1205GWMMW034-1-U	05/12/12	L12050491-23
1205GWMMW034-2-U	05/12/12	L12050491-25
1205GWMMW013U	05/12/12	L12050491-27
1205GWMMW024U	05/12/12	L12050491-29

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
5/22/12	CRDL (13:46)	Selenium	185 (70-130)	1205GWMMW023U	J+ (all detects)	P

Selenium results were outside the QC limits; data were not qualified since the sample concentration for samples 1205GWMMW028-2-U, 1205GWMMW027U, 1205GWMMW017U, 1205GWMMW028U, 1205GWMBW085U, 1205GWMMW034-1-U, 1205GWMMW034-2-U, 1205GWMMW013U, and 1205GWMMW024U were less than 2X the RLs.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Selenium	0.000779 mg/L	All samples in SDG L12050491
ICB/CCB	Selenium	0.380 ug/L	1205GWMMW028-2-U 1205GWMMW023U 1205GWMBW085U 1205GWMMW027U 1205GWMMW017U 1205GWMMW028U 1205GWMMW034-1-U 1205GWMMW034-2-U 1205GWMMW013U 1205GWMMW024U

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1205GWMMW007U	Selenium	0.00176 mg/L	0.00176U mg/L
1205GWMMW011U	Selenium	0.00124 mg/L	0.00124U mg/L
1205GWMMW028-2-U	Selenium	0.0115 mg/L	0.0115U mg/L
1205GWMMW023U	Selenium	0.00256 mg/L	0.00256U mg/L
1205GWMBW085U	Selenium	0.00539 mg/L	0.00539U mg/L

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Selenium results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L12050521-03) is representative of client's sample matrix.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050491

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12050491	1205GWMMW023U	Selenium	J+ (all detects)	P	Low-level continuing calibration (%R)	9

Metals - Laboratory Blank Data Qualification Summary - SDG L12050491

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
L12050491	1205GWMMW007U	Selenium	0.00176U mg/L	A	10
L12050491	1205GWMMW011U	Selenium	0.00124U mg/L	A	10
L12050491	1205GWMMW028-2-U	Selenium	0.0115U mg/L	A	10
L12050491	1205GWMMW023U	Selenium	0.00256U mg/L	A	10
L12050491	1205GWMBW085U	Selenium	0.00539U mg/L	A	10

Metals - Field Blank Data Qualification Summary - SDG L12050491

No Sample Data Qualified in this SDG

LDC #: 28023H4D

SDG #: L12050491

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7/26/12

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method ~~6010B~~ 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/12-13/12
II.	ICP/MS Tune	A	
III.	Calibration	A or SW	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	SW	(non-client)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMMW007U	11	1205GWMBW085U	21		31	
2	1205GWMMW007UMS	12	1205GWMMW034-1-U	22		32	
3	1205GWMMW007UMSD	13	1205GWMMW034-2-U	23		33	
4	1205GWMMW011U	14	1205GWMMW013U	24		34	
5	1205GWMMW028-1-U	15	1205GWMMW024U	25		35	
6	1205GWMMW028-2-U	16		26		36	
7	1205GWMMW023U	17		27		37	
8	1205GWMMW027U	18		28		38	
9	1205GWMMW017U	19		29		39	
10	1205GWMMW028U	20		30		40	

Notes: (3 metals)

LDC #: 28023H4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: QR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,4-15		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC2,3		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 28023H4b

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of
Reviewer:
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	5/22/12	CRDL (13:46)	Se	185 (70-130)	6-15	6, 8-15 : No qual (>2xRL) 7 : J+dot/P (9)

Comments:

CAL.4SW

LDC #: 28023H4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: OL
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 4x Reason: 10
Sample Concentration units, unless otherwise noted: mg/L Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	~~5~~ 4								
Se		0.000779		0.003895	0.00176	0.00124								

Sample Concentration units, unless otherwise noted: mg/L Associated Samples: 6-15

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit (2x dil)	6	7	11							
Se			0.380	0.0152	0.0115	0.00256	0.00539							

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 28023H4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		L1205052-03	W	Se(25x)	92.30		No Qual (non-client)
		L1205052-03	W	Se(5x)	24.60		

Comments:

SDILICPMS.wpd

Report# 28023H6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050491

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW007U**	05/13/12	L12050491-01**
1205GWMMW007F**	05/13/12	L12050491-02**
1205GWMMW007UMS	05/13/12	L12050491-03
1205GWMMW007FMS	05/13/12	L12050491-04
1205GWMMW007UMSD	05/13/12	L12050491-05
1205GWMMW007FMSD	05/13/12	L12050491-06
1205GWMMW011U**	05/13/12	L12050491-07**
1205GWMMW011F**	05/13/12	L12050491-08**
1205GWMMW028-1-U**	05/13/12	L12050491-09**
1205GWMMW028-1-F**	05/13/12	L12050491-10**
1205GWMMW028-2-U**	05/13/12	L12050491-11**
1205GWMMW028-2-F**	05/13/12	L12050491-12**
1205GWMMW023U**	05/13/12	L12050491-13**
1205GWMMW023F**	05/13/12	L12050491-14**
1205GWMMW027U**	05/13/12	L12050491-15**
1205GWMMW027F**	05/13/12	L12050491-16**
1205GWMMW017U**	05/13/12	L12050491-17**
1205GWMMW017F**	05/13/12	L12050491-18**
1205GWMMW028U	05/13/12	L12050491-19
1205GWMMW028F	05/13/12	L12050491-20
1205GWMBW085U	05/12/12	L12050491-21
1205GWMBW085F	05/12/12	L12050491-22
1205GWMMW034-1-U	05/12/12	L12050491-23
1205GWMMW034-1-F	05/12/12	L12050491-24
1205GWMMW034-2-U	05/12/12	L12050491-25

1205GWMMW034-2-F	05/12/12	L12050491-26
1205GWMMW013U	05/12/12	L12050491-27
1205GWMMW013F	05/12/12	L12050491-28
1205GWMMW024U	05/12/12	L12050491-29
1205GWMMW024F	05/12/12	L12050491-30
1205GWMMW017UDUP	05/13/12	L12050491-17DUP

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 31 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, and EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, and 7 days for methods 160.1 and 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
125GWMMW021-UDUP (1205GWMMW007U**)	Total dissolved solids	26.0 (≤20)	-	J (all detects) UJ (all non-detects)	A

Total dissolved solids results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L120504201-01) is representative of client's sample matrix.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1205GWMMW007FMS/MSD (1205GWMMW007F** 1205GWMMW011F** 1205GWMMW028-1-F** 1205GWMMW028-2-F** 1205GWMMW023F** 1205GWMMW027F** 1205GWMMW017F** 1205GWMMW028F 1205GWMBW085F 1205GWMMW034-1-F 1205GWMMW034-2-F 1205GWMMW013F 1205GWMMW024F)	Sulfate	111 (90-110)	111 (90-110)	-	J+ (all detects)	A

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage IV review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050491

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12050491	1205GWMMW007U**	Total dissolved solids	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD)	15
L12050491	1205GWMMW007F** 1205GWMMW011F** 1205GWMMW028-1-F** 1205GWMMW028-2-F** 1205GWMMW023F** 1205GWMMW027F** 1205GWMMW017F** 1205GWMMW028F 1205GWMBW085F 1205GWMMW034-1-F 1205GWMMW034-2-F 1205GWMMW013F 1205GWMMW024F	Sulfate	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R)	16

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050491

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050491

No Sample Data Qualified in this SDG

LDC #: 28023H6
SDG #: L12050491
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III / IV

Date: 7-26-12
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), Total Dissolved Solids (EPA Method 160.1)/SM2540C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/12-13/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	~~A~~ SW	MS/D
VI.	Duplicates	SW	Dup
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water ** = Level 4

1	1205GWMMW007U **	11	1205GWMMW028-2-U **	21	1205GWMBW085U	31	(#17) Dup
2	1205GWMMW007F **	12	1205GWMMW028-2-F **	22	1205GWMBW085F	32	
3	1205GWMMW007UMS	13	1205GWMMW023U **	23	1205GWMMW034-1-U	33	
4	1205GWMMW007FMS	14	1205GWMMW023F **	24	1205GWMMW034-1-F	34	
5	1205GWMMW007UMSD	15	1205GWMMW027U **	25	1205GWMMW034-2-U	35	
6	1205GWMMW007FMSD	16	1205GWMMW027F **	26	1205GWMMW034-2-F	36	
7	1205GWMMW011U **	17	1205GWMMW017U **	27	1205GWMMW013U	37	
8	1205GWMMW011F **	18	1205GWMMW017F **	28	1205GWMMW013F	38	
9	1205GWMMW028-1-U **	19	1205GWMMW028U	29	1205GWMMW024U	39	
10	1205GWMMW028-1-F **	20	1205GWMMW028F	30	1205GWMMW024F	40	

Notes:

LDC #: 28023#6

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: ✓

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	NO	✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.		✓		
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 28023H6

VALIDATION FINDINGS CHECKLIST

Reviewer: QR
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 25023H6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
2,8,10,12, 14,16,18,20,	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
22,24,26,28 30	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
1,7,9,11,13,15, 17,19,21,23,	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
25,27,29	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC:3531,	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
4,6	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 28023H6

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y (N) N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water and ≤ 35% for soil samples (≤ 10% for Method 300.0)? If no, see qualificatic below. A control limit of ±CRDL (±2X CRDL for soil) was used for samples that were ≤5X the CRDL, including when only one of the duplicate sample value were ≤5X the CRDL. If field blanks were used for laboratory duplicates, see overall assessment.

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Duplicate ID	Matrix	Analyte	RPD (Limits)	Associated Samples	Qualifications
		125GWMMW02H (L1205042 5)	W	TDS	260 (≤20)	1	J/UJ/A (15)
		L1205042 9-01	W	TDS	34.9		No Qual (non client)

Comments:

DUP.6

LDC #: 28023H6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125?~~ (90-110) If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	4/6	W	SO4	111	111		2,8,10,12,14,16,18, 20,22,24,26,28,30	J-det/A (6)

Comments:

LDC #: 28028H6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of SO4 was recalculated. Calibration date: 4/26/12

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	SO4	s1	1.0	0.12	0.9967	0.9955	Y
		s2	5	0.577			
		s3	20	2.363			
		s4	40	5.098			
		s5	50	7.193			
		s6	140	17.696			
Calibration verification		CCV	40	40.603	102	102	
Calibration verification				41.272	103	103	
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28023116

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: 9R
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	TDS	466	500	93.2	93.2	Y
4	Matrix spike sample	SO4	(SSR-SR) 44.5	40	111	111	
31	Duplicate sample	TDS	864	800	7.69	7.69	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 28023H6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: QR
2nd reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for TDS / SO_4 reported with a positive detect were recalculated and verified using the following equation:

Concentration =

TDS = Dry-Tare / Vol

$y = 0.1266x - 0.0090$

Recalculation: 1: TDS = $\frac{54.6286g - 51.6214g}{50mL} \times 1000000 = 144 mg$

2: $SO_4 = \frac{1.989 + 0.009}{0.1266} = 15.78 mg/L$

8: $SO_4 = \frac{8.727 + 0.009}{0.1266} = 69.00 mg/L$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	2	SO_4	15.8	15.8	Y
	8	SO_4	69.0	69.0	
	1	TDS	144	144	

Note:

RECALC.6

Report# 28023I4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 27, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050495

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMBW087-U	05/11/12	L12050495-01

Introduction

This data review covers 1 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
5/22/12	CRDL (13:46)	Selenium	185 (70-130)	All samples in SDG L12050495	J+ (all detects)	P

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Selenium	0.000779 mg/L	All samples in SDG L12050495
ICB/CCB	Selenium	0.380 ug/L	All samples in SDG L12050495

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1205GWMBW087-U	Selenium	0.00277 mg/L	0.00277U mg/L

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Selenium results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L12050521-03) is representative of client's sample matrix.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050495

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12050495	1205GWMBW087-U	Selenium	J+ (all detects)	P	Low-level continuing calibration (%R)	9

Metals - Laboratory Blank Data Qualification Summary - SDG L12050495

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
L12050495	1205GWMBW087-U	Selenium	0.00277U mg/L	A	10

Metals - Field Blank Data Qualification Summary - SDG L12050495

No Sample Data Qualified in this SDG

LDC #: 28023I4b

SDG #: L12050495

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-26-12

Page: 1 of 1

Reviewer: OR

2nd Reviewer: W

METHOD: Metals (EPA SW 846 Method ~~6010B~~ 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/11/12
II.	ICP/MS Tune	A	
III.	Calibration	SW	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D (L12050491)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	SW	(nonclient)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMBW087-U	11		21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28023I4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: QR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 28023I4b

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 c
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?
Y N N/A Are all correlation coefficients ≥0.995?
Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	5/22/12	CRDL (13:46)	Se	185 (70-130)	All	J+ det/P (9)

Comments:

LDC #: 28023I4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 4x Reason: 10
Sample Concentration units, unless otherwise noted: mg/L Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1									
Se		0.000779	0.380	0.0152	0.00277									

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 28023I4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?

Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?

Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications ~~(<50x MDL)~~
		L1205052I-03	W	Se (5x)	24.60	All	No Qual (nonclient) <50x MDL
				Se (25x)	92.30	All	↓ ↓ ↓

Comments:

Report# 28023I6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050495

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMBW087-U	05/11/12	L12050495-01
1205GWMBW087-F	05/11/12	L12050495-02
1205GWMBW087-UDUP	05/11/12	L12050495-01DUP

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, and EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, and 7 days for methods 160.1 and 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050495

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050495

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050495

No Sample Data Qualified in this SDG

LDC #: 28023I6
SDG #: L12050495
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 7-26-12
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Sulfate (EPA Method 300.0), Total Dissolved Solids (EPA Method 160.1)/SM2540C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/11/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS/D (L1205041 91)
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Water

1	1205GWMBW087-U	11		21		31	
2	1205GWMBW087-F	12		22		32	
3	(M1) Dup	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28026I6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
2	pH TDS Cl F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC:3	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

Report# 28023J4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: August 6, 2012

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050563

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMPW019-1-U	05/16/12	L12050563-01
1205GWMPW019-1-F	05/16/12	L12050563-02
1205GWMPW019-2-U	05/16/12	L12050563-03
1205GWMPW019-2-F	05/16/12	L12050563-04

Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Aluminum, Calcium, Iron, Magnesium, Potassium, Sodium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium results were outside the QC limits; results were not qualified since the original sample (1205GWMPW019-1-U) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050563

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050563

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050563

No Sample Data Qualified in this SDG

LDC #: 28023J4G

SDG #: L12050563

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-16-12

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010B~~/6020A)~~

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/16/12
II.	ICP/MS Tune	N	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMPW019-1-U	11		21		31	
2	1205GWMPW019-1-F	12		22		32	
3	1205GWMPW019-2-U	13		23		33	
4	1205GWMPW019-2-F	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28023J4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: QR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,3		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
2,4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 28023554a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	1205GWMPW019-1-U (L12050563)		Ca	175	175			No Qual (>4x)

Comments:

Report# 28023J4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050563

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMPW019-1-U	05/16/12	L12050563-01
1205GWMPW019-2-U	05/16/12	L12050563-03

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Chromium, Manganese, Nickel, Selenium, and Zinc.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Chromium results were outside the QC limits; data were not qualified since the original sample (L12050562-02) concentration was less than 50 times the MDLs and is a non-client sample.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050563

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050563

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050563

No Sample Data Qualified in this SDG

LDC #: 28023J4b

SDG #: L12050563

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7/26/12

Page: 1 of 1

Reviewer: aR

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/16/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/P
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Water

1	1205GWMPW019-1-U	11		21		31	
2	1205GWMPW019-2-U	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 5744CVH
28023J4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ~

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2		Al, Sb, As, Ba, Be, **Cd**, Ca, **Cr**, Co, Cu, Fe, Pb, Mg, **Mn**, Hg, **Ni**, K, **Se**, Ag, Na, Tl, V, **Zn**, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___

Comments: Mercury by CVAA if performed

LDC #: 28023054

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: AR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		L1205056 2-02	W	Cr	304.00		No Qual (non-client, <50x MDL)

Comments:

SDILICPMS.wpd

Report# 28023J6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050563

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMPW019-1-U	05/16/12	L12050563-01
1205GWMPW019-1-F	05/16/12	L12050563-02
1205GWMPW019-2-U	05/16/12	L12050563-03
1205GWMPW019-2-F	05/16/12	L12050563-04
1205GWMPW019-2-FDUP	05/16/12	L12050563-04DUP
1205GWMPW019-1-UDUP	05/16/12	L12050563-01DUP

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 310.2 for Alkalinity, EPA Method 300.0 for Chloride, and Sulfate, EPA Method 353.2 for Nitrate as Nitrogen, Standard Method 2340B for Dissolved Hardness, EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids, and EPA Method 160.2 and Standard Method 2540D for Total Suspended Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 353.2, 14 days for method 310.2, 7 days for methods 160.1, 160.2, 2450C, and 2540D, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
5/21/12	CCV (13:26)	Alkalinity	89.70 (90-110)	1205GWMPW019-1-F 1205GWMPW019-2-F	J- (all detects) UJ (all non-detects)	P

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050563

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12050563	1205GWMPW019-1-F 1205GWMPW019-2-F	Alkalinity	J- (all detects) UJ (all non-detects)	P	Continuing calibration (CCV %R)	8

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050563

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050563

No Sample Data Qualified in this SDG

LDC #: 28023J6
SDG #: L12050563
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 7-27-12
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Alkalinity (EPA Method 310.2), Chloride, Sulfate (EPA Method 300.0), Nitrate as Nitrogen (EPA Method 353.2), Dissolved Hardness (SM2340B), Total Dissolved Solids (~~EPA~~ E Method 160.1) /SM2540C, Total Suspended Solids (EPA Method 160.2) SM2540D

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/16/12
II	Initial calibration	A	
III.	Calibration verification	SW	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMPW019-1-U	11		21		31	
2	1205GWMPW019-1-F	12		22		32	
3	1205GWMPW019-2-U	13		23		33	
4	1205GWMPW019-2-F	14		24		34	
5	(~~X~~4) DUP	15		25		35	
6	(~~X~~1) DUP	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28023J6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
2,4	pH TDS Cl F NO_3/NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 Hardness
1,3	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 TSS
QC:5	pH TDS Cl F NO_3/NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
↓ 6	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 28623J6

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% ?
Y N N/A Are all correlation coefficients ≥0.995 ?

