Domestic Well Sampling Field Report
2012 Sampling Event

Domestic Well – Whole House Filter Program
Moses Lake Wellfield Superfund Site
Moses Lake, Washington

Field Investigation:
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US Army Corps
of Engineers ®
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1.0 BACKGROUND AND OBJECTIVE OF INVESTIGATION

1.1 BACKGROUND

The Moses Lake Wellfield Superfund Site is located between the Grant County Airport and the City of Moses Lake, Washington. The Site includes the former Larson Air Force Base (LAFB) property and adjacent properties affected by groundwater contamination. The Site is listed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 National Priorities List (NPL) for Uncontrolled Hazardous Waste Sites.

The Moses Lake Wellfield Superfund Site is an area of approximately 15 square miles, which includes the former LAFB, commercial facilities, and residences. The former LAFB occupied approximately 9,607 acres three miles northwest of the City of Moses Lake. The United States Air Force was active at the site from 1942 until 1966. Previous site investigations have focused primarily on the former LAFB, where in 1988, three municipal wells operated by the City of Moses Lake were found to be contaminated with trichloroethylene (TCE). Wells outside the former base also have shown detections of TCE. The Seattle District, US Army Corps of Engineers (USACE) has completed a Remedial Investigation (RI) phase in 2003. Appendix A of this report shows the general location map and a site map.

During the course of the RI, several private domestic wells were tested and found to be contaminated with TCE. In 2001, the USACE contracted installation of carbon filtration units at five of these wells. Seven rounds of monitoring have occurred since the filters were installed.

The final results of the Phase I RI released in a report in March 1993 indicated that TCE was consistently found in shallow alluvial and upper basalt (*a*-basalt) groundwater in the central area of the former base.

On October 14, 1992, the affected areas of the former LAFB and off-site downgradient areas, termed the "Moses Lake Wellfield Contamination", were listed on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 for Uncontrolled Hazardous Waste Sites. The former LAFB property is one part of the Moses Lake Wellfield Superfund Site; the site also includes the contaminant plume.

Chemical results from 1993 and 1994 combined with historical data indicated that TCE occurred in the central and southern portion of the former LAFB in alluvial and *a*-basalt groundwater. In 2004, USACE confirmed TCE contamination in the next lower basalt aquifer (c-basalt). As of 1995, the data suggest that more than one source may have contributed TCE to the alluvial and *a*-basalt groundwater in the central portion of the former LAFB.

In 1998, URS Greiner completed a sampling round of private water wells and wells for Class A and Class B water systems east, south and southwest of the previously known TCE plume. There were eight detections of TCE during this study. Four wells that were previously outside the plume extent were found to be above the detection limit.

1.2 FIELD SAMPLING SCOPE AND OBJECTIVES

The event detailed in this report involved the collection, analysis, validation, and evaluation of tap-water samples from five whole house filter (WHF) systems and 47 residences in the

impacted area of the Moses Lake Wellfield Superfund Site. The objective of the well sampling is to collect representative water from designated domestic wells for the analysis of volatile organics.

The overall Data Quality Objectives (DQOs) for this FSP are to provide data of known and sufficient quality to evaluate concentrations ranges of chemicals of potential concern in domestic wells, to assure compliance with the requirements of the U.S. Environmental Protection Agency (USEPA), the U.S. Department of Transportation (USDOT), Washington State Department of Ecology, and Occupational Safety and Health Act (OSHA), and to be able to make project specific decisions based on the data.

1.3 Summary of Field Activities

This report addresses the 2012 WHF and domestic well groundwater sampling event conducted by the Seattle District, US Army Corps of Engineers (USACE) environmental sampling team, comprised of Joseph Marsh, Katie King, Tom Gardner-Clayson, and Blair Kinser. The prior-year groundwater sampling event was conducted during May, 2011 by EHS – International, Inc. under contract to Seattle District, USACE.

All of the work described in this report was accomplished in accordance with the Moses Lake Wellfield Superfund Site Quality Assurance Project Plan. In addition, the team followed the guidance presented in: the Seattle District, USACE Safety and Health Plan; USACE Safety Manual EM 385-1-1; Seattle District, USACE, Sampling Standard Operating Procedures.