LEVEL IV/D ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recaluculation Worksheet for recalulations.
Y N N/A Was a balance check conducted prior to the TDS analysis.?
Y N N/A Was the titrant normality checked?

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
	5/21/12	CCV (13:26)	Alk	89.70	2,4	J-/UJ/P (8)

Comments:

Report# 28023K4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 27, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050573

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMBW048-U	05/14/12	L12050573-01
1205GWMBW032-1-U	05/14/12	L12050573-03
1205GWMBW032-2-U	05/14/12	L12050573-05
1205GWMBW131-U	05/14/12	L12050573-07
1205GWMBW006-U	05/14/12	L12050573-09
1205GWMBW14A-U	05/14/12	L12050573-11
1205GWMBW009-U	05/14/12	L12050573-13
1205GWMBW130-U	05/14/12	L12050573-15
1205GWMBW011-U	05/14/12	L12050573-17
1205GWMBW152-U	05/14/12	L12050573-19

Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1205GWMMW018-MS/MSD (All samples in SDG L12050573)	Manganese	144 (75-125)	136 (75-125)	-	J+ (all detects)	A

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050573

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12050573	1205GWMBW048-U 1205GWMBW032-1-U 1205GWMBW032-2-U 1205GWMBW131-U 1205GWMBW006-U 1205GWMBW16A-U 1205GWMBW009-U 1205GWMBW130-U 1205GWMBW011-U 1205GWMBW152-U	Manganese	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R)	16

Metals - Laboratory Blank Data Qualification Summary - SDG L12050573

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050573

No Sample Data Qualified in this SDG

LDC #: 28023K4b

SDG #: L12050573

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-27-12

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Metals (EPA SW 846 Method ~~6010B~~/6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/14/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	~~A~~ SW	MS/P
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMBW048-U	11		21		31	
2	1205GWMBW032-1-U	12		22		32	
3	1205GWMBW032-2-U	13		23		33	
4	1205GWMBW131-U	14		24		34	
5	1205GWMBW006-U	15		25		35	
6	1205GWMBW16A-U	16		26		36	
7	1205GWMBW009-U	17		27		37	
8	1205GWMBW130-U	18		28		38	
9	1205GWMBW011-U	19		29		39	
10	1205GWMBW152-U	20		30		40	

Notes:

LDC #: 28023K4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: QR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ____

Comments: Mercury by CVAA if performed

LDC #: 28034154b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: d
2nd Reviewer: b

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits (of 75-125)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

(Y) (N) N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	120S6WMMW018-MS/MSD (L1205057A)	W	Mn	144	136		All	J+det/A (16)

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: August 2, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050573

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMBW048-U	05/14/12	L12050573-01
1205GWMBW048-F	05/14/12	L12050573-02
1205GWMBW032-1-U	05/14/12	L12050573-03
1205GWMBW032-1-F	05/14/12	L12050573-04
1205GWMBW032-2-U	05/14/12	L12050573-05
1205GWMBW032-2-F	05/14/12	L12050573-06
1205GWMBW131-U	05/15/12	L12050573-07
1205GWMBW131-F	05/15/12	L12050573-08
1205GWMBW006-U	05/15/12	L12050573-09
1205GWMBW006-F	05/15/12	L12050573-10
1205GWMBW16A-U	05/15/12	L12050573-11
1205GWMBW16A-F	05/15/12	L12050573-12
1205GWMBW009-U	05/15/12	L12050573-13
1205GWMBW009-F	05/15/12	L12050573-14
1205GWMBW130-U	05/15/12	L12050573-15
1205GWMBW130-F	05/15/12	L12050573-16
1205GWMBW011-U	05/15/12	L12050573-17
1205GWMBW011-F	05/15/12	L12050573-18
1205GWMBW152-U	05/15/12	L12050573-19
1205GWMBW152-F	05/15/12	L12050573-20

Introduction

This data review covers 20 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, and EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, and 7 days for methods 160.1 and 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050573

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050573

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050573

No Sample Data Qualified in this SDG

LDC #: 28023K6
SDG #: L1205053
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 7-27-12
Page: 1 of 1
Reviewer: CL
2nd Reviewer: [illegible]

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (WPA Method 160.1/SM2540C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/14/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	
VI.	Duplicates	A	D/P
VII.	Laboratory control samples	A	LCS/P
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water

1	1205GWMBW048-U	11	1205GWMBW16A-U	21		31	
2	1205GWMBW048-F	12	1205GWMBW16A-F	22		32	
3	1205GWMBW032-1-U	13	1205GWMBW009-U	23		33	
4	1205GWMBW032-1-F	14	1205GWMBW009-F	24		34	
5	1205GWMBW032-2-U	15	1205GWMBW130-U	25		35	
6	1205GWMBW032-2-F	16	1205GWMBW130-F	26		36	
7	1205GWMBW131-U	17	1205GWMBW011-U	27		37	
8	1205GWMBW131-F	18	1205GWMBW011-F	28		38	
9	1205GWMBW006-U	19	1205GWMBW152-U	29		39	
10	1205GWMBW006-F	20	1205GWMBW152-F	30		40	

Notes:

LDC #: 28023556

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
2,4,6,8,10,12,14,16,18,20	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
1,3,5,7,9,11,13,15,17,19	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 27, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050574

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW029-U	05/15/12	L23060685-01
1205GWMMW018-U	05/15/12	L23060685-03
1205GWMMW018-U-MS	05/15/12	L23060685-05
1205GWMMW018-U-MSD	05/15/12	L23060685-07
1205GWMMW030-U	05/15/12	L23060685-09
1205GWMMW015A-U	05/15/12	L23060685-11
1205GWMMW025-U	05/15/12	L23060685-13

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1205GWMMW018-U-MS/MSD (All samples in SDG L12050574)	Manganese	144 (75-125)	136 (75-125)	-	J+ (all detects)	A

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050574

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12050574	1205GWMMW029-U 1205GWMMW018-U 1205GWMMW030-U 1205GWMMW015A-U 1205GWMMW025-U	Manganese	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R)	16

Metals - Laboratory Blank Data Qualification Summary - SDG L12050574

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050574

No Sample Data Qualified in this SDG

LDC #: 28023L4b

SDG #: L12050574

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level ~~III~~ IV

Date: 7-27-12

Page: 1 of 1

Reviewer: CL

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method ~~6010B~~/6020~~A~~)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/15/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMMW029-U	11		21		31	
2	1205GWMMW018-U	12		22		32	
3	1205GWMMW018-U-MS	13		23		33	
4	1205GWMMW018-U-MSD	14		24		34	
5	1205GWMMW030-U	15		25		35	
6	1205GWMMW015A-U	16		26		36	
7	1205GWMMW025-U	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 25023L4D

VALIDATION FINDINGS CHECKLIST

Page: 1 of
Reviewer: CR
2nd Reviewer: ✓

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?				

LDC #: 28023145

VALIDATION FINDINGS CHECKLIST

Page: 2 of 4
Reviewer: CR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 28023L4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: QR
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2,5-7		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
QC3,4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 28023L4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	3/4	W	Mn	144	136		All	J+ det/17 (16)

Comments:

MSD.4SW

LDC #: 28023C4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Mn	49.7	50	99.4	99.5	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Se	49.2	50	98.4	98.4	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28023L6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
	ICP interference check						Y
LCS	Laboratory control sample	Se	0.0615	0.0625	98.4	98.4	
3	Matrix spike	Cd	(SSR-SR) 0.0678	0.0625	108	108	
3/4	Duplicate	Mn	0.169	0.163	3.61	3.32	
5	ICP serial dilution	Mn	16.2	16.9	4.32	4.70	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28023C4D

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Mn were recalculated and verified using the followin equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{100mL(2)(15.66 ug/L)}{40mL(1000)} = 0.0783 mg/L$$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	2	Mn	0.0783	0.0783	Y
		Se	0.0369	0.0369	↓

Note:

RECALC.4SW

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050574

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW029-U	05/15/12	L23060685-01
1205GWMMW029-F	05/15/12	L23060685-02
1205GWMMW018-U	05/15/12	L23060685-03
1205GWMMW018-F	05/15/12	L23060685-04
1205GWMMW018-U-MS	05/15/12	L23060685-05
1205GWMMW018-F-MS	05/15/12	L23060685-06
1205GWMMW018-U-MSD	05/15/12	L23060685-07
1205GWMMW018-F-MSD	05/15/12	L23060685-08
1205GWMMW030-U	05/15/12	L23060685-09
1205GWMMW030-F	05/15/12	L23060685-10
1205GWMMW015A-U	05/15/12	L23060685-11
1205GWMMW015A-F	05/15/12	L23060685-12
1205GWMMW025-U	05/15/12	L23060685-13
1205GWMMW025-F	05/15/12	L23060685-14
1205GWMMW029-UDUP	05/15/12	L23060685-01DUP

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, and EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, and 7 days for methods 160.1 and 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050574

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050574

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050574

No Sample Data Qualified in this SDG

LDC #: 28023L6
SDG #: L12050574
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 7-27-12
Page: 1 of 1
Reviewer: OL
2nd Reviewer: [illegible]

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (WPA Method 160.1/SM2540 C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/15/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS/D
VI.	Duplicates	~~N~~A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water

1	1205GWMMW029-U	11	1205GWMMW015A-U	21		31	
2	1205GWMMW029-F	12	1205GWMMW015A-F	22		32	
3	1205GWMMW018-U	13	1205GWMMW025-U	23		33	
4	1205GWMMW018-F	14	1205GWMMW025-F	24		34	
5	1205GWMMW018-U-MS	15	(A) DUP	25		35	
6	1205GWMMW018-F-MS	16		26		36	
7	1205GWMMW018-U-MSD	17		27		37	
8	1205GWMMW018-F-MSD	18		28		38	
9	1205GWMMW030-U	19		29		39	
10	1205GWMMW030-F	20		30		40	

Notes:

LDC #: 28023L6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
2,4,10,12,14	pH TDS Cl F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
1,3,9,11,13	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC: 6,8	pH TDS Cl F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
↓ 5,7,15	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

Report# 28023M4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 27, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050575

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW10U	05/14/12	L12050575-01
1205GWMMW099U	05/14/12	L12050575-03
1205GWMMW031U	05/14/12	L12050575-05
1205GWMMW135U	05/14/12	L12050575-07
1205GWMMW033U	05/14/12	L12050575-09

Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050575

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050575

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050575

No Sample Data Qualified in this SDG

LDC #: 28023M4 b

SDG #: L12050575

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-27-12

Page: 1 of 1

Reviewer: CL

2nd Reviewer: —

METHOD: Metals (EPA SW 846 Method ~~6010B~~/6020~~A~~)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/14/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D (non client)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMMW10U	11		21		31	
2	1205GWMMW099U	12		22		32	
3	1205GWMMW031U	13		23		33	
4	1205GWMMW135U	14		24		34	
5	1205GWMMW033U	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28023M4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: QR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-5		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050575

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW10U	05/14/12	L12050575-01
1205GWMMW10F	05/14/12	L12050575-02
1205GWMMW099U	05/14/12	L12050575-03
1205GWMMW099F	05/14/12	L12050575-04
1205GWMMW031U	05/14/12	L12050575-05
1205GWMMW031F	05/14/12	L12050575-06
1205GWMMW135U	05/14/12	L12050575-07
1205GWMMW135F	05/14/12	L12050575-08
1205GWMMW033U	05/14/12	L12050575-09
1205GWMMW033F	05/14/12	L12050575-10
1205GWMMW031UDUP	05/14/12	L12050575-05DUP

Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, and EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, and 7 days for methods 160.1 and 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050575

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050575

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050575

No Sample Data Qualified in this SDG

LDC #: 28023M6
SDG #: L12050575
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 7-27-12
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (WPA Method 160.1)/Sm2540C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/14/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water

1	1205GWMMW10U	11	(MS) Dup	21		31	
2	1205GWMMW10F	12		22		32	
3	1205GWMMW099U	13		23		33	
4	1205GWMMW099F	14		24		34	
5	1205GWMMW031U	15		25		35	
6	1205GWMMW031F	16		26		36	
7	1205GWMMW135U	17		27		37	
8	1205GWMMW135F	18		28		38	
9	1205GWMMW033U	19		29		39	
10	1205GWMMW033F	20		30		40	

Notes:

LDC #: 28023M6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter
2,4,6,8,10	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
1,3,5,7,9	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC:11	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

Report# 28023N4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 27, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050576

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW022U	05/16/12	L12050576-01
1205GWMMW032U	05/16/12	L12050576-03

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050576

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050576

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050576

No Sample Data Qualified in this SDG

LDC #: 28023N4b

SDG #: L12050576

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-27-12

Page: 1 of 1

Reviewer: CL

2nd Reviewer: W

METHOD: Metals (EPA SW 846 Method ~~6010B~~/6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/16/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D (nonclient)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMMW022U	11		21		31	
2	1205GWMMW032U	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: L8UL2IV-1

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: V

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2		Al, Sb, As, Ba, Be, **Cd**, Ca, Cr, Co, Cu, Fe, Pb, Mg, **Mn**, Hg, Ni, K, **Se**, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
ICP-MS		Al, Sb, As, Ba, Be, **Cd**, Ca, Cr, Co, Cu, Fe, Pb, Mg, **Mn**, Hg, Ni, K, **Se**, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U

Comments: Mercury by CVAA if performed

Report# 28023N6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050576

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW022U	05/16/12	L12050576-01
1205GWMMW022F	05/16/12	L12050576-02
1205GWMMW032U	05/16/12	L12050576-03
1205GWMMW032F	05/16/12	L12050576-04

Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, and EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, and 7 days for methods 160.1 and 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050576

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050576

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050576

No Sample Data Qualified in this SDG

LDC #: 28023N6
SDG #: L12050576
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 7-27-12
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (WPA Method 160.1)/SM2540 C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/16/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	
VI.	Duplicates	A	DUP (L12050563)
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Water

1	1205GWMMW022U	11		21		31	
2	1205GWMMW022F	12		22		32	
3	1205GWMMW032U	13		23		33	
4	1205GWMMW032F	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28023N6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter
2,4	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
1,3	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

Report# 28023O4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: August 2, 2012

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050490

Sample Identification	Collection Date	Laboratory Sample Identification
1205SWMST092-F**	05/11/12	L12050490-01**
1205SWMST089-F**	05/11/12	L12050490-03**
1205SWMST089-F-MS	05/11/12	L12050490-05
1205SWMST089-F-MSD	05/11/12	L12050490-07
1205SWMST090-F**	05/11/12	L12050490-09**
1205SWMSG005-F**	05/11/12	L12050490-11**
1205SWDS030-1-F	05/11/12	L12050490-13
1205SWDS030-2-F	05/11/12	L12050490-15
1205SWMST067-F	05/11/12	L12050490-17
1205ERSW-03-F	05/11/12	L12050490-19
1205SWMDS026-F	05/11/12	L12050490-21
1205SWMST133-F	05/11/12	L12050490-23
1205SWMST274-F	05/12/12	L12050490-25
1205SWMST274-F-MS	05/12/12	L12050490-27
1205SWMST274-F-MSD	05/12/12	L12050490-29
1205SWMST131-F	05/12/12	L12050490-31
1205SWMST128-F	05/12/12	L12050490-33
1205SWMST132-1-F	05/12/12	L12050490-35
1205SWMST132-2-F	05/12/12	L12050490-37
1205SWMDS025-F	05/12/12	L12050490-39
1205ER-SW-04-F	05/12/12	L12050490-41
1205SWMST006-F	05/12/12	L12050490-43
1205SWMST020-F	05/13/12	L12050490-45
1205SWMST019-F	05/13/12	L12050490-47
1205ER-SW-05-F	05/13/12	L12050490-49

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 25 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium, Magnesium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1205ERSW-03-F and 1205ER-SW-05-F were identified as equipment blanks. No metal contaminants were found with the following exceptions:

Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1205ERSW-03-F	5/11/12	Calcium	0.117 mg/L	1205SWMST092-F 1205SWMST089-F 1205SWMST090-F 1205SWMSG005-F 1205SWDS030-1-F 1205SWDS030-2-F 1205SWMST067-F 1205SWMDS026-F 1205SWMST133-F

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>1X blank contaminants) than the concentrations found in the associated field blanks.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium results were outside the QC limits; results were not qualified since the original samples (1205SWMST089-F and 1205SWMST274-F) were greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050490

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050490

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12050490

No Sample Data Qualified in this SDG

LDC #: 28023O4a
SDG #: L12050490
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III / IV

Date: 7-27-12
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/11-13/12
II.	ICP/MS Tune	N	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	EB=10 µg/L

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205SWMST092-F**	11	1205SWMDS026-F	21	1205ER-SW-04-F	31	
2	1205SWMST089-F**	12	1205SWMST133-F	22	1205SWMST006-F	32	
3	1205SWMST089-F-MS	13	1205SWMST274-F	23	1205SWMST020-F	33	
4	1205SWMST089-F-MSD	14	1205SWMST274-F-MS	24	1205SWMST019-F	34	
5	1205SWMST090-F**	15	1205SWMST274-F-MSD	25	1205ER-SW-05-F	35	
6	1205SWMSG005-F**	16	1205SWMST131-F	26		36	
7	1205SWDS030-1-F	17	1205SWMST128-F	27		37	
8	1205SWDS030-2-F	18	1205SWMST132-1-F	28		38	
9	1205SWMST067-F	19	1205SWMST132-2-F	29		39	
10	1205ERSW-03-F	20	1205SWMDS025-F	30		40	

Notes:

LDC #: 28023040

VALIDATION FINDINGS CHECKLIST

Page: 1 of 1
Reviewer: CR
2nd Reviewer: ✓

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?		✓		
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 28023Dc

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?				✓
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.	✓			
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?				✓
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 28023046

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: GR
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2,5-13, 16-25		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC: 3,4,14,15		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 28023O4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 5/11/12 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1, 2, 5-9, 11, 12