A list and locations of the 5 WHF systems and 47 domestic wells designated for sampling is displayed on a map found at Appendix A. These wells are selected based on their downgradient locations relative to the inferred flow direction of TCE-contaminated groundwater and sampling results from previous monitoring events. Each well is marked with a unique Department of Health well ID number. These ID numbers start with "WP" for “Private Wells" and are then numbered based on sequential township, range, and quarter sections.

Environmental sampling procedures, techniques, and observations associated with these field activities are discussed in the following sections.

2.0 DESCRIPTION OF WORK

2.1 Activities Prior to Sample Collection

The project team worked to collect signatures on Department of the Army Right of Entry forms as required before conducting the well sampling on private property. For some properties, previously signed Right of Entry forms were still valid. For all properties designated for sample collection, owners (and renters if applicable) were contacted to coordinate sample collection times during the first week of May, 2012. Many of the owners allowed the sampling teams to work on their property while they were not at home. At some of the properties, home owners or well system managers had to unlock pump houses and open valves for the sampling teams – requiring prior coordination.

Both sampling teams worked independently each day sampling groundwater from a pre-determined group of residential wells. Once mobilized to each property, the teams verified the address and map location were correct, and that the Right of Entry form had been signed. In some cases, Right of Entry forms were signed immediately prior to sample collection.

Each team determined if dangerous conditions existed in the sample site area. If so, an alternate water tap would be selected for sample collection in a safer area of the property. Also, if the pump was not operating at a specific residence, and the owner/tenant cannot restart the pump, no sampling would be conducted at that location (the team did not experience this problem). The teams were also tasked with determining the most appropriate cold-water tap or other sample port as close to each wellhead as practical, while comparing notes on sample points collected during previous sampling events. The teams were briefed that water samples will not be taken from water taps delivering chlorinated, aerated, softened or filtered water.

2.2 Whole House Filter Sample Collection

Whole house filter (WHF) system water sampling was conducted by Joseph Marsh on 5March 2012. USEPA project managers Rob Lobos and Dennis Falk assisted with the sampling at WP-82, WP-14, and WP-83. Residents of WP-86 and WP-70 observed the field sampling activities. The sampler did not work alone at any time during the day. Refer to sampling photos found at Appendix B.

USACE project manager Dan Sacks contacted the owners or residents at each of the five homes containing the whole house filter systems to set up times for sample collection prior to arrival at Moses Lake. Joseph Marsh confirmed the appointments with each resident prior to sample collection time. [redacted] resident at WP-86, signed a right of entry form to allow USACE to collect water samples on the property. Existing right of entry forms had been previously signed for the other four WHF systems. [redacted], owner of WP-82 and WP-83, agreed to allow sampling earlier than scheduled. [redacted] also approved an early start at WP 14.

Mr. Marsh arrived at **WP-82** at 1221 hours on 5 March 2012. The two vertical granular activated carbon filter canisters were located inside of an unlocked wooden shed on the south side of the home. Each sampling port (filter influent, between filters, and house influent) was found to be clearly labeled with a black permanent marker. The filter influent and between filter sampling ports were grey plastic marked “Hayward PVC pressure regulator 1/4 inch” with screw top valve controls. The house influent sampling port was a brass Watts “precision low pressure regulator 3/8 inch” with “T” handle valve control. The filter influent sampling port was plumbed to discharge straight up instead of out or down, so Mr. Marsh fastened a garbage bag to the port with a cable tie to prevent flooding the pump house shed. The discharged water was directed into a five gallon plastic bucket. Flow rates were measured with a graduated container, and stabilized temperature readings monitored using a QED MP20 flow cell. The measured flow rate from each port was regulated to approximately 800 milliliters per minute with a stable temperature of 15.71 degrees C after three minutes of flushing. Approximately 1.5 gallons of water was flushed from each sample port, and then discharged to ground surface outside of the pump house. Lead filter pressure gauge indicated 30 psi. Lag filter pressure gauge indicated 35

psi. Sample collection consisted of regulating the flow rate of each port to a smooth, non-turbulent stream, then filling three pre-preserved VOA vials to zero headspace. New Nitrile gloves were donned before collecting samples at each port. No significant problems were noted. The shed doors were closed at the completion of sampling activities.

Mr. Marsh arrived at **WP-14** at 1305 hours on 5 March 2012. The two vertical granular activated carbon filter canisters were located inside of an unlocked wooden well house shed across the driveway on the west side of the home. Each sampling port (filter influent, between filters, and house influent) was found to be clearly labeled with a black permanent marker. The filter influent and between filter sampling ports were grey plastic marked "Hayward PVC pressure regulator 1/4 inch" with screw top valve controls. The house influent sampling port was a brass Watts "precision low pressure regulator 3/8 inch" with "T" handle valve control. All three sampling ports were difficult to access due tires and insulation stacked up next to the filter canisters. Flow rates were measured with a graduated container, and stabilized temperature readings monitored using a QED MP20 flow cell. The measured flow rate from each port was regulated to approximately 600 milliliters per minute with a stable temperature of 15.50 degrees C after 10 minutes of flushing. Approximately three gallons of water was flushed from the filter influent port, and approximately one gallon from each of the other two sample ports during the sampling activity. All discharged water was directed into a five gallon plastic bucket for transfer to ground surface outside of the pump house after the samples were collected. Sample collection consisted of regulating the flow rate of each port to a smooth, non-turbulent stream if possible, then filling three pre-preserved VOA vials to zero headspace. At this location, the filter influent port emitted an aerated sample that could not be corrected by slowing the flow rate – resulting in small 1mm bubbles in the filled sample vials. The mid filter valve was dripping water onto the pump house floor after being shut off. Rob Lobos purchased and installed a plastic threaded plug that fit into the threaded discharge port to stop the leak. In addition, the house influent port valve was sticking, making it difficult to control flow rates. New Nitrile gloves were donned before collecting samples at each port. The shed door was held closed by a cement block at the conclusion of sampling activities at the request of the resident.

Mr. Marsh arrived at **WP-83** at 1400 hours on 5 March 2012. The two vertical granular activated carbon filter canisters were located inside of an unlocked wooden well house shed at the east end of the lawn on the east side of the home. Each sampling port (filter influent, between filters, and house influent) was found to be clearly labeled with a black permanent marker. The filter influent was a brass Watts "precision low pressure regulator 3/8 inch" with "T" handle valve control. Upstream of the Watts valve was a Nibco butterfly valve with hand control to add an additional flow control. The between filter and house influent sample ports were the grey plastic valves marked "Hayward PVC pressure regulator 1/4 inch" with screw top valve controls. These two valves were also fitted with upstream butterfly valves as a secondary flow control. The filter influent port was installed to discharge water up and out at a 45 degree angle making sampling difficult. Also, the house influent port was installed to discharge straight up requiring the installation of a garbage bag around the port to capture water and avoid flooding the shed. Lead filter gauge displayed 44 psi, and the lag pressure gauge displayed 48 psi. Flow rates were measured with a graduated container, and stabilized temperature readings monitored using a QED MP20 flow cell. The measured flow rate from each port was regulated to

approximately 800 milliliters per minute with a stable temperature of 15.12 degrees C after five minutes of flushing. Approximately three gallons of water was flushed from the filter influent port, and approximately one gallon from each of the other two sample ports during the sampling activity. All discharged water was directed into a five gallon plastic bucket for transfer to ground surface outside of the pump house after the samples were collected. Sample collection consisted of regulating the flow rate of each port to a smooth, non-turbulent stream if possible, then filling three pre-preserved VOA vials to zero headspace. At this location, filter influent and house influent sample ports emitted fine, high pressure water streams that could not be regulated to collect non-aerated samples even with the additional control valves. The high pressure streams resulted in the presence of micro-bubbles in the filled sample vials that could not be avoided. New Nitrile gloves were donned before collecting samples at each port. The shed door was closed at the completion of sampling activities.