Analyte	Blank ID	Sample Identification											
	10	Action Limit	No Qualifiers										
Ca	0.117	0.117											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 28023O4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

(Y) N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	3/4	W	Ca		141			NO Qual (>4x)
	14/15	W	Ca	74.9				NO Qual (>4x)

Comments:

MSD.4SW

LDC #: 28023C4/5

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	V	0.992	1	99.2	99.2	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Co	10.3	10	103	103	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28023046

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	V	0.253	0.250	101	101	Y
LCS	Laboratory control sample	Ca	500	500	100	100	
3	Matrix spike	V	(SSR-SR) 0.48103	0.5	96.2	96.2	
3/4	Duplicate	Mg	15.2	14.9	1.99	1.94	
2	ICP serial dilution	Ca	57.3	58.1	1.40	1.27	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28023046

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Ca were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

Raw Data = 62.3 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Ca	62.3	62.3	Y
		Mg	10.0	10.0	↓

Note:

RECALC.4SW

Report# 28023O4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050490

Sample Identification	Collection Date	Laboratory Sample Identification
1205SWMST092-F**	05/11/12	L12050490-01**
1205SWMST092-U**	05/11/12	L12050490-02**
1205SWMST089-F**	05/11/12	L12050490-03**
1205SWMST089-U**	05/11/12	L12050490-04**
1205SWMST089-F-MS	05/11/12	L12050490-05
1205SWMST089-U-MS	05/11/12	L12050490-06
1205SWMST089-F-MSD	05/11/12	L12050490-07
1205SWMST089-U-MSD	05/11/12	L12050490-08
1205SWMST090-F**	05/11/12	L12050490-09**
1205SWMST090-U**	05/11/12	L12050490-10**
1205SWMSG005-F**	05/11/12	L12050490-11**
1205SWMSG005-U**	05/11/12	L12050490-12**
1205SWDS030-1-F	05/11/12	L12050490-13
1205SWDS030-1-U	05/11/12	L12050490-14
1205SWDS030-2-F	05/11/12	L12050490-15
1205SWDS030–2-U	05/11/12	L12050490-16
1205SWMST067-F	05/11/12	L12050490-17
1205SWMST067-U	05/11/12	L12050490-18
1205ERSW-03-F	05/11/12	L12050490-19
1205ERSW-03-U	05/11/12	L12050490-20
1205SWMDS026-F	05/11/12	L12050490-21
1205SWMDS026-U	05/11/12	L12050490-22
1205SWMST133-F	05/11/12	L12050490-23
1205SWMST133-U	05/11/12	L12050490-24
1205SWMST274-F	05/12/12	L12050490-25

1205SWMST274-U	05/12/12	L12050490-26
1205SWMST274-F-MS	05/12/12	L12050490-27
1205SWMST274-U-MS	05/12/12	L12050490-28
1205SWMST274-F-MSD	05/12/12	L12050490-29
1205SWMST274-U-MSD	05/12/12	L12050490-30
1205SWMST131-F	05/12/12	L12050490-31
1205SWMST131-U	05/12/12	L12050490-32
1205SWMST128-F	05/12/12	L12050490-33
1205SWMST128-U	05/12/12	L12050490-34
1205SWMST132-1-F	05/12/12	L12050490-35
1205SWMST132-1-U	05/12/12	L12050490-36
1205SWMST132-2-F	05/12/12	L12050490-37
1205SWMST132-2-U	05/12/12	L12050490-38
1205SWMDS025-F	05/12/12	L12050490-39
1205SWMDS025-U	05/12/12	L12050490-40
1205ER-SW-04-F	05/12/12	L12050490-41
1205ER-SW-04-U	05/12/12	L12050490-42
1205SWMST006-F	05/12/12	L12050490-43
1205SWMST006-U	05/12/12	L12050490-44
1205SWMST020-F	05/13/12	L12050490-45
1205SWMST020-U	05/13/12	L12050490-46
1205SWMST019-F	05/13/12	L12050490-47
1205SWMST019-U	05/13/12	L12050490-48
1205ER-SW-05-F	05/13/12	L12050490-49
1205ER-SW-05-U	05/13/12	L12050490-50

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 50 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Selenium	0.259 ug/L	1205SWDS030–2-U 1205SWMST067-U 1205ERSW-03-U

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines (and associated field results between the MDL and RL were flagged as U at the detected values). No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1205ERSW-03-U	Selenium	0.000521 mg/L	0.000521U mg/L

Samples 1205ERSW-03-F, 1205ERSW-03-U, 1205ER-SW-05-F, and 1205ER-SW-05-U were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Analyte	Concentration (mg/L)
1205ERSW-03-U	Selenium	0.000521

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>1X blank contaminants) than the concentrations found in the associated field blanks.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]).

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12050490

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12050490

SDG	Sample	Analyte	Modified Final Concentration	A or P	Reason Code
L12050490	1205ERSW-03-U	Selenium	0.000521U mg/L	A	10

Metals - Field Blank Data Qualification Summary - SDG L12050490

No Sample Data Qualified in this SDG

LDC #: 28023O4b

SDG #: L12050490

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III /IV

Date: 7-27-12

Page: 1 of 2

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Cd, Se (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/11/12 - 5/13/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	EB= 19, 20, 49, 50

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205SWMST092-F **	11	1205SWMSG005-F **	21	1205SWMDS026-F	31	1205SWMST131-F
2	1205SWMST092-U **	12	1205SWMSG005-U **	22	1205SWMDS026-U	32	1205SWMST131-U
3	1205SWMST089-F **	13	1205SWDS030-1-F	23	1205SWMST133-F	33	1205SWMST128-F
4	1205SWMST089-U **	14	1205SWDS030-1-U	24	1205SWMST133-U	34	1205SWMST128-U
5	1205SWMST089-F-MS	15	1205SWDS030-2-F	25	1205SWMST274-F	35	1205SWMST132-1-F
6	1205SWMST089-U-MS	16	1205SWDS030--2-U	26	1205SWMST274-U	36	1205SWMST132-1-U
7	1205SWMST089-F-MSD	17	1205SWMST067-F	27	1205SWMST274-F-MS	37	1205SWMST132-2-F
8	1205SWMST089-U-MSD	18	1205SWMST067-U	28	1205SWMST274-U-MS	38	1205SWMST132-2-U
9	1205SWMST090-F **	19	1205ERSW-03-F	29	1205SWMST274-F-MSD	39	1205SWMDS025-F
10	1205SWMST090-U **	20	1205ERSW-03-U	30	1205SWMST274-U-MSD	40	1205SWMDS025-U

Notes:

LDC #: 28023O4b

SDG #: L12050490

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 7-27-12

Page: 2 of 2

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Cd, Se (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times		Sampling dates:
II.	ICP/MS Tune		
III.	Calibration		
IV.	Blanks		
V.	ICP Interference Check Sample (ICS) Analysis		
VI.	Matrix Spike Analysis		
VII.	Duplicate Sample Analysis		
VIII.	Laboratory Control Samples (LCS)		
IX.	Internal Standard (ICP-MS)		
X.	Furnace Atomic Absorption QC		
XI.	ICP Serial Dilution		
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data		
XIV.	Field Duplicates		
XV	Field Blanks		

See previous page

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

41	1205ER-SW-04-F	51		61		71	
42	1205ER-SW-04-U	52		62		72	
43	1205SWMST006-F	53		63		73	
44	1205SWMST006-U	54		64		74	
45	1205SWMST020-F	55		65		75	
46	1205SWMST020-U	56		66		76	
47	1205SWMST019-F	57		67		77	
48	1205SWMST019-U	58		68		78	
49	1205ER-SW-05-F	59		69		79	
50	1205ER-SW-05-U	60		70		80	

Notes:

LDC #: 28023046

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: CR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?				

LDC #: 28023046

VALIDATION FINDINGS CHECKLIST

Reviewer: ER
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 45605304D

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: VC

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,3,9,11,13,15, 17,19,21,23,25, 31,33,35,37,39, 41,43,45,47,49,		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
2,4,10,12,14,16,18,20, 22,24,26,32,34,36, 38,40,42,44,46, 48,50		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se) Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
QC 5,27,29		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
6,8,28,30		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se) Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
ICP-MS		Al, Sb, As, Ba, Be, (Cd) Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se) Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, U, ____

Comments: Mercury by CVAA if performed

LDC #: 28023O4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 4x Reason: 10
Sample Concentration units, unless otherwise noted: mg/L Associated Samples: 16, 18, 20

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	20									
Se			0.259	0.00518	0.000521									

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 28023O4b

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 5/11/12 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 2, 4, 10, 12, 14, 16, 18, 22, 24

Analyte	Blank ID	Sample Identification											
	20	Action Limit	No Qualifiers										
Se	0.000521	0.000521											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 28023046

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{Found}{True} \times 100$$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Se	49.4	50	98.8	98.9	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Cd	48.1	50	96.2	96.2	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28023046

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: OR
2nd Reviewer: L

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Cd	99.2	100	99.2	99.2	Y
LCS	Laboratory control sample	Se	0.0574	0.0625	91.8	91.8	
S	Matrix spike	Cd	(SSR-SR) 0.0653	0.0625	104	105	
28130	Duplicate	Se	0.0752	0.0722	4.07	4.07	
18	ICP serial dilution	Se	272	294	8.0	7.95	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28023046

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: AR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Se were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{100\,mL(2)(0.4186\,\mu g/L)}{40\,mL(1000)} = 0.002093\,mg/L$$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	2	Se	0.00209	0.00209	Y

Note:

RECALC.4SW

Report# 28023O6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 30, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12050490

Sample Identification	Collection Date	Laboratory Sample Identification
1205SWMST092-F	05/11/12	L12050490-01
1205SWMST092-U	05/11/12	L12050490-02
1205SWMST089-F	05/11/12	L12050490-03
1205SWMST089-U	05/11/12	L12050490-04
1205SWMST089-F-MS	05/11/12	L12050490-05
1205SWMST089-U-MS	05/11/12	L12050490-06
1205SWMST089-F-MSD	05/11/12	L12050490-07
1205SWMST089-U-MSD	05/11/12	L12050490-08
1205SWMST090-F	05/11/12	L12050490-09
1205SWMST090-U	05/11/12	L12050490-10
1205SWMSG005-F	05/11/12	L12050490-11
1205SWMSG005-U	05/11/12	L12050490-12
1205SWDS030-1-F	05/11/12	L12050490-13
1205SWDS030-1-U	05/11/12	L12050490-14
1205SWDS030-2-F	05/11/12	L12050490-15
1205SWDS030–2-U	05/11/12	L12050490-16
1205SWMST067-F	05/11/12	L12050490-17
1205SWMST067-U	05/11/12	L12050490-18
1205ERSW-03-F	05/11/12	L12050490-19
1205ERSW-03-U	05/11/12	L12050490-20
1205SWMDS026-F	05/11/12	L12050490-21
1205SWMDS026-U	05/11/12	L12050490-22
1205SWMST133-F	05/11/12	L12050490-23
1205SWMST133-U	05/11/12	L12050490-24
1205SWMST274-F	05/12/12	L12050490-25

1205SWMST274-U	05/12/12	L12050490-26
1205SWMST274-F-MS	05/12/12	L12050490-27
1205SWMST274-U-MS	05/12/12	L12050490-28
1205SWMST274-F-MSD	05/12/12	L12050490-29
1205SWMST274-U-MSD	05/12/12	L12050490-30
1205SWMST131-F	05/12/12	L12050490-31
1205SWMST131-U	05/12/12	L12050490-32
1205SWMST128-F	05/12/12	L12050490-33
1205SWMST128-U	05/12/12	L12050490-34
1205SWMST132-1-F	05/12/12	L12050490-35
1205SWMST132-1-U	05/12/12	L12050490-36
1205SWMST132-2-F	05/12/12	L12050490-37
1205SWMST132-2-U	05/12/12	L12050490-38
1205SWMDS025-F	05/12/12	L12050490-39
1205SWMDS025-U	05/12/12	L12050490-40
1205ER-SW-04-F	05/12/12	L12050490-41
1205ER-SW-04-U	05/12/12	L12050490-42
1205SWMST006-F	05/12/12	L12050490-43
1205SWMST006-U	05/12/12	L12050490-44
1205SWMST020-F	05/13/12	L12050490-45
1205SWMST020-U	05/13/12	L12050490-46
1205SWMST019-F	05/13/12	L12050490-47
1205SWMST019-U	05/13/12	L12050490-48
1205ER-SW-05-F	05/13/12	L12050490-49
1205ER-SW-05-U	05/13/12	L12050490-50

Introduction

This data review covers 50 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, Standard Method 2340B for Dissolved Hardness, and EPA Method 160.1 and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 6 months for method 2340B, and 7 days for methods 160.1 and 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1205ERSW-03-F, 1205ERSW-03-U, 1205ER-SW-05-F, and 1205ER-SW-05-U were identified as equipment blanks. No contaminant concentrations were found.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
1205GWMBW087-UDUP (1205SWMST274-U 1205SWMST131-U 1205SWMST128-U 1205SWMST132-1-U 1205SWMST132-2-U 1205SWMDS025-U 1205ER-SW-04-U 1205SWMST006-U 1205SWMST020-U 1205SWMST019-U 1205ER-SW-05-U)	Total dissolved solids	26.0 (≤20)	-	J (all detects) UJ (all non-detects)	A

Total dissolved solids results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L12050429-01) is representative of client's sample matrix.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12050490

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12050490	1205SWMST274-U 1205SWMST131-U 1205SWMST128-U 1205SWMST132-1-U 1205SWMST132-2-U 1205SWMDS025-U 1205ER-SW-04-U 1205SWMST006-U 1205SWMST020-U 1205SWMST019-U 1205ER-SW-05-U	Total dissolved solids	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD)	15

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12050490

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12050490

No Sample Data Qualified in this SDG

LDC #: 28023O6
SDG #: L12050490
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 7-27-12
Page: 1 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Sulfate (EPA Method 300.0), Dissolved Hardness(SM2340B), Total Dissolved Solids (EPA Method 160.1)/SM2540C

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/11-13/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS/D
VI.	Duplicates	SW	Dup
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	ND	EB=19,20,49,50

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water

1	1205SWMST092-F	11	1205SWMSG005-F	21	1205SWMDS026-F	31	1205SWMST131-F
2	1205SWMST092-U	12	1205SWMSG005-U	22	1205SWMDS026-U	32	1205SWMST131-U
3	1205SWMST089-F	13	1205SWDS030-1-F	23	1205SWMST133-F	33	1205SWMST128-F
4	1205SWMST089-U	14	1205SWDS030-1-U	24	1205SWMST133-U	34	1205SWMST128-U
5	1205SWMST089-F-MS	15	1205SWDS030-2-F	25	1205SWMST274-F	35	1205SWMST132-1-F
6	1205SWMST089-U-MS	16	1205SWDS030–2-U	26	1205SWMST274-U	36	1205SWMST132-1-U
7	1205SWMST089-F-MSD	17	1205SWMST067-F	27	1205SWMST274-F-MS	37	1205SWMST132-2-F
8	1205SWMST089-U-MSD	18	1205SWMST067-U	28	1205SWMST274-U-MS	38	1205SWMST132-2-U
9	1205SWMST090-F	19	1205ERSW-03-F	29	1205SWMST274-F-MSD	39	1205SWMDS025-F
10	1205SWMST090-U	20	1205ERSW-03-U	30	1205SWMST274-U-MSD	40	1205SWMDS025-U

Notes:

LDC #: 28023O6
SDG #: L12050490
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 7-27-12
Page: 2 of 2
Reviewer: OL
2nd Reviewer: V

METHOD: Sulfate (EPA Method 300.0), Dissolved Hardness(SM2340B), Total Dissolved Solids (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times		Sampling dates:
II	Initial calibration		
III.	Calibration verification		
IV	Blanks		
V	Matrix Spike/Matrix Spike Duplicates		
VI.	Duplicates		
VII.	Laboratory control samples		
VIII.	Sample result verification	N	See Previous Page
IX.	Overall assessment of data		
X.	Field duplicates		
XI	Field blanks		

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

41	1205ER-SW-04-F	51		61		71	
42	1205ER-SW-04-U	52		62		72	
43	1205SWMST006-F	53		63		73	
44	1205SWMST006-U	54		64		74	
45	1205SWMST020-F	55		65		75	
46	1205SWMST020-U	56		66		76	
47	1205SWMST019-F	57		67		77	
48	1205SWMST019-U	58		68		78	
49	1205ER-SW-05-F	59		69		79	
50	1205ER-SW-05-U	60		70		80	

Notes:

LDC #: 28023O6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter
1,3,9,11,13,15,17,19,21,	pH TDS Cl F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 (Hardness)
23,25,31,33,35,37,39,41,	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
43,45,47,49	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
2,4,10,12,14,16,18,20,22,	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
24,26,32,34,36,38,40,42,	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
44,46,48,50	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
X 5,7,27,29	pH TDS Cl F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 (Hardness)
✓ 6,8,28,30	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 28023C6

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Page: 1 of 1
Reviewer: 02
2nd Reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water and ≤ 35% for soil samples (≤ 10% for Method 300.0)? If no, see qualificatic below. A control limit of ±CRDL (±2X CRDL for soil) was used for samples that were ≤5X the CRDL, including when only one of the duplicate sample value were ≤5X the CRDL. If field blanks were used for laboratory duplicates, see overall assessment.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Duplicate ID	Matrix	Analyte	RPD (Limits)	Associated Samples	Qualifications
		1205GW MBW087-U (L1205049S)	W	TDS	260 (≤20)	26, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50	J/UJ/A (15)
		L1205042S-01	W	TDS	34.9 (≤20)		No Qual (non Client)

Comments:

DUP.6

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

MWH Americas, Inc.
2890 East Cottonwood Parkway Suite 300
Salt Lake City, UT 84121
ATTN: Ms. Betty VanPelt

September 11, 2012

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. VanPelt,

Enclosed is the final verification report for the fraction listed below. This SDG was received on September 7, 2012. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 28355:

SDG #	**Fraction**
304389	Gross Alpha & Gross Beta by Methods 900.0

The data verification was performed under Stage 2B guidelines. The analyses were validated using the following documents, as applicable to each method:

- Data Validation Technical Memorandum, MWH, 2009, to the project SAP, April 2004
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

LDC #28355 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Gross α&β (900.0)																																	
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	304389	09/07/12	09/28/12	2	0																																
Total	A/LR			2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2

Shaded cells indicate Level III validation (all other cells are ADR review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

Report# 28355A22

Data Validation Company Name
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: September 10, 2012

Matrix: Water

Parameters: Gross Alpha and Gross Beta by Methods 900.0
Gas Flow Proportional Counting System (GFPC)

Validation Level: Stage 2B

Laboratory: GEL Laboratories, LLC

Sample Delivery Group (SDG): 304389

Sample Identification	Collection Date	Laboratory Sample Identification
1205GWMMW037-1-U	05/09/12	304389001
1205GWMMW037-2-U	05/09/12	304389002
1205GWMMW037-1-UMS	05/09/12	304389001MS
1205GWMMW037-1-UMSD	05/09/12	304389001MSD
1205GWMMW037-1-UDUP	05/09/12	304389001DUP

Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA Methods noted below:

- SW 846 Method 9310/EPA Method 900.0: Gross Alpha and Gross Beta.