Mr. Marsh arrived at **WP-86** at 1515 hours on 5 March 2012. The two vertical granular activated carbon filter canisters were located in a pit inside the basement crawlspace of the house. Entry is made to the crawlspace by entering a basement closet next to the stairway. At the back of the closet, a hatch must be removed from the wall to gain entry to the crawlspace. A light bulb can be turned on to illuminate the work area. Each sampling port (filter influent, between filters, and house influent) was found to be clearly labeled with a black permanent marker. The filter influent and between filter sample ports were brass Nibco butterfly valves with control handles making regulation of water flow rate nearly impossible. A high pressure stream discharged from both ports no matter how far the valve handles were moved. The house influent sample point was fitted with a brass Watts "precision low pressure regulator 3/8 inch" with "T" handle valve control. The filter influent and between filter ports were installed to discharge water downward and horizontally respectively. The lag filter had a pressure gauge reading of 61 psi. There was no gauge on the lead filter. Flow rates were measured with a graduated container, and stabilized temperature readings monitored using a QED MP20 flow cell. The measured flow rate from each port was regulated to approximately 500 milliliters per minute with a stable temperature of 13.58 degrees C after 10 minutes of flushing. Approximately three gallons of water was flushed from the filter influent port, and approximately one gallon from each of the other two sample ports during the sampling activity. All discharged water was directed into a five gallon plastic bucket for transfer to ground surface outside of the pump house after the samples were collected. Sample collection consisted of regulating the flow rate of each port to a smooth, non-turbulent stream if possible, then filling three pre-preserved VOA vials to zero headspace. At this location, filter influent and between filter sample ports emitted fine, high pressure water streams that could not be regulated to collect non-aerated samples due to the type of discharge valves installed. The high pressure streams resulted in the presence of micro-bubbles in the filled sample vials that could not be avoided. The house influent sample port could be controlled to produce an acceptable turbulence-free flow rate. New Nitrile gloves were donned before collecting samples at each port. At the conclusion of sampling here, the crawlspace light was turned off, the hatch closed, and closet door closed before leaving the house.

Mr. Marsh arrived at **WP-70** at 1607 hours on 5 March 2012. The two vertical granular activated carbon filter canisters were located inside an unlocked wooden pump house located in

the backyard east of the house. Each sampling port (filter influent, between filters, and house influent) was found to be clearly labeled with a black permanent marker. The filter influent and between filter sample ports were brass Nibco butterfly valves with control handles, but lower water pressure resulted in more accurate control of the water discharge. The house influent sample port was the brass Watts "precision low pressure regulator 3/8 inch" with "T" handle valve control. The filter influent and between filter ports were installed to discharge water downward through brass elbow fittings where a five gallon bucket was placed to collect the flowing water. There were no gauges on the filter lids at this location. Flow rates were measured with a graduated container, and stabilized temperature readings monitored using a QED MP20 flow cell. The measured flow rate from each port was regulated to approximately 500 milliliters per minute with a stable temperature of 15.40 degrees C after 10 minutes of flushing. Approximately three gallons of water was flushed from the filter influent port, and approximately one gallon from each of the other two sample ports during the sampling activity. All discharged water was directed into a five gallon plastic bucket for transfer to ground surface outside of the pump house after the samples were collected. Sample collection consisted of regulating the flow rate of each port to a smooth, non-turbulent stream, then filling three pre-preserved VOA vials to zero headspace. Turbulence-free flow rates were observed. No problems noted. New Nitrile gloves were donned before collecting samples at each port. The shed door was closed and locked at the conclusion of sampling per resident request.

All collected groundwater samples were labeled, bagged, and placed into a pre-iced sample shipping cooler under chain of custody procedures. The cooler was hand delivered to the analytical lab ARI on 6 March 2012.