This review follows the specific guidance in the Data Validation Technical Memorandum (MWH, 2009) to the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 - not applicable to this method -
6 Initial Calibration
7 -not applicable to this method-
8 Continuing Calibration Verification
9 - not applicable to this method -
10 - not applicable to this method -
11 Laboratory or Preparation Blank
12 - not applicable to this method -
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 - not applicable to this method –
19 - not applicable to this method -
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
24 Result is less than the MDC
25 Result is less than two times the error

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

_X__ Signatures on chain(s) and all samples accounted for
_X__ Gross alpha and beta: preserved with nitric acid to pH < 2; 6-month holding time (if preserved)

A total of two groundwater samples were collected on May 9, 2012 in preserved containers. Samples were shipped and arrived at the laboratory on May 15, 2012. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on May 24, 2012, 15 days from collection to analysis.

II. Instrument Calibration

_X___ Confirm dates of calibration, detectors IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards
_X___ Confirm matrix used in geometry standard
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Calibration points including efficiencies for each detector
_X___ Background checks performed at the time of initial calibration
_X___ Self absorption curves for each detector, covering an appropriate range of residue masses
_X___ Alpha-beta cross talk values and voltage plateaus (if needed)
_X___ Certificates for NBS- or NIST-traceable standards
_X___ Review standard preparation and dilution logs for accuracy

Initial calibration data were within all required criteria.

III. Calibration Verification

_NA__ Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits
_X___ Routine (daily, weekly, monthly) background checks for each detector
_X___ Daily efficiency checks for each detector
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Confirm detector IDs and geometries used in analysis
_X___ Check if sample residues are within the range of the self absorption curve

Calibration verification data were within all required criteria.

IV. Target Compound Identification and Quantitation

_X___ Confirm all samples less than MDC are qualified not detected (U)
_X___ Less than two times the uncertainty (2 sigma error) were reported by the laboratory as not detected

No Gross Alpha or Gross Beta results were reported below the MDC.

V. Blanks

_X___ Confirm method blank results < MDC
If method blank result is ≥ MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤ 5X the concentration of the method blank, then U at detected value.

Gross Alpha and Gross Beta were not detected in the method blank above their MDCs.

VI. Laboratory Duplicates

_X___ Confirm laboratory duplicate analyzed for each batch or for every 20 samples

_X___ Confirm that the DER ≤ 1.42 or RPD ≤ 20

Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2 \text{ sigma error}^2_{\text{Sample}}] + [2 \text{ sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

__NA_ If DER > 1.42, qualify sample J

__NA_ If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

The DUP results were within all required criteria.

VII. Laboratory Control Samples

_X___ Must be analyzed for each batch or for every 20 samples

_X___ Compare %R for Gross Alpha with lab control limits (75-125%)

_X___ Compare %R for Gross Beta with lab control limits (75-125%)

Recoveries for Gross Alpha and Gross Beta in each laboratory control sample were within control limits.

VIII. Matrix Spike Samples

_X___ Must be analyzed for each batch or for every 20 samples

_X___ Compare %R for Gross Alpha with lab control limits (65-135%)

_X___ Compare %R for Gross Beta with lab control limits (65-135%)

Recoveries for Gross Alpha and Gross Beta in each matrix spike sample were within control limits.

IX. Equipment and Water Blank Samples

No field blanks were identified in this SDG.

X. Overall Assessment of Data

With the following exceptions, all quality control data associated with the field samples were within control limits. All other field results are usable as reported by the laboratory.

No Sample Data Qualified in this SDG

LDC #: 28355A22

SDG #: 304389

Laboratory: GEL Laboratories LLC

VALIDATION COMPLETENESS WORKSHEET

Level ~~IV~~ III

Date: 9/10/12

Page: 1 of 1

Reviewer: CL

2nd Reviewer: VC

METHOD: Gross Alpha & Beta (EPA ~~SW 846~~ Method 900.0)/SW846 9310

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/9/12
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Blanks	A	
V.	Matrix Spike/(Matrix Spike) Duplicates	A/A	MS/D, DP
VI.	Laboratory control samples	A	LCS
VII.	Minimum detectable activity (MDA)	A	
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1205GWMMW037-1-U	11		21		31	
2	1205GWMMW037-2-U	12		22		32	
3	1205GWMMW037-1-UMS	13		23		33	
4	1205GWMMW037-1-UMSD	14		24		34	
5	1205GWMMW037-1-UDUP	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

✓ Signatures on chain(s) and all samples accounted for

✓ Gross alpha and beta: preserved with nitric acid to ph < 2; 6-month holding time (if preserved)

A total of 2 groundwater samples were collected on 5/9/12 in preserved containers. Samples were shipped and arrived at the laboratory on 5/15/12. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on 5/24/12, 15 days from collection to analysis.

II. Instrument Calibration

✓ Confirm dates of calibration, detector IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards

✓ Confirm matrix used in geometry standard

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

✓ Calibration points including efficiencies fo reach detector

✓ Background checks performed at the time of initial calibration

✓ Self absorption curves for each detector, covering an appropriate range of residue masses

✓ Alpha-beta cross talk values and voltage plateaus (if needed)

✓ Certificates for NBS- or NIST-traceable standards

✓ Review standard preparation and dilution logs for accuracy

III. Calibration Verification

NA Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits

✓ Routine (daily, weekly, monthly) background checks for each detector

✓ Daily efficiency checks for each detector

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

✓ Confirm defector IDs and geometries used in analysis

✓ Check if sample residues are within the range of the self absorption curve

IV. Target Compound Identification and Quantitation

✓ Confirm all samples less than MDC are quailed non detected (U)

✓ Less than two times the uncertainly (2 sigma error)were reported by the laboratory as non detected

V. Blanks

✓ Confirm method blank results < MDC
If method blank result is ≥MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤5X the concentration of the method blank, then U at detected value.

VI. Laboratory Duplicates

✓ Confirm laboratory duplicate analyzed for each batch or for every 20 samples
✓ Confirm that the DER ≤ 1.42 or RPD ≤ 20
Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2 \text{ sigma error}^2_{\text{Sample}}] + [2 \text{ sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

NA If DER > 1.42, qualify sample J
NA If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

VII. Laboratory Control Samples

✓ Must be analyzed for each batch or for every 20 samples
✓ Compare %R for Gross Alpha with lab control limits (75-125%)
✓ Compare %R for Gross Beta with lab control limits (75-125%)

VIII. Matrix Spike Samples

✓ Must be analyzed for each batch or for every 20 samples
✓ Compare %R for Gross Alpha with lab control limits (65-135%)
✓ Compare %R for Gross Beta with lab control limits (65-135%)

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

MWH Americas, Inc.
2890 East Cottonwood Parkway Suite 300
Salt Lake City, UT 84121
ATTN: Ms. Betty VanPelt

October 18, 2012

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. VanPelt,

Enclosed are the final verification reports for the fraction listed below. These SDGs were received on October 5, 2012. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 28540:

SDG #	Fraction
311672	Gross Alpha & Gross Beta by Methods 900.0
311680	
311682	

The data verification was performed under Stage 2B/4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Data Validation Technical Memorandum, MWH, 2009, to the project SAP, April 2004
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

LDC #28540 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Gross α&β (900.0)																																	
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	311672	10/05/12	10/26/12	4	0																																
B	311680	10/05/12	10/26/12	4	0																																
C	311682	10/05/12	10/26/12	2	0																																
C	311682	10/05/12	10/26/12	2	0																																
Total	A/LR			12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12

Shaded cells indicate Level III validation (all other cells are ADR review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

Report# 28540A22

Data Validation Company Name
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 15, 2012

Matrix: Water

Parameters: Gross Alpha and Gross Beta by Method 900.0
Gas Flow Proportional Counting System (GFPC)

Validation Level: Stage 2B

Laboratory: GEL Laboratories, LLC

Sample Delivery Group (SDG): 311672

Sample Identification	Collection Date	Laboratory Sample Identification
1209GWMDW003-U	09/18/12	311672001
1209GWMAW001-U	09/18/12	311672002
1209GWMAW003-U	09/18/12	311672003
1209GWMDW001-U	09/18/12	311672004

Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA Methods noted below:

- SW 846 Method 9310/EPA Method 900.0: Gross Alpha and Gross Beta.

This review follows the specific guidance in the Data Validation Technical Memorandum (MWH, 2009) to the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 - not applicable to this method -
6 Initial Calibration
7 -not applicable to this method-
8 Continuing Calibration Verification
9 - not applicable to this method -
10 - not applicable to this method -
11 Laboratory or Preparation Blank
12 - not applicable to this method -
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 - not applicable to this method –
19 - not applicable to this method -
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
24 Result is less than the MDC
25 Result is less than two times the error

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

_X__ Signatures on chain(s) and all samples accounted for
_X__ Gross alpha and beta: preserved with nitric acid to pH < 2; 6-month holding time (if preserved)

A total of four groundwater samples were collected on September 18, 2012 in preserved containers. Samples were shipped and arrived at the laboratory on September 21, 2012. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on September 26, 2012, 8 days from collection to analysis.

II. Instrument Calibration

_X___ Confirm dates of calibration, detectors IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards
_X___ Confirm matrix used in geometry standard
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Calibration points including efficiencies for each detector
_X___ Background checks performed at the time of initial calibration
_X___ Self absorption curves for each detector, covering an appropriate range of residue masses
_X___ Alpha-beta cross talk values and voltage plateaus (if needed)
_X___ Certificates for NBS- or NIST-traceable standards
_X___ Review standard preparation and dilution logs for accuracy

Initial calibration data were within all required criteria.

III. Calibration Verification

_NA__ Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits
_X___ Routine (daily, weekly, monthly) background checks for each detector
_X___ Daily efficiency checks for each detector
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Confirm detector IDs and geometries used in analysis
_X___ Check if sample residues are within the range of the self absorption curve

Calibration verification data were within all required criteria.

IV. Target Compound Identification and Quantitation

_X___ Confirm all samples less than MDC are qualified not detected (U)
_X___ Less than two times the uncertainty (2 sigma error) were reported by the laboratory as not detected

Sample results that were reported as values less than the MDC were qualified as not detected at the MDC (flagged U). Sample results that were less than two times the error were qualified as not detected at the MDC (flagged U) or qualified as not detected at the reported concentration (flagged U). The following results were qualified:

Field Sample Identification	Laboratory Sample ID	Parameter	Result (pCi/L)	MDC (pCi/L)	2*Error	Data Validation Result	Reason Code
1209GWMAW001-U	311672002	Gross Beta	5.44	4.27	5.6	5.44U	25

V. Blanks

_X___ Confirm method blank results < MDC
If method blank result is ≥ MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤ 5X the concentration of the method blank, then U at detected value.

Gross Alpha and Gross Beta were not detected in the method blank above their MDCs.

VI. Laboratory Duplicates

_X___ Confirm laboratory duplicate analyzed for each batch or for every 20 samples
_X___ Confirm that the DER ≤ 1.42 or RPD ≤ 20
Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2\ \text{sigma error}^2_{\text{Sample}}] + [2\ \text{sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

__NA_ If DER > 1.42, qualify sample J
__NA_ If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

The DUP results were within all required criteria.

VII. Laboratory Control Samples

_X___ Must be analyzed for each batch or for every 20 samples
_X___ Compare %R for Gross Alpha with lab control limits (75-125%)
_X___ Compare %R for Gross Beta with lab control limits (75-125%)

Recoveries for Gross Alpha and Gross Beta in each laboratory control sample were within control limits.

VIII. Matrix Spike Samples

_X___ Must be analyzed for each batch or for every 20 samples
_X___ Compare %R for Gross Alpha with lab control limits (65-135%)
_X___ Compare %R for Gross Beta with lab control limits (65-135%)

Recoveries for Gross Alpha and Gross Beta in each matrix spike sample were within control limits.

IX. Equipment and Water Blank Samples

No field blanks were identified in this SDG.

X. Overall Assessment of Data

With the following exceptions, all quality control data associated with the field samples were within control limits. All other field results are usable as reported by the laboratory.

Summary of Qualified Data:

Field Sample Identification	Laboratory Sample ID	Parameter	Result (pCi/L)	Data Validation Result/Flag	A or P	Reason Code
1209GWMAW001-U	311672002	Gross Beta	5.44	5.44U	-	25

LDC #: 28540A22

SDG #: 311672

Laboratory: GEL Laboratories LLC

VALIDATION COMPLETENESS WORKSHEET

Level ~~IV~~ III

Date: 10-10-12

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Gross Alpha & Beta (EPA SW 846 Method 900.0)/ SW846 9310

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/18/12
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Blanks	A	
V.	Matrix Spike/(Matrix Spike) Duplicates	~~A~~/A	MS/D (311682), Dup
VI.	Laboratory control samples	A	~~Dup~~ LCS
VII.	Minimum detectable activity (MDA)	A	
VIII.	Sample result verification	SW	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1209GWMDW003-U	11		21		31	
2	1209GWMAW001-U	12		22		32	
3	1209GWMW003-U	13		23		33	
4	1209GWMDW001-U	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28846A22
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Radiochemistry, Method See Cover

#	Sample ID	Parameter	Result (~~unit~~) pCi/L	uncertainty ~~MDC~~ (~~unit~~) pCi/L	2x Error (~~Unit~~) pCi/L	Findings	Qualifications
	2	Gross β	5.44	4.272,80	5.6	Detected result < 2x 2σ	5.44 U25

Comments: α = Gross alpha
β = Gross Beta
2σ = 2 sigma error

SampleVerf.6.wpd

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

✓ Signatures on chain(s) and all samples accounted for

✓ Gross alpha and beta: preserved with nitric acid to ph < 2; 6-month holding time (if preserved)

A total of 4 groundwater samples were collected on 9/18/12 in preserved containers. Samples were shipped and arrived at the laboratory on 9/21/12. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on 9/26/12, 8 days from collection to analysis.

II. Instrument Calibration

✓ Confirm dates of calibration, detector IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards

✓ Confirm matrix used in geometry standard

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

✓ Calibration points including efficiencies fo reach detector

✓ Background checks performed at the time of initial calibration

✓ Self absorption curves for each detector, covering an appropriate range of residue masses

✓ Alpha-beta cross talk values and voltage plateaus (if needed)

✓ Certificates for NBS- or NIST-traceable standards

✓ Review standard preparation and dilution logs for accuracy

III. Calibration Verification

NA Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits

✓ Routine (daily, weekly, monthly) background checks for each detector

✓ Daily efficiency checks for each detector

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

✓ Confirm defector IDs and geometries used in analysis

✓ Check if sample residues are within the range of the self absorption curve

IV. Target Compound Identification and Quantitation

✓ Confirm all samples less than MDC are quailed non detected (U)

✓ Less than two times the uncertainly (2 sigma error)were reported by the laboratory as non detected

V. Blanks

✓ Confirm method blank results < MDC
If method blank result is ≥MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤5X the concentration of the method blank, then U at detected value.

VI. Laboratory Duplicates

✓ Confirm laboratory duplicate analyzed for each batch or for every 20 samples
✓ Confirm that the DER ≤ 1.42 or RPD ≤ 20
Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2 \text{ sigma error}^2_{\text{Sample}}] + [2 \text{ sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

NA If DER > 1.42, qualify sample J
NA If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

VII. Laboratory Control Samples

✓ Must be analyzed for each batch or for every 20 samples
✓ Compare %R for Gross Alpha with lab control limits (75-125%)
✓ Compare %R for Gross Beta with lab control limits (75-125%)

VIII. Matrix Spike Samples

✓ Must be analyzed for each batch or for every 20 samples
✓ Compare %R for Gross Alpha with lab control limits (65-135%)
✓ Compare %R for Gross Beta with lab control limits (65-135%)

Report# 28540B22

Data Validation Company Name
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 15, 2012

Matrix: Water

Parameters: Gross Alpha and Gross Beta by Method 900.0
Gas Flow Proportional Counting System (GFPC)

Validation Level: Stage 2B

Laboratory: GEL Laboratories, LLC

Sample Delivery Group (SDG): 311680

Sample Identification	Collection Date	Laboratory Sample Identification
1209GWMDW002-1-U	09/18/12	311680001
1209GWMDW002-2-U	09/18/12	311680002
1209GWMDW005-U	09/18/12	311680003
1209GWMDW006-U	09/18/12	311680004

Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA Methods noted below:

- SW 846 Method 9310/EPA Method 900.0: Gross Alpha and Gross Beta.

This review follows the specific guidance in the Data Validation Technical Memorandum (MWH, 2009) to the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 - not applicable to this method -
6 Initial Calibration
7 -not applicable to this method-
8 Continuing Calibration Verification
9 - not applicable to this method -
10 - not applicable to this method -
11 Laboratory or Preparation Blank
12 - not applicable to this method -
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 - not applicable to this method –
19 - not applicable to this method -
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
24 Result is less than the MDC
25 Result is less than two times the error

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

_X__ Signatures on chain(s) and all samples accounted for
_X__ Gross alpha and beta: preserved with nitric acid to pH < 2; 6-month holding time (if preserved)

A total of four groundwater samples were collected on September 18, 2012 in preserved containers. Samples were shipped and arrived at the laboratory on September 21, 2012. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on September 26, 2012, 8 days from collection to analysis.