The following is a table of whole house filter sample locations and sample identifications, and selected analysis:

TABLE 1: WHOLE HOUSE FILTER SAMPLE COLLECTION INFORMATION

WELL ID	Sampling Location	Sample ID	Sample Collection Date/Time	VOCs 8260B, 5030B 3 x 40 ml VOA w/ Hcl
WP-14	Filter Influent	12MLW00AWP14	3/5/12 1330	3
WP-14	Between Filters	12MLW00BWP14	3/5/12 1340	3
WP-14	House Influent	12MLW00CWP14	3/5/12 1350	9 [1]
WP-14	**House Influent Field Duplicate**	12MLW20CWP14	3/5/12 1325	3

WP-70	Filter Influent	12MLW00AWP70	3/5/12 1612	3
WP-70	Between Filters	12MLW00BWP70	3/5/12 1620	3
WP-70	House Influent	12MLW00CWP70	3/5/12 1632	3
WP-82	Filter Influent	12MLW00AWP82	3/5/12 1245	3
WP-82	Between Filters	12MLW00BWP82	3/5/12 1252	3
WP-82	House Influent	12MLW00CWP82	3/5/12 1305	3
WP-83	Filter Influent	12MLW00AWP83	3/5/12 1417	3
WP-83	Between Filters	12MLW00BWP83	3/5/12 1428	3
WP-83	House Influent	12MLW00CWP83	3/5/12 1438	3
WP-83	**House Influent Field Duplicate**	12MLW20CWP83	3/5/12 1452	3
WP-86	Filter Influent	12MLW00AWP86	3/5/12 1528	3
WP-86	Between Filters	12MLW00BWP86	3/5/12 1537	3
WP-86	House Influent	12MLW00CWP86	3/5/12 1542	3
Trip Blank	Trip Blanks	12MLW0305TB	3/5/12 1510	3

Notes: [1] Extra volume for MS/MSD analysis.

2.3 Residential Well Field Measurements and Sample Collection

Upon arrival at each sampling point (water tap), the sampling teams opened the tap valves and directed a steady water stream into a five-gallon bucket. The water flow rate was measured in liters per minute using a graduated container. This data was entered into the project field book. While one team member recorded field data, the other used a Trimble GeoExplorer XT GPS receiver to record sample point coordinates to update the project map. Next, water temperature was monitored and a stabilized reading in degrees Fahrenheit was entered into the project field book. During this activity, water was allowed to flow for approximately 5 to 10 minutes depending on sample collection point in relation to the wellhead to flush stagnant water from the system. Stabilized temperature readings were a good indicator that stagnant water had passed through the piping. Less flushing time was required if the tap was located on the wellhead or pump house.

Prior to collecting a water sample, the flow rate at each tap was reduced to approximately 100 milliliters per minute to minimize sample aeration. Field personnel donned new Nitrile gloves prior to sample collection at each residence. All sample containers were filled with water directly from each tap – forming a meniscus at the top of each vial to provide zero headspace

samples as required. Sample point location and components of the plumbing system were noted to assist in data interpretation. A photographic record of each sample site was made by both teams.

After the sample containers were filled, sample labels describing project, location, analysis, team members, preservative, sampling date, and collection time were placed on the containers. The samples were packaged in bubble wrap bags and plastic Ziploc® bags, placed into pre-iced sample shipping coolers and prepared for shipment as described in Section 3.0. Both sampling teams worked to ensure each property was left just as they found it with no damage done, and gates closed as required. Specific information on sampling observations made during each day of this sampling event is presented on page 10.

Field measurement data is presented in Table 2 shown below:

TABLE 2: RESIDENTIAL WELL FIELD MEASUREMENTS

WELL ID	Flow Rate Prior to Sampling in Liters/min.	Water Temperature Degrees F
WP-01	10L/min.	59°
WP-03	2.4L/min.	53°
WP-04	1.8L/min.	62°
WP-05	25L/min.	61°
WP-09	1.8L/min.	54°
WP-10	1.8L/min.	62°
WP-13E	20L/min.	58°
WP-16	6L/min.	61°
WP-18N	20L/min.	61°
WP-18S	25L/min.	59°
WP-20N	12L/min.	61°
WP-21	10L/min.	60°