II. Instrument Calibration

_X___ Confirm dates of calibration, detectors IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards
_X___ Confirm matrix used in geometry standard
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Calibration points including efficiencies for each detector
_X___ Background checks performed at the time of initial calibration
_X___ Self absorption curves for each detector, covering an appropriate range of residue masses
_X___ Alpha-beta cross talk values and voltage plateaus (if needed)
_X___ Certificates for NBS- or NIST-traceable standards
_X___ Review standard preparation and dilution logs for accuracy

Initial calibration data were within all required criteria.

III. Calibration Verification

_NA__ Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits
_X___ Routine (daily, weekly, monthly) background checks for each detector
_X___ Daily efficiency checks for each detector
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Confirm detector IDs and geometries used in analysis
_X___ Check if sample residues are within the range of the self absorption curve

Calibration verification data were within all required criteria.

IV. Target Compound Identification and Quantitation

_X___ Confirm all samples less than MDC are qualified not detected (U)
_X___ Less than two times the uncertainty (2 sigma error) were reported by the laboratory as not detected

Sample results that were reported as values less than the MDC were qualified as not detected at the MDC (flagged U). Sample results that were less than two times the error were qualified as not detected at the MDC (flagged U) or qualified as not detected at the reported concentration (flagged U). The following results were qualified:

Field Sample Identification	Laboratory Sample ID	Parameter	Result (pCi/L)	MDC (pCi/L)	2*Error	Data Validation Result	Reason Code
1209GWMDW002-2-U	311680002	Gross Beta	4.91	4.71	6.24	4.91U	25
1209GWMDW005-U	311680003	Gross Alpha	6.86	4.93	7.68	6.86U	25
1209GWMDW006-U	311680004	Gross Alpha	7.02	3.35	7.54	7.02U	25
1209GWMDW006-U	311680004	Gross Beta	5.84	4.09	5.86	5.84U	25

V. Blanks

_X___ Confirm method blank results < MDC
If method blank result is ≥ MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤ 5X the concentration of the method blank, then U at detected value.

Gross Alpha and Gross Beta were not detected in the method blank above their MDCs.

VI. Laboratory Duplicates

_X___ Confirm laboratory duplicate analyzed for each batch or for every 20 samples
_X___ Confirm that the DER ≤ 1.42 or RPD ≤ 20
Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2 \text{ sigma error}^2_{\text{Sample}}] + [2 \text{ sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

__NA_ If DER > 1.42, qualify sample J
__NA_ If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

The DUP results were within all required criteria.

VII. Laboratory Control Samples

_X___ Must be analyzed for each batch or for every 20 samples
_X___ Compare %R for Gross Alpha with lab control limits (75-125%)
_X___ Compare %R for Gross Beta with lab control limits (75-125%)

Recoveries for Gross Alpha and Gross Beta in each laboratory control sample were within control limits.

VIII. Matrix Spike Samples

_X___ Must be analyzed for each batch or for every 20 samples
_X___ Compare %R for Gross Alpha with lab control limits (65-135%)
_X___ Compare %R for Gross Beta with lab control limits (65-135%)

Recoveries for Gross Alpha and Gross Beta in each matrix spike sample were within control limits.

IX. Equipment and Water Blank Samples

No field blanks were identified in this SDG.

X. Overall Assessment of Data

With the following exceptions, all quality control data associated with the field samples were within control limits. All other field results are usable as reported by the laboratory.

Summary of Qualified Data:

Field Sample Identification	Laboratory Sample ID	Parameter	Result (pCi/L)	Data Validation Result/Flag	A or P	Reason Code
1209GWMDW002-2-U	311680002	Gross Beta	4.91	4.91U	-	25
1209GWMDW005-U	311680003	Gross Alpha	6.86	6.86U	-	25
1209GWMDW006-U	311680004	Gross Alpha	7.02	7.02U	-	25
1209GWMDW006-U	311680004	Gross Beta	5.84	5.84U	-	25

LDC #: 28540B22

SDG #: 311680

Laboratory: GEL Laboratories LLC

VALIDATION COMPLETENESS WORKSHEET

Level ~~IV~~ III

Date: 10-10-12

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Gross Alpha & Beta (EPA SW 846 Method 900.0/ SW846 9310)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/18/12
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Blanks	A	
V.	Matrix Spike/(Matrix Spike) Duplicates	A/A	MS/D, Dup (311682)
VI.	Laboratory control samples	A	LCS
VII.	Minimum detectable activity (MDA)	A	
VIII.	Sample result verification	SW/SW	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1209GWMDW002-1-U	11		21		31	
2	1209GWMDW002-2-U	12		22		32	
3	1209GWMDW005-U	13		23		33	
4	1209GWMDW006-U	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28540B22

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Radiochemistry, Method See Cover

#	Sample ID	Parameter	Result (~~unit~~) pCi/L		MDC (~~unit~~) ~~Uncertainty~~ MDC pCi/L	2x Error (~~Unit~~) pCi/L	Findings	Qualifications
	2	Gross β	4.91	4	7 ~~3.12~~	6.24	Detected result < 2x 2σ	4.91 U25
	3	Gross α	6.86	4.9	3 ~~3.84~~	7.68	↓	6.86 U25
	4	Gross α	7.02	3.3	5 ~~3.99~~	7.54	↓	7.02 U25
		Gross β	5.84	4.0	9 ~~2.93~~	5.86	✓	5.86 ↓

Comments: α = Gross alpha
β = Gross Beta
2σ = 2 sigma error

SampleVerf.6.wpd

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

✓ Signatures on chain(s) and all samples accounted for

✓ Gross alpha and beta: preserved with nitric acid to ph < 2; 6-month holding time (if preserved)

A total of 4 groundwater samples were collected on 9/18/12 in preserved containers. Samples were shipped and arrived at the laboratory on 9/21/12. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on 9/26/12, 8 days from collection to analysis.

II. Instrument Calibration

✓ Confirm dates of calibration, detector IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards

✓ Confirm matrix used in geometry standard

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

✓ Calibration points including efficiencies fo reach detector

✓ Background checks performed at the time of initial calibration

✓ Self absorption curves for each detector, covering an appropriate range of residue masses

✓ Alpha-beta cross talk values and voltage plateaus (if needed)

✓ Certificates for NBS- or NIST-traceable standards

✓ Review standard preparation and dilution logs for accuracy

III. Calibration Verification

NA Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits

✓ Routine (daily, weekly, monthly) background checks for each detector

✓ Daily efficiency checks for each detector

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

✓ Confirm defector IDs and geometries used in analysis

✓ Check if sample residues are within the range of the self absorption curve

IV. Target Compound Identification and Quantitation

✓ Confirm all samples less than MDC are quailed non detected (U)

✓ Less than two times the uncertainly (2 sigma error)were reported by the laboratory as non detected

V. Blanks

✓ Confirm method blank results < MDC
If method blank result is ≥MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤5X the concentration of the method blank, then U at detected value.

VI. Laboratory Duplicates

✓ Confirm laboratory duplicate analyzed for each batch or for every 20 samples
✓ Confirm that the DER ≤ 1.42 or RPD ≤ 20
Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2\ \text{sigma error}^2_{\text{Sample}}] + [2\ \text{sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

NA If DER > 1.42, qualify sample J
NA If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

VII. Laboratory Control Samples

✓ Must be analyzed for each batch or for every 20 samples
✓ Compare %R for Gross Alpha with lab control limits (75-125%)
✓ Compare %R for Gross Beta with lab control limits (75-125%)

VIII. Matrix Spike Samples

✓ Must be analyzed for each batch or for every 20 samples
✓ Compare %R for Gross Alpha with lab control limits (65-135%)
✓ Compare %R for Gross Beta with lab control limits (65-135%)

Report# 28540C22

Data Validation Company Name
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 15, 2012

Matrix: Water

Parameters: Gross Alpha and Gross Beta by Method 900.0
Gas Flow Proportional Counting System (GFPC)

Validation Level: Stage 2B & 4

Laboratory: GEL Laboratories, LLC

Sample Delivery Group (SDG): 311682

Sample Identification	Collection Date	Laboratory Sample Identification
1209GWMDW004-U**	09/19/12	311682001**
1209GWMAW006-U**	09/19/12	311682002**
1209B-GW-01-U	09/19/12	311682003
1209ER-GW-01-U	09/19/12	311682004
1209GWMDW004-UMS	09/19/12	311682001MS
1209GWMDW004-UMSD	09/19/12	311682001MSD
1209GWMDW004-UDUP	09/19/12	311682001DUP

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA Methods noted below:

- SW 846 Method 9310/EPA Method 900.0: Gross Alpha and Gross Beta.

This review follows the specific guidance in the Data Validation Technical Memorandum (MWH, 2009) to the project SAP (April 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 - not applicable to this method -
6 Initial Calibration
7 -not applicable to this method-
8 Continuing Calibration Verification
9 - not applicable to this method -
10 - not applicable to this method -
11 Laboratory or Preparation Blank
12 - not applicable to this method -
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 - not applicable to this method –
19 - not applicable to this method -
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
24 Result is less than the MDC
25 Result is less than two times the error

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

_X__ Signatures on chain(s) and all samples accounted for
_X__ Gross alpha and beta: preserved with nitric acid to pH < 2; 6-month holding time (if preserved)

A total of four groundwater samples were collected on September 19, 2012 in preserved containers. Samples were shipped and arrived at the laboratory on September 21, 2012. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on September 26, 2012, 7 days from collection to analysis.

II. Instrument Calibration

_X___ Confirm dates of calibration, detectors IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards
_X___ Confirm matrix used in geometry standard
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Calibration points including efficiencies for each detector
_X___ Background checks performed at the time of initial calibration
_X___ Self absorption curves for each detector, covering an appropriate range of residue masses
_X___ Alpha-beta cross talk values and voltage plateaus (if needed)
_X___ Certificates for NBS- or NIST-traceable standards
_X___ Review standard preparation and dilution logs for accuracy

Initial calibration data were within all required criteria.

III. Calibration Verification

_NA__ Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits
_X___ Routine (daily, weekly, monthly) background checks for each detector
_X___ Daily efficiency checks for each detector
_NA__ Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate
_X___ Confirm detector IDs and geometries used in analysis
_X___ Check if sample residues are within the range of the self absorption curve

Calibration verification data were within all required criteria.

IV. Target Compound Identification and Quantitation

_X___ Confirm all samples less than MDC are qualified not detected (U)
_X___ Less than two times the uncertainty (2 sigma error) were reported by the laboratory as not detected

Sample results that were reported as values less than the MDC were qualified as not detected at the MDC (flagged U). Sample results that were less than two times the error were qualified as not detected at the MDC (flagged U) or qualified as not detected at the reported concentration (flagged U). The following results were qualified:

Field Sample Identification	Laboratory Sample ID	Parameter	Result (pCi/L)	MDC (pCi/L)	2*Error	Data Validation Result	Reason Code
1209GWMAW006-U**	311682002**	Gross Alpha	3.68	3.42	5.5	3.68U	25
1209GWMAW006-U**	311682002**	Gross Beta	5.27	3.79	5.4	5.27U	25

V. Blanks

_X___ Confirm method blank results < MDC
If method blank result is ≥ MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤ 5X the concentration of the method blank, then U at detected value.

Gross Alpha and Gross Beta were not detected in the method blank above their MDCs.

VI. Laboratory Duplicates

_X___ Confirm laboratory duplicate analyzed for each batch or for every 20 samples
_X___ Confirm that the DER ≤ 1.42 or RPD ≤ 20
Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2\ \text{sigma error}^2_{\text{Sample}}] + [2\ \text{sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

__NA_ If DER > 1.42, qualify sample J
__NA_ If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

The DUP results were within all required criteria.

VII. Laboratory Control Samples

_X___ Must be analyzed for each batch or for every 20 samples
_X___ Compare %R for Gross Alpha with lab control limits (75-125%)
_X___ Compare %R for Gross Beta with lab control limits (75-125%)

Recoveries for Gross Alpha and Gross Beta in each laboratory control sample were within control limits.

VIII. Matrix Spike Samples

_X___ Must be analyzed for each batch or for every 20 samples
_X___ Compare %R for Gross Alpha with lab control limits (65-135%)
_X___ Compare %R for Gross Beta with lab control limits (65-135%)

Recoveries for Gross Alpha and Gross Beta in each matrix spike sample were within control limits.

IX. Equipment and Water Blank Samples

Sample 1209B-GW-01-U was identified as a source blank. No gross alpha or gross beta was found.

Sample 1209ER-GW-01-U was identified as an equipment rinsate. No gross alpha or gross beta was found.

X. Overall Assessment of Data

With the following exceptions, all quality control data associated with the field samples were within control limits. All other field results are usable as reported by the laboratory.

Summary of Qualified Data:

Field Sample Identification	Laboratory Sample ID	Parameter	Result (pCi/L)	Data Validation Result/Flag	A or P	Reason Code
1209GWMAW006-U**	311682002**	Gross Alpha	3.68	3.68U	-	25
1209GWMAW006-U**	311682002**	Gross Beta	5.27	5.27U	-	25

LDC #: 28540C22

SDG #: 311682

Laboratory: GEL Laboratories LLC

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 10/10/12

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Gross Alpha & Beta (EPA SW 846 Method 900.0/ SW846 9310

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/19/12
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Blanks	A	
V.	Matrix Spike/(Matrix Spike) Duplicates	A/A	MS/D, Dup
VI.	Laboratory control samples	A	LCS
VII.	Minimum detectable activity (MDA)	A	
VIII.	Sample result verification	SW	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	ND	SB=3 ER=4

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1209GWMDW004-U**	11		21		31	
2	1209GWMAW006-U**	12		22		32	
3	1209B-GW-01-U	13		23		33	
4	1209ER-GW-01-U	14		24		34	
5	1209GWMDW004-UMS	15		25		35	
6	1209GWMDW004-UMSD	16		26		36	
7	1209GWMDW004-UDUP	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

DC #: 0785WCCL

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Radiochemistry (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
II. Calibration				
Were all instruments and detectors calibration as required?	✓			
Were NIST traceable standards used for all calibrations?	✓			
Was the check source identified by activity and radionuclide?	✓			
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?	✓			
III. Blanks				
Were blank analyses performed as required?	✓			
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spikes and Duplicates				
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Was a duplicate sample anaylzed at the required frequency of 5% in this SDG?	✓			
Were all duplicate sample duplicate error rations (DER) <1.42?.	✓			
V. Laboratory control samples				
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%	✓			
VI. Sample Chemical/Carrier Recovery				
Was a tracer/carrier added to each sample?			✓	
Were tracer/carrier recoveries within the QC limits?			✓	
VII. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
VIII. Sample Result Verification				
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were the Minimum Detectable Activities (MDA) < RL?				

DC #: 28540C22

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: ✓

Validation Area	Yes	No	NA	Findings/Comments
IX. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
X. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XI. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 28540C22
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of
Reviewer:
2nd Reviewer

METHOD: Radiochemistry, Method See Cover

#	Sample ID	Parameter	Result (~~µnit~~) pCi/L	~~Uncertainty~~ ~~MDC (µnit)~~ MDC pCi/L	2x Error (~~Unit~~) pCi/L	Findings	Qualifications
	2	Gross α	3.68 3.42	~~2.75~~	5.5	~~Detected~~ result < 2x 2σ	3.68 UJ5
		Gross β	5.27 3.79	~~2.70~~	5.4		5.27 J

Comments: α = Gross alpha
β = Gross Beta
2σ = 2sigma error

SampleVerf.6.wpd

LDC #: 28540C22

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: h

METHOD: Radiochemistry (Method: see cover)

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = activity of each analyte measured in the analysis of the sample. True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample activity D = Duplicate sample activity

Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	Recalculated %R or RPD	Reported %R or RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Gross α	112	120	93.3	93.1	Y
5	Matrix spike sample	↓	ND	ND	—	—	↓
7	Duplicate RPD	Gross β	51700	49800	104	104	↓
N	Chemical recovery						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 16640 CDC

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Radiochemistry (Method: See cover)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?

Analyte results for Gross β reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$$\frac{(\text{cpm} - \text{background})}{2.22 \times E \times SA \times Vol}$$

E = Counter Efficiency
SA = Self-absorbance factor
Vol = Volume of sample

Recalculation:

$$\frac{\left(0.5413 - \left(\frac{13}{60}\right)\right) 0.05274}{2.22(0.1)(0.4532)} = 5.27 \text{ pCi/L}$$

#	Sample ID	Analyte	Reported Concentration (pCi/L)	Calculated Concentration (pCi/L)	Acceptable (Y/N)
	2	Gross α	3.68	3.68	Y
		Gross β	5.27	5.27	Y

ote:

I. Chain-of-Custody Procedure, Sample Preservation, and Holding Time

✓ Signatures on chain(s) and all samples accounted for

✓ Gross alpha and beta: preserved with nitric acid to ph < 2; 6-month holding time (if preserved)

A total of 4 groundwater samples were collected on 9/19/12 in preserved containers. Samples were shipped and arrived at the laboratory on 9/21/12. Sample chain-of-custody and laboratory receipt documentation appear intact. The samples were analyzed within the 6-month holding time on 9/26/12, 7 days from collection to analysis.

II. Instrument Calibration

✓ Confirm dates of calibration, detector IDs, geometry, counting times, number of counts for each standard, measured activity for all standards, identity and true value of all standards

✓ Confirm matrix used in geometry standard

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

✓ Calibration points including efficiencies fo reach detector

✓ Background checks performed at the time of initial calibration

✓ Self absorption curves for each detector, covering an appropriate range of residue masses

✓ Alpha-beta cross talk values and voltage plateaus (if needed)

✓ Certificates for NBS- or NIST-traceable standards

✓ Review standard preparation and dilution logs for accuracy

III. Calibration Verification

NA Tolerance chart or statistical control chart of the appropriate efficiencies and background activities (at least 20 points) with ± 2 sigma error (warning) and ± 3 sigma error (failure) limits

✓ Routine (daily, weekly, monthly) background checks for each detector

✓ Daily efficiency checks for each detector

NA Evidence of decay correction of standard prior to calculation of efficiencies, as appropriate

✓ Confirm defector IDs and geometries used in analysis

✓ Check if sample residues are within the range of the self absorption curve

IV. Target Compound Identification and Quantitation

✓ Confirm all samples less than MDC are quailed non detected (U)

✓ Less than two times the uncertainly (2 sigma error)were reported by the laboratory as non detected

V. Blanks

✓ Confirm method blank results < MDC
If method blank result is ≥MDC:
If sample result is > 5X the concentration of the method blank, then no action.
If sample result is ≤5X the concentration of the method blank, then U at detected value.

VI. Laboratory Duplicates

✓ Confirm laboratory duplicate analyzed for each batch or for every 20 samples
✓ Confirm that the DER ≤ 1.42 or RPD ≤ 20
Where the duplicate (or replicate) error ratio (DER) =

$$\frac{|([\text{Sample}] - [\text{Duplicate}])|}{([2 \text{ sigma error}^2_{\text{Sample}}] + [2 \text{ sigma error}^2_{\text{Duplicate}}])^{1/2}}$$

NA If DER > 1.42, qualify sample J
NA If RPD > 20 and result(s) ≥ 5x MDC, then qualify J. If result(s) < 5x MDC, then calculate absolute difference. If absolute difference is within ± MDC (water) or ± 2x MDC (soil), then no action; if > ± MDC (water) or ± 2x MDC (soil), then qualify sample J.

VII. Laboratory Control Samples

✓ Must be analyzed for each batch or for every 20 samples
✓ Compare %R for Gross Alpha with lab control limits (75-125%)
✓ Compare %R for Gross Beta with lab control limits (75-125%)

VIII. Matrix Spike Samples

✓ Must be analyzed for each batch or for every 20 samples
✓ Compare %R for Gross Alpha with lab control limits (65-135%)
✓ Compare %R for Gross Beta with lab control limits (65-135%)

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

MWH Americas, Inc.
2890 East Cottonwood Parkway Suite 300
Salt Lake City, UT 84121
ATTN: Ms. Betty VanPelt

October 18, 2012

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. VanPelt,

Enclosed are the final verification reports for the fractions listed below. These SDGs were received on October 2, 2012. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 28518:

SDG #	Fraction
L12090584	Metals by ICP SW 846 Method 6010B
L12090585	Metals by ICPMS SW-846 Method 6020
L12090586	Wet Chemistry

The data verification was performed under Stage 2B/4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- QAPP Addendum, MWH 2009, to the project SAP, April 2004
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

LDC #28518 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	(3) Metals (6010B)		(5/6) Metals (6020)		Diss Metals (6010B)		Se (6020)		Diss. Cd (6020)		Alk. (310.2)		Diss SO_4 (300.0)		NO_3-N (353.2)		Diss Hard (2340B)		TDS (160.1)		TSS (160.2)													
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	L12090584	10/02/12	10/23/12	4	0	-	-	-	-	3	0	3	0	-	-	4	0	-	-	4	0	4	0	-	-												
A	L12090584	10/02/12	10/23/12	-	-	-	-	-	-	1	0	1	0	-	-	-	-	-	-	-	-	-	-	-	-												
B	L12090585	10/02/12	10/23/12	6	0	7	0	7	0	-	-	-	-	7	0	6	0	7	0	6	0	6	0	7	0												
B	L12090585	10/02/12	10/23/12	2	0	1	0	1	0	-	-	-	-	1	0	2	0	1	0	2	0	2	0	1	0												
C	L12090586	10/02/12	10/23/12	4	0	4	0	4	0	-	-	-	-	4	0	4	0	4	0	4	0	4	0	4	0												
Total	A/LR			16	0	12	0	12	0	4	0	4	0	12	0	16	0	12	0	16	0	16	0	12	0	0	0	0	0	0	0	0	0	0	0	0	132

Shaded cells indicate Level III validation (all other cells are ADR review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

Report# 28518A4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 15, 2012

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12090584

Sample Identification	Collection Date	Laboratory Sample Identification
1209SWMST044-1-F	09/17/12	L12090584-01
1209SWMST044-2-F	09/17/12	L12090584-03
1209SWMST045-1-F	09/17/12	L12090584-05
1209SWMST069-1-F	09/17/12	L12090584-07
1209SWMST069-1-FMS	09/17/12	L12090584-09
1209SWMST069-1-FMSD	09/17/12	L12090584-11

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium, Magnesium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Magnesium and Calcium results were outside the QC limits; results were not qualified since the original sample (1209SWMST069-1-F) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12090584

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12090584

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12090584

No Sample Data Qualified in this SDG

LDC #: 28518A4a

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 10-10-12

SDG #: L12090584

Page: 1 of 1

Laboratory: Microbac

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/17/12
II.	ICP/MS Tune	N	Not utilized
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1209SWMST044-1-F	11		21		31	
2 3	1209SWMST044-2-F	12		22		32	
3 5	1209SWMST045-1-F	13		23		33	
4 7	1209SWMST069-1-F	14		24		34	
5	1209SWMST069-1-FMS	15		25		35	
6	1209SWMST069-1-FMSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28857A4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CB
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
QCS6		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___

Comments: Mercury by CVAA if performed

LDC #: 01851849

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions ~~are identified~~ as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125?~~ 80-120 If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	S16	W	Mg	45.1			All	No Qual (>4X)
			Ca	-430	-384		↓	↓

Comments:

MSD.4SW

Report# 28518A4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 15, 2012

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12090584

Sample Identification	Collection Date	Laboratory Sample Identification
1209SWMST044-1-U**	09/17/12	L12090584-02**
1209SWMST044-2-U	09/17/12	L12090584-04
1209SWMST045-1-U	09/17/12	L12090584-06
1209SWMST069-1-U	09/17/12	L12090584-08
1209SWMST044-1-F**	09/17/12	L12090584-01**
1209SWMST044-2-F	09/17/12	L12090584-03
1209SWMST045-1-F	09/17/12	L12090584-05
1209SWMST069-1-F	09/17/12	L12090584-07
1209SWMST069-1-UMS	09/17/12	L12090584-10
1209SWMST069-1-UMSD	09/17/12	L12090584-12
1209SWMST069-1-FMS	09/17/12	L12090584-09
1209SWMST069-1-FMSD	09/17/12	L12090584-11

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Selenium results were outside the QC limits; results were not qualified since the original sample (1209SWMST069-1-U) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 100 times the lower limit of quantitation (i.e., the method detection limits [MDLs]).

Selenium results were outside the QC limits; results were not qualified since the original sample (1209SWMST045-1-U) was less than 100 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12090584

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12090584

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12090584

No Sample Data Qualified in this SDG

LDC #: 28518A4Ab

SDG #: L12090584

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 10-10-12

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/17/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	A	Not reviewed for level 4
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

** Level 4

Validated Samples:

water

1	1209SWMST044-1-U **	11	1209SWMST069-1-FMS	21		31	
2	1209SWMST044-2-U	12	1209SWMST069-1-FMSD	22		32	
3	1209SWMST045-1-U	13		23		33	
4	1209SWMST069-1-U	14		24		34	
5	1209SWMST044-1-F **	15		25		35	
6	1209SWMST044-2-F	16		26		36	
7	1209SWMST045-1-F	17		27		37	
8	1209SWMST069-1-F	18		28		38	
9	1209SWMST069-1-UMS	19		29		39	
10	1209SWMST069-1-UMSD	20		30		40	

Notes:

LDC #: 28518HA5

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: CR
2nd Reviewer: ✓

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 28516A7

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 28518A4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CB
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
5-8		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC: 9,10		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
11,12		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___

Comments: Mercury by CVAA if performed

LDC #: 21851844b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: OR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125~~ 80-120? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	9/10	W	Se	451	526		1-4	No Qual (>4x)

Comments:

LDC #: 01851B4H5

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CL
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		43	W	Se	78.10	All	No Qual (<100xMDL)

Comments:

SDILICPMS.wpd

LDC #: 28518A6

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Se	49.1	50	98.2	98.2	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Cd	49.2	50	98.4	98.4	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28518A5

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Se	102	100	102	102	Y
LCS	Laboratory control sample	Se	0.0668	0.0625	107	107	
11	Matrix spike	Cd	(SSR-SR) 0.06587	0.0625	105	105	
11/12	Duplicate	Cd	0.0673	0.0701	4	4	
1	ICP serial dilution	Cd	ND	ND	0	0	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28518A1b

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: QR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Se were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$\frac{0.5653 \text{ mg/L}(100\text{mL})}{40\text{mL}(1000)} = 0.00141 \text{ mg/L}$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Se	0.00141	0.00141	Y

Note:

RECALC.4SW

Report# 28518A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 17, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12090584

Sample Identification	Collection Date	Laboratory Sample Identification
1209SWMST044-1-F	09/17/12	L12090584-01
1209SWMST044-1-U	09/17/12	L12090584-02
1209SWMST044-2-F	09/17/12	L12090584-03
1209SWMST044-2-U	09/17/12	L12090584-04
1209SWMST045-1-F	09/17/12	L12090584-05
1209SWMST045-1-U	09/17/12	L12090584-06
1209SWMST069-1-F	09/17/12	L12090584-07
1209SWMST069-1-U	09/17/12	L12090584-08
1209SWMST069-1-UMS	09/17/12	L12090584-10
1209SWMST069-1-UMSD	09/17/12	L12090584-12
1209SWMST069-1-FMS	09/17/12	L12090584-09
1209SWMST069-1-FMSD	09/17/12	L12090584-11

Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate, Standard Method 2340B for Dissolved Hardness, and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 6 months for method 2340B, and 7 days for method 160.1) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120%.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Sulfate results were outside the QC limits; results were not qualified since the original sample (1209SWMST069-1-F) was greater than 4X the spike amount.

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12090584

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12090584

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12090584

No Sample Data Qualified in this SDG

LDC #: 28518A6
SDG #: L12090584
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 10-10-12
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (WPA Method 160.1), Hardness (SM2340B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/17/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
VI.	Duplicates	N	
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1209SWMST044-1-F	11	1209SWMST069-1-FMS~~D~~	21		31	
2	1209SWMST044-1-U	12	1209SWMST069-1-~~U~~FMSD	22		32	
3	1209SWMST044-2-F	13		23		33	
4	1209SWMST044-2-U	14		24		34	
5	1209SWMST045-1-F	15		25		35	
6	1209SWMST045-1-U	16		26		36	
7	1209SWMST069-1-F	17		27		37	
8	1209SWMST069-1-U	18		28		38	
9	1209SWMST069-1-~~F~~UMS	19		29		39	
10	1209SWMST069-1-UMS~~D~~	20		30		40	

Notes:

LDC #: 28518A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1,3,5,7	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 Hardness
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
2,4,6,8	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC: 9,10	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
11,12	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 Hardness
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 26518A6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions ~~are identified~~ as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125?~~ 90-110 If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	11/12	W	~~74.6~~	~~72.2~~				
			SO4	74.6	72.2		1,3,5,7	No Qual (74x)

Comments:

Report# 28518B4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 15, 2012

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12090585

Sample Identification	Collection Date	Laboratory Sample Identification
1209GWMDW003-F	09/18/12	L12090585-01
1209GWMDW003-U**	09/18/12	L12090585-02**
1209GWMAW001-F**	09/18/12	L12090585-03**
1209GWMAW001-U**	09/18/12	L12090585-04**
1209GWMAW003-F	09/18/12	L12090585-05
1209GWMAW003-U	09/18/12	L12090585-06
1209GWMDW001-F	09/18/12	L12090585-07
1209GWMDW001-U	09/18/12	L12090585-08
1209GWMDW002-1-F	09/18/12	L12090585-09
1209GWMDW002-1-U	09/18/12	L12090585-10
1209GWMDW002-2-F	09/18/12	L12090585-11
1209GWMDW002-2-U	09/18/12	L12090585-12
1209GWMDW005-F	09/18/12	L12090585-13
1209GWMDW005-U	09/18/12	L12090585-14
1209GWMDW006-F	09/18/12	L12090585-15
1209GWMDW006-U	09/18/12	L12090585-16
1209GWMDW006-FMS	09/18/12	L12090585-15MS
1209GWMDW006-FMSD	09/18/12	L12090585-16MSD

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Aluminum, Calcium, Iron, Magnesium, Potassium, Sodium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium results were outside the QC limits; results were not qualified since the original sample (1209GWMDW006-F) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12090585

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12090585

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12090585

No Sample Data Qualified in this SDG

LDC #: 28518B4a

SDG #: L12090585

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III / IV

Date: 10-6-12

Page: 1 of 1

Reviewer: CL

2nd Reviewer: W

METHOD: Metals (EPA SW 846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/18/12
II.	ICP/MS Tune	N	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	A	Not reviewed for IV
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

** Level 4

1	1209GWMDW003-F	11	1209GWMDW002-2-F	21		31	
2	1209GWMDW003-U **	12	1209GWMDW002-2-U	22		32	
3	1209GWMAW001-F **	13	1209GWMDW005-F	23		33	
4	1209GWMAW001-U **	14	1209GWMDW005-U	24		34	
5	1209GWMAW003-F	15	1209GWMDW006-F	25		35	
6	1209GWMAW003-U	16	1209GWMDW006-U	26		36	
7	1209GWMDW001-F	17	(15) MS	27		37	
8	1209GWMDW001-U	18	MSD	28		38	
9	1209GWMDW002-1-F	19		29		39	
10	1209GWMDW002-1-U	20		30		40	

Notes:

LDC #: 28518B4a

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			✓	
Were %RSD of isotopes in the tuning solution ≤5%?			✓	
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 28518B4a

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 26518B4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CB
2nd reviewer: V

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,3,5,7,9,11,13,15		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
2,4,6,8,10,12,14,16		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
QC: 17,18		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 28518B4G

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125~~? 80-120 If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	17/18	CW	Ca	171	176		1,3,5,7,9,11,13,15	~~J det~~ for No Qual (>4x)

Comments:

LDC #: 28518B4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Al	10.1	10	101	101	Y
	ICP/MS (Initial calibration)						
	CVAA (Initial calibration)						
CCV	ICP (Continuing calibration)	Ca	10.4	10	104	104	Y
	ICP/MS (Continuing calibration)						
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28548B4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	V	0.251	0.25	100	100	Y
LCS	Laboratory control sample	V	0.510	0.5	102	102	
17	Matrix spike	Fe	(SSR-SR) 1.06	2	98	98	
17/18	Duplicate	Na	59.0	61.0	1.82	1.83	
6	ICP serial dilution	Ca	63.8	66.4	4.08	4.15	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 28518054

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: QR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for K were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

Raw Data = 0.668 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	3	Ca	64.8	64.8	Y
		Mg	13.0	13.0	
		K	0.668	0.668	
		Na	5.37	5.37	

Note:

RECALC.4SW

Report# 28518B4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 15, 2012

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12090585

Sample Identification	Collection Date	Laboratory Sample Identification
1209GWMDW003-U**	09/18/12	L12090585-02**
1209GWMAW001-U	09/18/12	L12090585-04
1209GWMAW003-U	09/18/12	L12090585-06
1209GWMDW001-U	09/18/12	L12090585-08
1209GWMDW002-1-U	09/18/12	L12090585-10
1209GWMDW002-2-U	09/18/12	L12090585-12
1209GWMDW005-U	09/18/12	L12090585-14
1209GWMDW006-U	09/18/12	L12090585-16

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Chromium, Manganese, Nickel, Selenium, and Zinc.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediments and soils with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1209GWMDW004-UMS/MSD (All samples in SDG L12090585)	Zinc	161 (75-125)	-	-	J+ (all detects)	A
1209GWMDW004-UMS/MSD (All samples in SDG L12090585)	Zinc	-	-	32.8 (≤20)	J (all detects) UJ (all non-detects)	A

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 100 times the lower limit of quantitation (i.e., the method detection limits [MDLs]).

Manganese and Selenium results were outside the QC limits; results were not qualified since the original sample (1209GWMDW004-U) was less than 100 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12090585

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12090585	1209GWMDW003-U 1209GWMAW001-U 1209GWMAW003-U 1209GWMDW001-U 1209GWMDW002-1-U 1209GWMDW002-2-U 1209GWMDW005-U 1209GWMDW006-U	Zinc	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
L12090585	1209GWMDW003-U 1209GWMAW001-U 1209GWMAW003-U 1209GWMDW001-U 1209GWMDW002-1-U 1209GWMDW002-2-U 1209GWMDW005-U 1209GWMDW006-U	Zinc	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (RPD)	17

Metals - Laboratory Blank Data Qualification Summary - SDG L12090585

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12090585

No Sample Data Qualified in this SDG

LDC #: 28518B4b

SDG #: L12090585

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III /IV

Date: 10-10-12

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Metals (EPA SW 846 Method ~~6010B~~ 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/18/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	~~A~~ SW	MS/D (SDG: L12090586)
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	~~A~~	Not reviewed for IV
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water **IV

1	1209GWMDW003-U **	11		21		31	
2	1209GWMAW001-U	12		22		32	
3	1209GWMAW003-U	13		23		33	
4	1209GWMDW001-U	14		24		34	
5	1209GWMDW002-1-U	15		25		35	
6	1209GWMDW002-2-U	16		26		36	
7	1209GWMDW005-U	17		27		37	
8	1209GWMDW006-U	18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28518B4b

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: CR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.		✓		
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 28518045

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 01851B3 4/6

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: V

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-8		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 28518034b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	1209GWMDW004-UMS/D		Zn	161			All	J+ det/A (16)
			Zn			32.8	↓	J/UJ/A (17)

Comments:

LDC #: 28518B4D

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer: ✓

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?

Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?

Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		12096WMDW0040	W	Mn	48.6	All	No Qual (<100 MDL)
				Se	78.10	↓	↓

Comments:

LDC #: 38518B4b

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Se	49.7	50	99.4	99.4	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Ni	51.5	50	103	103	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28518B4b

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Cr	101	100	101	101	Y
LCS	Laboratory control sample	Cr	0.0676	0.0625	108	108	↓
1209GWMW004U	Matrix spike	Mn	(SSR-SR) 0.0723	0.0625	116	116	↓
↓	Duplicate	Se	0.0712	0.0709	0.4	0.4	↓
1209GWMW004U	ICP serial dilution	Zn	ND	ND	0	0	↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 28518B4b

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: QR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Se were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{4.34\,mg/L\,(100\,mL)}{40\,mL\,(1000)} = 0.01085\,mg/L$$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Cr	0.00185	0.00185	Y
		Mn	0.00196	0.00196	↓
		Ni	0.00300	0.00300	↓
		Se	0.0109	0.0109	↓

Note:

RECALC.4SW

Report# 28518B6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 17, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12090585

Sample Identification	Collection Date	Laboratory Sample Identification
1209GWMDW003-F**	09/18/12	L12090585-01**
1209GWMDW003-U**	09/18/12	L12090585-02**
1209GWMAW001-F**	09/18/12	L12090585-03**
1209GWMAW001-U***	09/18/12	L12090585-04***
1209GWMAW003-F	09/18/12	L12090585-05
1209GWMAW003-U	09/18/12	L12090585-06
1209GWMDW001-F	09/18/12	L12090585-07
1209GWMDW001-U	09/18/12	L12090585-08
1209GWMDW002-1-F	09/18/12	L12090585-09
1209GWMDW002-1-U	09/18/12	L12090585-10
1209GWMDW002-2-F	09/18/12	L12090585-11
1209GWMDW002-2-U	09/18/12	L12090585-12
1209GWMDW005-F	09/18/12	L12090585-13
1209GWMDW005-U	09/18/12	L12090585-14
1209GWMDW006-F	09/18/12	L12090585-15
1209GWMDW006-U	09/18/12	L12090585-16

**Indicates sample underwent Stage 4 review
***Indicates sample underwent Stage 4 review for Total Dissolved Solids only

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 310.2 for Alkalinity, EPA Method 300.0 for Sulfate, EPA Method 353.2 for Nitrate/Nitrite for Nitrogen, Standard Method 2340B for Dissolved Hardness, and EPA Method 160.1 and EPA Method 160.2 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for methods 300.0 and 353.2, 6 months for method 2340B, 14 days for method 310.2, and 7 days for methods 160.1 and 160.2) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120%.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage IV review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12090585

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12090585

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12090585

No Sample Data Qualified in this SDG

LDC #: 28518B6
SDG #: L12090585
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III /IV

Date: 10-10-12
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Alkalinity (EPA Method 310.2), Sulfate (EPA Method 300.0), Nitrate/Nitrite as Nitrogen (EPA Method 353.2), Dissolved Hardness (SM2340B), Total Dissolved Solids (WPA Method 160.1), Total Suspended Solids (EPA Method 160.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/18/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	MS Not provided
VI.	Duplicates	N	↓
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	AN	Not reviewed for level 4
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

** Level 4 *** Level 4 for TDS only

1	1209GWMDW003-F ***	11	1209GWMDW002-2-F	21		31	
2	1209GWMDW003-U **	12	1209GWMDW002-2-U	22		32	
3	1209GWMAW001-F **	13	1209GWMDW005-F	23		33	
4	1209GWMAW001-U ***	14	1209GWMDW005-U	24		34	
5	1209GWMAW003-F	15	1209GWMDW006-F	25		35	
6	1209GWMAW003-U	16	1209GWMDW006-U	26		36	
7	1209GWMDW001-F	17		27		37	
8	1209GWMDW001-U	18		28		38	
9	1209GWMDW002-1-F	19		29		39	
10	1209GWMDW002-1-U	20		30		40	

Notes:

LDC #: 25818D6

VALIDATION FINDINGS CHECKLIST

Reviewer: QR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)	✓			
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.			✓	
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓	✓	
Were the performance evaluation (PE) samples within the acceptance limits?				

LDC #: 28518B6

VALIDATION FINDINGS CHECKLIST

Reviewer: AR
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓	✓	
Target analytes were detected in the field blanks.				

LDC #: 28518B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter
1,3,5,7,9,11,13,15	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 Hardness
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
2,4,6,8,10, 12,14,16	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 TSS
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 28518B6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of SO_4 was recalculated. Calibration date: 4/26/12

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	SO_4	s1	1.0	0.12	*0.996843*	0.995464	Y
		s2	5	0.577			
		s3	20	2.363			
		s4	40	5.098			
		s5	50	7.193			
		s6	150	17.696			
Calibration verification		CCV	40	41.171	103	–	
Calibration verification	NO_3/NO_2	CCV	1	0.98	98	–	
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28518B5

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: SR
2nd Reviewer: SR

METHOD: Inorganics, Method See cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Alk	194	200	97	97	Y
	Matrix spike sample		(SSR-SR)				
	Duplicate sample						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28518B6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: QR
2nd reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for SO4 reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$y = 0.1266x - 0.009$

Recalculation:

$\frac{1.199 + 0.009}{0.1266} = 9.54$ mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	SO4	9.54	9.54	Y
		Hardness	195	195	+

Note:

Report# 28518C4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 15, 2012

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12090586

Sample Identification	Collection Date	Laboratory Sample Identification
1209GWMDW004-F	09/19/12	L12090586-01
1209GWMDW004-U	09/19/12	L12090586-02
1209GWMDW004-FMS	09/19/12	L12090586-03
1209GWMDW004-UMS	09/19/12	L12090586-04
1209GWMDW004-FMSD	09/19/12	L12090586-05
1209GWMDW004-UMSD	09/19/12	L12090586-06
1209GWMDW006-F	09/19/12	L12090586-07
1209GWMDW006-U	09/19/12	L12090586-08
1209B-GW-01-F	09/19/12	L12090586-09
1209B-GW-01-U	09/19/12	L12090586-10
1209ER-GW-01-F	09/19/12	L12090586-11
1209ER-GW-01-U	09/19/12	L12090586-12

Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Aluminum, Calcium, Iron, Magnesium, Potassium, Sodium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Samples 1209ER-GW-01-F and 1209ER-GW-01-U were identified as equipment rinsates. No metal contaminants were found with the following exceptions:

Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1209ER-GW-01-F	9/19/12	Sodium	0.521 mg/L	1209GWMDW004-F 1209GWMDW006-F

Samples 1209B-GW-01-F and 1209B-GW-01-U were identified as source blanks. No metal contaminants were found with the following exceptions:

Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1209B-GW-01-F	9/19/12	Sodium	0.380 mg/L	1209GWMDW004-F 1209GWMDW006-F

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>1X blank contaminants) than the concentrations found in the associated field blanks.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium results were outside the QC limits; results were not qualified since the original sample (1209GWMDW004-F) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12090586

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L12090586

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12090586

No Sample Data Qualified in this SDG

LDC #: 28518C4a

SDG #: L12090586

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 10/012

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/19/12
II.	ICP/MS Tune	N	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	Source Blk=9,10 ; ~~EB~~ ER=11,12

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

1	1209GWDW004-F	11	1209ER-GW-01-F	21		31	
2	1209GWDW004-U	12	1209ER-GW-01-U	22		32	
3	1209GWDW004-FMS	13		23		33	
4	1209GWDW004-UMS	14		24		34	
5	1209GWDW004-FMSD	15		25		35	
6	1209GWDW004-UMSD	16		26		36	
7	1209GWDW006-F	17		27		37	
8	1209GWDW006-U	18		28		38	
9	1209B-GW-01-F	19		29		39	
10	1209B-GW-01-U	20		30		40	

Notes:

LDC #: 28518C4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,7,9,11		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
2,8,10,12		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC 3,5		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
4,6		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 28518C4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 9/19/12 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: SB Associated Samples: 1, 7

Analyte	Blank ID	Sample Identification											
	9	Action Limit	No Qualifiers										
Na	0.380	0.380											

Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 9/19/12 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: ER Associated Samples: 1, 7

Analyte	Blank ID	Sample Identification											
	11	Action Limit	No Qualifiers										
Na	0.521	0.521											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 28518C4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125?~~ 80-120 If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	3/5	W	Ca	188	213		1,7,9,11	No Qual (>4x)

Comments:

MSD.4SW

Report# 28518C4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 15, 2012

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12090586

Sample Identification	Collection Date	Laboratory Sample Identification
1209GWMDW004-U	09/19/12	L12090586-02
1209GWMDW004-UMS	09/19/12	L12090586-04
1209GWMDW004-UMSD	09/19/12	L12090586-06
1209GWMDW006-U	09/19/12	L12090586-08
1209B-GW-01-U	09/19/12	L12090586-10
1209ER-GW-01-U	09/19/12	L12090586-12

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020 ICPMS: Cadmium, Chromium, Manganese, Nickel, Selenium, and Zinc.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

Sample 1209ER-GW-01-U was identified as an equipment rinsate. No metal contaminants were found.

Sample 1209B-GW-01-U was identified as a source blank. No metal contaminants were found with the following exceptions:

Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1209B-GW-01-U	9/19/12	Manganese	0.00175 mg/L	1209GWMDW004-U 1209GWMDW006-U

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>1X blank contaminants) than the concentrations found in the associated field blanks.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP-MS interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of # 20% for water or # 35% for soil. For low level results, <5 x RL, a difference of ∀ 1 x RL is allowed for water and ∀ 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits for water and 35% limits for sediments and soils with the following exceptions (qualification applies only if the spike value X 4 > sample result):

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1209GWMDW004-UMS/MSD (All samples in SDG L12090586)	Zinc	161 (75-125)	-	-	J+ (all detects)	A
1209GWMDW004-UMS/MSD (All samples in SDG L12090586)	Zinc	-	-	32.8 (≤20)	J (all detects) UJ (all non-detects)	A

IX. ICP-MS Serial Dilution

ICP-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 100 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

Manganese and Selenium results were outside the QC limits; results were not qualified since the original sample (1209GWMDW004-U) was less than 100 times the MDLs.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG L12090586

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12090586	1209GWMDW004-U 1209GWMDW006-U 1209B-GW-01-U 1209ER-GW-01-U	Zinc	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)	16
L12090586	1209GWMDW004-U 1209GWMDW006-U 1209B-GW-01-U 1209ER-GW-01-U	Zinc	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (RPD)	17

Metals - Laboratory Blank Data Qualification Summary - SDG L12090586

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L12090586

No Sample Data Qualified in this SDG

LDC #: 28518C4b

SDG #: L12090586

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 10-6-12

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Metals (EPA SW 846 Method ~~6010B~~ 6020)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/19/12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS/D
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	Source Blk = 5 ; EB = 6 GR

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: WG

1	1209GWDW004-U	11		21		31	
2	1209GWDW004-UMS	12		22		32	
3	1209GWDW004-UMSD	13		23		33	
4	1209GWDW006-U	14		24		34	
5	1209B-GW-01-U	15		25		35	
6	1209ER-GW-01-U	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 28518C4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,4,6		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
QC2,3		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___

Comments: Mercury by CVAA if performed

LDC #: 28518C4b

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 9/19/12 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: SB Associated Samples: 1, 4

Analyte	Blank ID	Sample Identification										
	5	Action Limit	No Qualifiers									
Mn	0.00175	0.00175										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 28518C4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: CR
2nd Reviewer: L

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125~~ 80-120? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	2B	W	Zn	161 (75-125)			All	J+det/A (16)
			Zn			32.8	↓	J/UJ/A (17)

Comments:

MSD.4SW

LDC #: 28518C4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A — If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y (N) N/A — Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A — Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:
Y N (N/A) — Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
		1	W	Mn	48.6	All	No Qual (<100x MDL)
				Se	78.10	↓	↓

Comments:

SDILICPMS.wpd

Report# 28518C6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 17, 2012

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L12090586

Sample Identification	Collection Date	Laboratory Sample Identification
1209GWMDW004-F	09/19/12	L12090586-01
1209GWMDW004-U	09/19/12	L12090586-02
1209GWMDW004-FMS	09/19/12	L12090586-03
1209GWMDW004-UMS	09/19/12	L12090586-04
1209GWMDW004-FMSD	09/19/12	L12090586-05
1209GWMDW004-UMSD	09/19/12	L12090586-06
1209GWMDW006-F	09/19/12	L12090586-07
1209GWMDW006-U	09/19/12	L12090586-08
1209B-GW-01-F	09/19/12	L12090586-09
1209B-GW-01-U	09/19/12	L12090586-10
1209ER-GW-01-F	09/19/12	L12090586-11
1209ER-GW-01-U	09/19/12	L12090586-12

Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 310.2 for Alkalinity, EPA Method 300.0 for Sulfate, EPA Method 353.2 for Nitrate/Nitrite for Nitrogen, Standard Method 2340B for Dissolved Hardness, and EPA Method 160.1 and EPA Method 160.2 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for methods 300.0 and 353.2, 6 months for method 2340B, 14 days for method 310.2, and 7 days for methods 160.1 and 160.2) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples 1209ER-GW-01-F and 1209ER-GW-01-U were identified as equipment rinsates. No contaminant concentrations were found with the following exceptions:

Source Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1209ER-GW-01-U	9/19/12	Alkalinity Nitrate/Nitrite as N Total dissolved solids	24 mg/L 0.146 mg/L 32 mg/L	1209GWMDW004-U 1209GWMDW006-U

Samples 1209B-GW-01-F and 1209B-GW-01-U were identified as source blanks. No contaminant concentrations were found with the following exceptions:

Source Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
1209B-GW-01-U	9/19/12	Alkalinity Nitrate/Nitrite as N	28.5 mg/L 0.141 mg/L	1209GWMDW004-U 1209GWMDW006-U

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>1X blank contaminants) than the concentrations found in the associated field blanks.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1209GWMDW004-UMS/MSD (1209GWMDW004-U 1209GWMDW006-U 1209B-GW-01-U 1209ER-GW-01-U)	Alkalinity	-	82.6 (90-110)	-	J- (all detects) UJ (all nondetects)	A

Nitrate/Nitrite as Nitrogen results were outside the QC limits; results were not qualified since the original sample (1209GWMDW004-U) was greater than 4X the spike amount.

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not reviewed for this SDG.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG L12090586

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L12090586	1209GWMDW004-U 1209GWMDW006-U 1209B-GW-01-U 1209ER-GW-01-U	Alkalinity	J- (all detects) UJ (all nondetects)	A	Matrix spike/Matrix spike duplicate (%R)	16

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L12090586

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L12090586

No Sample Data Qualified in this SDG

LDC #: 28518C6
SDG #: L12090586
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 10-10-12
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Alkalinity (EPA Method 310.2), Sulfate (EPA Method 300.0), Nitrate Nitrite as Nitrogen (EPA Method 353.2), Dissolved Hardness (SM2340B), Total Dissolved Solids (WPA Method 160.1), Total Suspended Solids (EPA Method 160.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/19/12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
VI.	Duplicates	N	
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	SW	Source BLK=9,10 ER=11,12

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

water

1	1209GWDW004-F	11	1209ER-GW-01-F	21		31	
2	1209GWDW004-U	12	1209ER-GW-01-U	22		32	
3	1209GWDW004-FMS	13		23		33	
4	1209GWDW004-UMS	14		24		34	
5	1209GWDW004-FMSD	15		25		35	
6	1209GWDW004-UMSD	16		26		36	
7	1209GWDW006-F	17		27		37	
8	1209GWDW006-U	18		28		38	
9	1209B-GW-01-F	19		29		39	
10	1209B-GW-01-U	20		30		40	

Notes:

LDC #: 28518C6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter
1,7,9,11	pH TDS Cl F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 (Hardness)
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
2,8,10,12	pH (TDS) Cl F (NO_3/NO_2) SO_4 O-PO_4 (Alk) CN NH_3 TKN TOC Cr6+ ClO_4 (TSS)
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC: 3,5	pH TDS Cl F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 (Hardness)
4,6	pH (TDS) Cl F (NO_3) NO_2 SO_4 O-PO_4 (Alk) CN NH_3 TKN TOC Cr6+ ClO_4 (TSS)
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 28518C6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 9/19/12 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: SB Associated Samples: 2, 8

Analyte	Blank ID	Action Limit	Sample Identification							
	10		No Qualifiers							
Alkalinity	24	24								
Nitrate/Nitrite as N	0.146	0.146								
TDS	32	32								

Sampling date: 9/19/12 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: ER Associated Samples: 2, 8

Analyte	Blank ID	Action Limit	Sample Identification							
	12		No Qualifiers							
Alkalinity	28.5	28.5								
Nitrate/Nitrite as N	0.141	0.141								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 28518C6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: a
2nd Reviewer: h

METHOD: Inorganics, EPA Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a matrix spike analyzed for each matrix in this SDG? 90-110

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125?~~ If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

(Y) N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	4/6	W	Alk.		82.6 (85-115)		2,8,10,12	J-/UJ/A (16)
			NO3/NO2N	-55.2 (90-110)	-92.8 (90-110)		↓	No Qual (>4x)

Comments:

APPENDIX F – COMMENTS AND COMMENT RESPONSES

P4's Reponses to A/T comments on 2010 and 2012 Data Summary Report, Ballard, Henry, and Enoch Valley Mines Remedial Investigation Activities, Draft Revision 0

- Prepared for P4 Production by MWH, dated June 12, 2013 -

General Comments (GC)

Comments are provided on the entire subject document, even though a DSR for Ballard was not specifically required per the SOW.

GC#1: The report should be revised to include a discussion of data gaps, consistent with direction in the SOW for the project. Data gap analysis is an iterative process, and the scope and level of detail at this stage of the project should reflect the scope of the sampling effort implemented. More specifically, a data gap analysis for this DSR should include a review of DQO's for the sampling activities undertaken in 2010-2012 and an assessment of whether the data collected were of adequate quality and are useable for their intended purpose, and whether the data collection effort revealed any additional questions of interest that must be resolved for the project to proceed. If any new data gaps are identified, the DSR must identify additional and/or modified sampling and analysis activities that shall be included in modifications to the SAP.