WP-22	22L/min.	58°
WP-23	20L/min.	60°
WP-27	5L/min.	61°
WP-30	20L/min.	59°
WP-33	3L/min.	58°
WP-45	4L/min.	59°
WP-49	5L/min.	59°
WP-50	4L/min.	74°
WP-52	3L/min.	55°
WP-54	2.4L/min.	54°
WP-55	4.2L/min.	53°
WP-56	2.8L/min.	58°
WP-57	1.2L/min.	58°
WP-60	25L/min.	60°
WP-63	40L/min.	59°
WP-64	15L/min.	62°
WP-65	3.8L/min.	48°
WP-66	5 L/min.	58°
WP-68	2.7L/min.	57°
WP-69	2.1L/min.	65°
WELL ID	**Flow Rate Prior to Sampling**	**Water Temperature**
WP-71A	2.8L/min.	59°
WP-71B	2L/min.	61°

WP-72	15L/min.	60°
WP-73	1.5L/min.	57°
WP-74	1.8L/min.	59°
WP-88	10L/min.	62°
WP-89	2.4L/min.	55°
WP-95	10L/min.	59°
WP-111	3L/min.	60°
WP-112	20L/min.	59°
WP-113	15L/min.	59°
WP-114	5L/min.	59°
WP-115	40L/min.	59°
WP-116	3L/min.	54°
WP-117	3L/min.	53°

The following is a table of well and sample identifications, and analysis followed by a summary of activities conducted by the team each day of this three day sampling event:

TABLE 3: SAMPLE COLLECTION INFORMATION

WELL ID	Sample ID	Sample Collection Date/Time	VOCs (524.3) 3 x 40 ml VOA w/ Hcl
WP-01	12MLW001WP01	5/1/12 0830	3
WP-03	12MLW001WP03	5/1/12 1032	3
WP-04	12MLW001WP04	5/1/12 0840	9 [1]
WP-04	12MLW201WP04	5/1/12 0850	3

WELL ID	Sample ID	Sample Collection Date/Time	VOCs (524.3) 3 x 40 ml VOA w/ Hcl
WP-05	12MLW001WP05	5/3/12 0949	3
WP-09	12MLW001WP09	5/2/12 1056	3
WP-10	12MLW001WP10	5/2/12 0819	3
WP-13E	12MLW001WP13E	5/2/12 1140	3
WP-16	12MLW001WP16	5/1/12 1330	3
WP-18N	12MLW001WP18N	5/2/12 1110	3
WP-18N	12MLW201WP18N	5/2/12 1110	3
WP-18S	12MLW201WP18S	5/2/12 0953	9 [1]
WP-20N	12MLW001WP20N	5/2/12 0905	3
WP-21	12MLW001WP21	5/1/12 1200	3
WP-22	12MLW001WP22	5/2/12 0844	3
WP-23	12MLW001WP23	5/1/12 1031	3
WP-27	12MLW001WP27	5/1/12 0830	3
WP-30	12MLW001WP30	5/3/12 0810	3
WP-30	12MLW201WP30	5/3/12 0810	3
WP-33	12MLW001WP33	5/3/12 0852	3
WP-45	12MLW001WP45	5/2/12 0834	3
WP-49	12MLW001WP49	5/2/12 0928	3
WP-50	12MLW001WP01	5/1/12 0830	3

WELL ID	Sample ID	Sample Collection Date/Time	VOCs (524.3) 3 x 40 ml VOA w/ Hcl
WP-52	12MLW001WP52	5/2/12 1110	3
WP-54	12MLW001WP54	5/2/12 1122	3
WP-55	12MLW001WP55	5/2/12 1012	3
WP-56	12MLW001WP56	5/2/12 1318	3
WP-57	12MLW001WP57	5/1/12 1334	3
WP-60	12MLW001WP60	5/2/12 1345	3
WP-63	12MLW001WP63	5/1/12 1500	3
WP-64	12MLW001WP64	5/1/12 1348	3
WP-65	12MLW001WP65	5/3/12 0829	3
WP-66	12MLW001WP66	5/1/12 0930	9 [1]
WP-66	12MLW201WP66	5/1/12 0945	3
WP-68	12MLW001WP68	5/1/12 1049	3
WP-69	12MLW001WP69	5/1/12 1006	9 [1]
WP-69	12MLW201WP69	5/1/12 1015	3
WP-71A	12MLW001WP71A	5/1/12 1112	3
WP-71B	12MLW001WP71B	5/1/12 1137	3
WP-72	12MLW001WP72	5/3/12 0920	3
WP-73	12MLW001WP73	5/2/12 0858	3