> **P4 Response**: *Table 1-1 has been revised and now includes a final column discussing the data gaps that were filled or if additional information is warranted. What should be recognized is this is an educated judgment based on our review of the data, the site conceptual model, and the risk assessment needs for each of the media that were sampled.*

GC#2: One area in particular that warrants additional discussion is defining the extent of groundwater plumes. Without this information, the reader is left in the dark as to whether there are still more data needed to fill the data gaps listed in Table 1-1 or other potential data gaps that may now be apparent. Please discuss at least to the point where the original intent of the sampling, i.e., to fill a particular data gap, can be deemed sufficient. For example, there were no exceedances of groundwater screening levels in direct push boreholes (BH159, -160, -161, and -172) in the southwest corner of Ballard Mine. Dissolved selenium concentrations from samples collected in 2010 were as follows: 0.0409 mg/L (BH159), 0.000676 J mg/L (BH160), 0.0164 mg/L (BH161), and 0.0144 mg/L (BH172). Surface water exceedances for all sampled COPCs were noted at surface water location MST066 (Table 3-19). Thus, it does not appear that the extent of the plume has been defined for this area. To assist the reader, therefore, the A/T requests that Figures 2-1, 2-2, and 2-3 be revised to show the 2010-2012 selenium concentrations at each sample location for each of the sampled media. If more than one sample was collected from a sample station during the period, the selenium concentration should be shown for each sample by date to assist with an assessment of potential recent data trends.

P4 Response: *As discussed in response to GC#1, data gaps are now evaluated in Table 1-1. To address this comment, we have attached direct-push sample location maps, which provide groundwater selenium concentrations from those borings for Ballard and Henry Mines (Figures 3-1 and 3-3) and an isoconcentration contour map for groundwater samples collected from direct-push borings at the Ballard Mine (Figure 3-2). These direct-push boreholes were installed to help define the shallow alluvial selenium plume at the Ballard and Henry mines. These maps initially were presented in the RI/FS Work Plan (MWH, 2011) to identify the data gaps and in the current figures, have been updated with 2010 data. These figures also now will be included in the revised DSR. With the addition of the 2010 direct-push boreholes, the nature and extent of the two plumes on the west side of the Ballard Mine and at the Henry Mine are adequately defined.*

In regard to MST066, this is a surface water station that receives upstream dump seepage and does not represent groundwater quality at that location (i.e., it is not directly relevant to the definition of the groundwater plume).

We have provided the direct-push location and groundwater isoconcentration maps because, in our estimation, these maps for this medium are the most important to show spatially as your comment suggests. A presentation of the spatial distribution of contamination in the medium is important for understanding the source and fate of contamination and if the related data gap has been addressed. In contrast, the data gaps for the other media in 2010/2012 were not focused on similar data gaps or DQOs. The other programs were routine seasonal sampling, conducted to expand the list of COPC sample (e.g., sediment and riparian soil sampling), or address hydrogeologic data gaps (e.g., MMW037).

Because the Sites are so large, in order to present selenium concentration for all media and sampling events at each Mine, we would need to prepare from nine to 15 additional maps (depending on how the media were grouped). This level of effort might be appropriate for an individual constituent, in an individual medium in the forthcoming RI Reports where spatial depictions assist the narrative and overall discussion of nature and extent of contamination, but typically aren't prepared for a "data summary" report because of the size of the effort.

In the body of the DSR, the data for each medium and event are summarized in exceedance tables and the complete data sets for the 2010 and 2012 sampling rounds are provided in Appendix B. This information should provide sufficient detail for the A/Ts to determine if there are data gaps associated with the other media. At present, we have not identified additional data gaps.

Specific Comments

1. **Page iii**. Insert "U.S." before "FWS" and "Fish and Wildlife Service"

   P4 Response: *The document has been revised per the comment.*

2. **Page iii.** Insert "health" after "human" in the phrase "human and ecological risk assessments"

P4 Response: *The document has been revised per the comment.*

3. **Section 1.0, page 1, 1st paragraph, 2nd sentence.** Insert "U.S." or "United States" before "Fish and Wildlife Service"

   P4 Response: *The document has been revised per the comment.*

4. **Section 2.2, page 7, 1st bullet**. In describing the differences between the 2009/2010 sampling program and the 2012 sampling program, it is stated that the sample locations characterized as SEGW were included under groundwater sampling program in 2009/2010, but were included in the surface water monitoring program in 2012. Is this change only about where the SEGW sampling stations are addressed in the project documentation, or will there be a change in how the data is obtained, such as a different method used to obtain data, or any type of changes that should be listed?

   ***P4 Response**: Headwater streams, seeps, and springs (Surface Expressions of Groundwater [SEGW]) were included in the 2012 surface water monitoring program. Sample locations characterized as SEGW locations originally were included under the groundwater program in the A/T-approved Final Revisions 2 - 2010 Groundwater Sampling and Analysis Plan (2010 Groundwater SAP; MWH, 2010). Because the sampling methodologies for the SEGW locations are very similar to the surface water locations, the SEGW locations from the 2010 Groundwater SAP have been included in the list of surface water stations in 2012, 2013, and the long-term sampling program.*

   For these SEGW stations, the primary difference in the analytes between the 2010 groundwater monitoring program and the 2012, 2013, and long-term surface water monitoring program is in the total and dissolved analyses. For the groundwater program, the total fraction for cadmium and vanadium was analyzed, and for the surface water program the dissolved fraction was analyzed. These SEGW stations will be compared to surface water screening criteria, which are based on the dissolved fraction. Therefore, analyses for cadmium and vanadium were analyzed for the dissolved fraction in 2012 and 2013.

5. **Section 3.1, Page 16, 1st paragraph and Table 3-1.** The text states "The procedures utilized for development of screening levels in the *P4's RI/FS Work Plan* also were used for the revision process (i.e. for each primary medium, preliminary screening levels are a combination of the most conservative of promulgated standards used in human and ecological risk assessment, as well as study-specific background values)." Table 3-1 does not reflect or use background data, consistent with recent discussion on this matter. Please revise the narrative to reflect the approach that background levels are not being used for screening purposes. In addition, the soil screening levels in Table 3-1 include only the human health screening levels. Please revise Table 3-1 to reflect ecological screening levels for soil where they are more conservative than the human health screening levels.

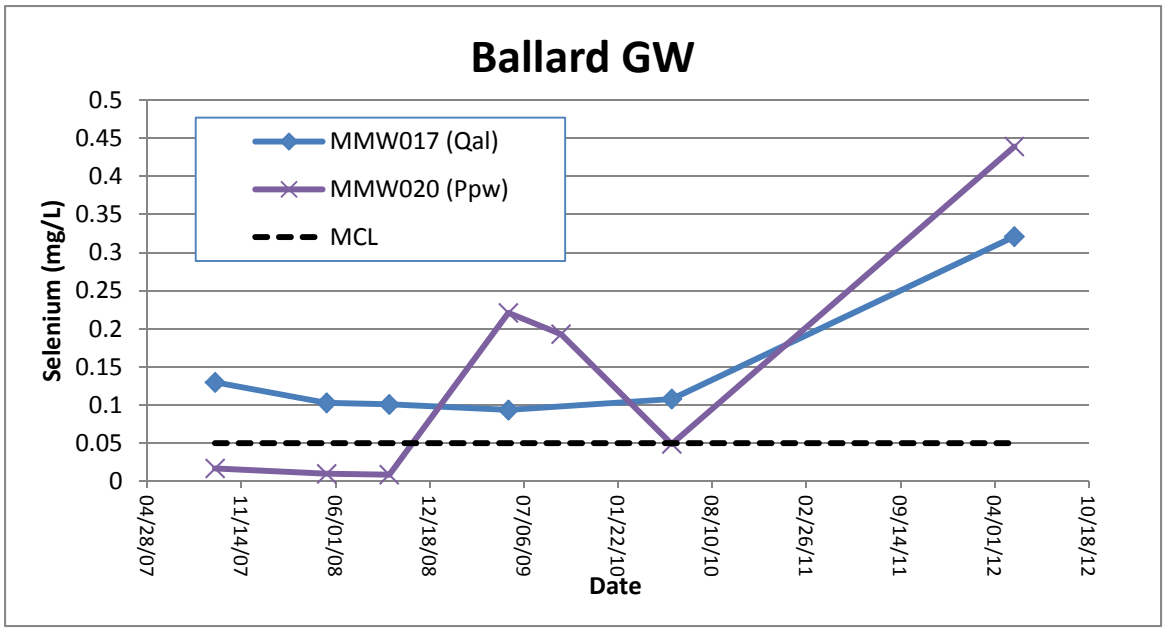
P4 Response:

a. Agreed. The words "as well as study-specific background values" have been eliminated from Table 3-1. The recently agreed to Background levels will be used in the forthcoming RI Reports for comparison purposes, but are not used in this document.

b. The soil comparative values in Table 3-1 were used for discussion of the nature and extent of contamination in the final RI/FS Work Plan (MWH, 2011). As discussed in the RI/FS Work Plan RTCs for General Comment No. 6 (dated November 11, 2010), "the screening levels tabulated in Table 3-1, and described in Section 3, were selected to describe the nature and extent of contamination on a macro level. They are not intended to be considered as risk screening criteria or as potential remediation goals for the Sites. Appendix C (HHERA Work Plan) includes medium-specific COPC and COPEC screening criteria that are based upon the lowest applicable human health and ecological screening criteria."

However, P4 recognizes that ecological benchmarks are used for other media in Table 3-1. As a result, this table and other DSR tables will be revised to reflect a combination of ecological and human health criteria for soil focusing on the most conservative values. Again, it is noted that the values in Table 3-1 will be used for characterization purposes only. Screening for the risk assessments also will rely on the criteria presented in Section 4 of the A/T- approved Background Levels Development Technical Memorandum (MWH, March 2013).

6. **Tables 3-2 through 3-8.** There are several instances where analysis required sample dilutions. In some cases, the dilutions correspond with concentrations that appear to the elevated relative to previous results. For example, the dilution results for selenium in May 2012 samples from alluvial well MMW017 (0.321 mg/L) and Wells Formation well MMW020 (0.439 mg/L) are substantially higher than previous results as indicated in the following graph. Please confirm that the sample results for the sample dilutions are correct and accurately represent the most recent detections.



P4 Response: *The data have been validated and the concentrations confirmed including the dilutions. Regarding the increases in concentrations, we believe that these spikes are due to the large recharge events associated with winters of 2008/2009 and 2010/2011. The increases in concentration in MMW020 track closely with the hydrograph for that well. This explanation will be fully presented in the Ballard RI Report. This concept also was discussed in the RI/FS Work Plan in regards to the 2008/2009 response in MMW020.*

7. **Figures 2-1, 2-2, 2-3**: As feasible, use an alternative color, other than blue, to delineate waste rock pile locations. It would be preferred that P4 uses blue for water features only. In that regard, it would assist the reader if P4 would shade all sampled water features blue.

   P4 Response: *If you have a representative figure of what you are requesting it would be most useful in interpreting this comment. The line depicting the edge of waste rock piles has been changed to black based on this comment. However, none of the other symbol colors have been changed. P4 believes it is useful to visually separate the sample locations, using symbols and colors.*

8. **Figure 2-2 & 2-3**: Riparian sample locations are indicated for MSP20, MSP21 (Fig 2-2) and MSP014 (Fig 2-3), but these were also sampled for surface water. Should the symbol used in this figure reflect surface water sampling?

   P4 Response: *Agreed. The symbols have been revised on figures 2-2 and 2-3.*

9. **Tables**. The report should include a table listing water level measurements and elevations collected during 2010-2012.

P4 Response: *Tables A-3, A-5, and A-7 in Appendix A include the water level measurements for the groundwater samples collected. The well elevation measuring points and static water elevations have been added to these tables in response to this comment.*

10. **Table 3-1**: The soil screening value for selenium appears to be incomplete. The EPA Eco-SSL values are: 0.52 (plants), 4.1 (soil invertebrates), 1.2 (avian), and 0.63 (mammalian) mg/kg. The indicated value in the table of 390 mg/kg is for human health only. See also comment above.

    P4 Response: *Table 3-1 has been revised per Specific Comment No. 5.*

11. **Figure 2-1 and Table 3-2.** The well MW15A at Ballard Mine has an increasing and high selenium concentration compared to other monitoring wells at the site. Similarly selenium concentrations are increasing and high in nearby wells MBW011 and MBW028. P4 should discuss the source and impacts of an increasingly high concentration of selenium at these monitoring wells The DSR should specify that a potentially expanding plume is present in this area and discuss whether this constitutes a potential data gap.

    P4 Response: *We feel the DSR is not the appropriate document to conduct this evaluation. However, to your point, we do not believe that variable groundwater concentrations in these near-source wells indicate an expanding plume. These concentrations really have very little relationship to the leading edge of the plume, and given slow groundwater transport velocities and the age of this plume (possibly 50 years old) these concentrations may not be reflected in the downstream portions of the plume for decades. Likely, what is reflected in these montoring well data are above-average snow fall years during the 2008/2009 and/or the 2010/2011 recharge events. Given the waste rock dump conceptual model (presented in the RI/FS Work Plan), one would expect variable concentrations expressed in monitoring locations near the toes of the dumps are related to increased infiltration from above average snowmelt events. Conversely, lower concentrations would be associated with below average snow years. These changes in the near source locations are attenuated along the flow pathway downgradient. We prefer to present this complete discussion in the Ballard Mine RI Report (and future RI reports for Henry and Enoch Valley Mines) and not revise the DSR with an incomplete and preliminary evaluation of these data.*

12. **Figures 2-1, 2-2, and 2-3.** If would be helpful to the reader if the figures showed the formation that each well monitors. Please revise the figure to include formation specific symbols for the wells.

    P4 Response: *Agreed. These figures were revised to include formation specific well symbols.*

13. **Appendix B-3**. It is unclear why parameters for organics, volatiles and surrogates were included in the report (which takes up quite a bit of space) when there are no data reported for said parameters. It is recommended those fields be deleted for clarity and conciseness.

P4 Response: *Agreed. Table B-5 in Appendix B was revised to remove the volatile and semi-volatile organics.*

Editorial Comments

P4 Response: *All of the following editorial comments were reviewed and revised as instructed.*

Section 1.0 page 1, 1st paragraph, line 10. Change "are" to "is."

Section 2.2, page 7, 3rd bullet , line 2. Change "exited" to "existed."

Section 2.4.1, page 12, 2nd paragraph , line 4. Change "was" to "were."

Section 2.4.2, page 13, 3rd paragraph of 1st bullet, line 5. Insert "were" between "protocols" and "outlined."

Section 2.4.2, page 13, 1st paragraph of 2nd bullet , line 3. Delete "An estimated" to read "Three to five composite . . ."

Section 2.4.2, page 14, 1st paragraph, line 8. Change the first "was" to "were."

Section 2.4.2, page 14, 1st paragraph, line 9. Change the first "was" to "were."

Section 3.5.2, page 18, 3rd paragraph, line 3. Change "192" to "292."

Section 3.5.2, page 18, 3rd paragraph, line 7. Change "Appendices" to "Appendix."

Table A-1. Under Specific Conductivity change from (µs/cm) to (µS/cm) for consistency with past documents.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
IDAHO OPERATIONS OFFICE
1435 N. Orchard St.
Boise, Idaho 83706

July 2, 2013

Rachel Roskelley
Sr. Environmental Engineer
Monsanto Company
Soda Springs Operations
1853 Highway 34
Soda Springs, Idaho 83276

Re: A/T approval of responses to comments on 2010 and 2012 Data Summary Report, Ballard, Henry, and Enoch Valley Mines Remedial Investigation Activities, Draft Revision 0, prepared for P4 Production by MWH (April 2013).

Dear Ms Roskelley,

The Agencies and Tribes (A/T) have reviewed the responses to comments on the above referenced deliverable submitted electronically by P4. The responses adequately addressed the comments that we provided. In reviewing the responses, one of our reviewers noted that I had not included the following two editorial corrections in our compiled comments. I apologize for this oversight.

IDEQ Comments on Draft *2010 AND 2012 DATA SUMMARY REPORT, Ballard, Enoch Valley, and Henry Mines, Remedial Investigation Activities*, Revision 0 (April 13) 8 May 13					
Item No.	**Subsection**	**Page**	**Paragraph**	**Line**	**Comments**
Specific Comments					
	3.5.2	18	3	3	Change "192" to "292."
	3.5.2	18	3	7 (last)	Change "Appendices" to "Appendix."

Please revise the document consistent with the responses to comments, make the two editorial corrections noted above, and distribute the final version per the usual protocol.

Printed on Recycled Paper

Please contact me if you have questions. I can be reached at 208-378-5763 or electronically at tomten.dave@epa.gov.

Sincerely,

//s//

Dave Tomten
Remedial Project Manager

cc: Cary Faulk, MWH (electronic version only)
Vance Drain, MWH (electronic version only)
Mike Rowe, IDEQ
Mary Kaufman, FS
Forest Service - Enoch Valley Site Record
Sandi Fisher, US FWS (electronic version only)
Mark Jankowski, US FWS
Kelly Wright, Shoshone Bannock Tribes
Susan Hanson (for the tribes)
Talia Martin, Shoshone Bannock Tribes (electronic version only)
Colleen O'Hara, BLM (electronic version only)
Eldine Stevens, BIA (electronic version only)
Bob Blaesing, BIA (electronic version only)
Tim Mosko, CH2MHill (electronic version only)
Charles Allbritton, EPA Records Center (electronic version only)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
IDAHO OPERATIONS OFFICE
1435 N. Orchard St.
Boise, Idaho 83706

July 26, 2013

Rachel Roskelley
Sr. Environmental Engineer
Monsanto Company
Soda Springs Operations
1853 Highway 34
Soda Springs, Idaho 83276

Re: A/T approval of Final 2010 and 2012 Data Summary Report, Ballard, Henry, and Enoch Valley Mines Remedial Investigation Activities, Final Revision 0, prepared for P4 Production by MWH (July 2013).

Dear Ms Roskelley,

The Agencies and Tribes (A/T) have reviewed the above referenced deliverable submitted electronically by P4. The electronic version submitted adequately incorporated comments provided earlier, and is approved.

Please produce and distribute the final version per the AOC (in a similar fashion as was done for the Background Levels Technical Memo).

Please contact me if you have questions. I can be reached at 208-378-5763 or electronically at tomten.dave@epa.gov.

Sincerely,

//s//

Dave Tomten
Remedial Project Manager

cc: Cary Faulk, MWH (electronic version only)
Vance Drain, MWH (electronic version only)
Mike Rowe, IDEQ - Pocatello
Mary Kaufman, FS - Pocatello
Forest Service - Enoch Valley Site Record
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Charles Allbritton, EPA Records Center (electronic version only)