WELL ID	Sample ID	Sample Collection Date/Time	VOCs (524.3) 3 x 40 ml VOA w/ Hcl
WP-74	12MLW001WP74	5/1/12 1159	9 [1]
WP-74	12MLW201WP74	5/1/12 1218	3
WP-88	12MLW001WP88	5/2/12 1400	3
WP-89	12MLW001WP89	5/3/12 0808	3
WP-95	12MLW001WP95	5/1/12 1410	3
WP-111	12MLW001WP111	5/1/12 1424	3
WP-112	12MLW001WP112	5/3/12 0830	3
WP-113	12MLW001WP113	5/3/12 0857	3
WP-114	12MLW001WP114	5/2/12 1300	3
WP-115	12MLW001WP115	5/2/12 1330	3
WP-116	12MLW001WP116	5/3/12 0909	3
WP-117	12MLW001WP117	5/3/12 0934	3
	Trip Blanks		
Day 1	12MLW0501TB	5/1/12 1015	3
Day 1 2nd Cooler	12MLW0501TB2	5/1/12 1530	3
Day 2	12MLW0502TB	5/2/12 0830	3
Day 3	12MLW0503TB	5/3/12 0810	3
	Field Blank		
	12MLW0501FB	5/2/12 0905	3

Notes: [1] = Extra volume for MS/MSD analysis.

1 May 2012: Sampling teams collected water samples from residential wells WP-01, WP-04, WP-16, WP-63, WP-64, WP-66, WP-69, WP-03, WP-21, WP-23, WP-27, WP-50, WP-57, WP-68, WP-71A, WP-71B, WP-74, WP-95 and WP-111. Significant or unusual observations on this day included the following: Pump house could not be accessed as planned resulting in sample collection from an exterior faucet at WP-21; [redacted] of Granite Construction Co. (formerly Basin Asphalt) unlocked the pump house for the sampling team at WP-04, allowing sample collection directly from the well riser water tap; WP-71A – sample collected from tap at right corner of front porch; WP-71B – well house unlocked by [redacted] (well system owner) who lives next door at [redacted] He asked that sampling results be sent to him, and to coordinate with him for sampling access next year. Water samples were collected from the tap on the west side of the house at WP-74since the owner was not home. At the completion of sampling, the owner arrived on the property and asked the sampling team to collect the 2013 sample from the pump house tap in the back yard (he gave verbal permission to enter his yard without him being present). The sampling team located the well adjacent to the pump house at WP-111. This well appears to be on a different property (as shown on the Right of Entry form) than the address of the adjacent house located at [redacted] The Washington State Department of Ecology well ID was APT084 which indicates the correct well matching the Right of Entry. The owners were not home to verify, and the sampling team collected water samples from the tap on the west side of the house since no tap was available at the wellhead or on the pump house. We may have to obtain a signed Right of Entry form for the property at [redacted] This issue should be resolved prior to the 2013 sampling event. The tap location at WP-50 is located under a 5 gallon steel bucket as seen in the picture of the site (Appendix B). At WP-25 the owner was unavailable to show us the location of the pump and sampling port. In this case, the sample was taken from a tap located on the driveway side of the house.

2 May 2012: Sampling teams collected water samples from residential wells WP-10, WP-45, WP-73, WP-49, WP-55, WP-09, WP-52, WP-54, WP-56, WP-114, WP-22, WP-20N, WP-18N, WP-18S, WP-13E, WP-115, WP-60, andWP-88. Significant or unusual observations on this day included: WP-45 sample point was exterior tap on standpipe in front of shed collected while sprinkler system was running on the property (sampling team covered the nearest sprinkler with a bucket to permit undisturbed sampling at the nearby tap); the team was informed by the homeowner the well at WP-49 served two homes, not just the one where the pump house was located; WP-55 was difficult to regulate a slow smooth flow of water for bubble-free samples; Electrical wires and batteries under the front yard tap at WP-09 forced the team to select a tap behind the house for safe sample collection; aerated samples due to turbulent water flow or high pressure during sampling were noted at WP-18 and WP-115. Sampling for WP20N was conducted prior to contacting the manager of the trailer park. The team collected water samples at [redacted] as indicated on the Well ID and address table provided to them. The next day the manager of the park notified us that the location of the sample should have been [redacted] For the next sampling event it is recommended that the sampling team first contact the manager prior to conducting any sampling due to possible confusion with ownership and sampling address that were faced during this sampling event. WP-114 was collected at [redacted]

[redacted] as seen in the photo, (Appendix B) not [redacted]. as indicated in the Well ID and address table.

3 May 2012: Sampling teams collected water samples from residential wells WP-89, WP-65, WP-33, WP-116, WP-117, WP-30, WP-112, WP-113, WP-72, and WP-05. Significant or unusual observations on this day included: sampling team arrived ahead of planned sampling time at WP-65. The team was asked not to do this next year since the owner has to unlock the pump house and open the valve for sampling to take place. She also asked for a report of results for her well or we would be denied access to the tap next year. Future sampling teams should remember the water softener system must be turned off at WP-05. Also of note, the day 3 trip blanks (all 3) had large air bubbles prior to being shipped to the lab. At WP-88, [redacted] was not available to show us the pump and location for sampling. Sampling was conducted off of the tap located off the side of the building as seen in the pictures for the site. At WP-113 the [redacted] were not in to show the team the exact location for sample collection. A tap located behind the house and near a supposed pump house was used for sample collection.

After samples were collected at each location, the teams labeled each vial, placed the vials in bubble wrap bags, then placed them into pre-iced sample shipping coolers for storage until being shipped to the analytical laboratory with trip blanks and under chain of custody.

2.4 Investigation-Derived Waste

No investigation-derived waste was generated during this sampling event. All residual well water captured in buckets during sampling activities was transferred to ground surface on each property.

3.0 PACKAGING AND SHIPMENT

Two sample shipping coolers were shipped priority overnight to Analytical Resources, Inc. via the Grant County Airport Fedex Station on Monday afternoon, 1 May 2012. On 2 May 2012, one sample shipping cooler was shipped to the lab via the Fedex station. On 3 May 2012, the final sample shipping cooler was shipped to the lab via the Fedex station.

All sample shipping coolers were prepared for laboratory delivery in the following manner: Each cooler was lined (sides and bottom) with plastic “bubble-wrap” sheets for shock absorption. A large 30-gallon plastic garbage bag was then placed into the cooler to contain the sample water in the event of container breakage during shipment to the laboratories. The glass sample vials were placed in bubble-wrap bags for shock protection. All the samples were placed in the shipping coolers as indicated on the corresponding chain of custody forms. Cubed ice bags were

placed between and on top of the samples in each cooler to ensure maintenance of the required 4 degrees centigrade (plus/minus two degrees) temperature. The completed chain of custody (COC) forms were placed in Ziploc bags and taped to the inside of each cooler lid. Two custody seals were affixed to the outside of each cooler. The custody seals were placed so that the coolers could not be opened without breaking the seals. Each cooler was then securely sealed with fiber tape. The field team ensured drain plugs were securely taped.

Lab project manager (Kelly Bottem) was informed of the sample delivery and ensured the samples were properly accepted and checked in upon receipt the following morning after the sample containers were shipped. All sample coolers and sample containers were accounted for at the contract laboratory following each shipment.

4.0 LABORATORY ANALYSIS

Chemical analyses performed on the samples for round two were as follows: VOCs (Method 524.3).

5.0 DECONTAMINATION PROCEDURES

Thermometers and water volume measurement containers used by each team were decontaminated at the end of the project with an Alconox®-water solution followed by triple rinsing using distilled water in the District Geology Laboratory.

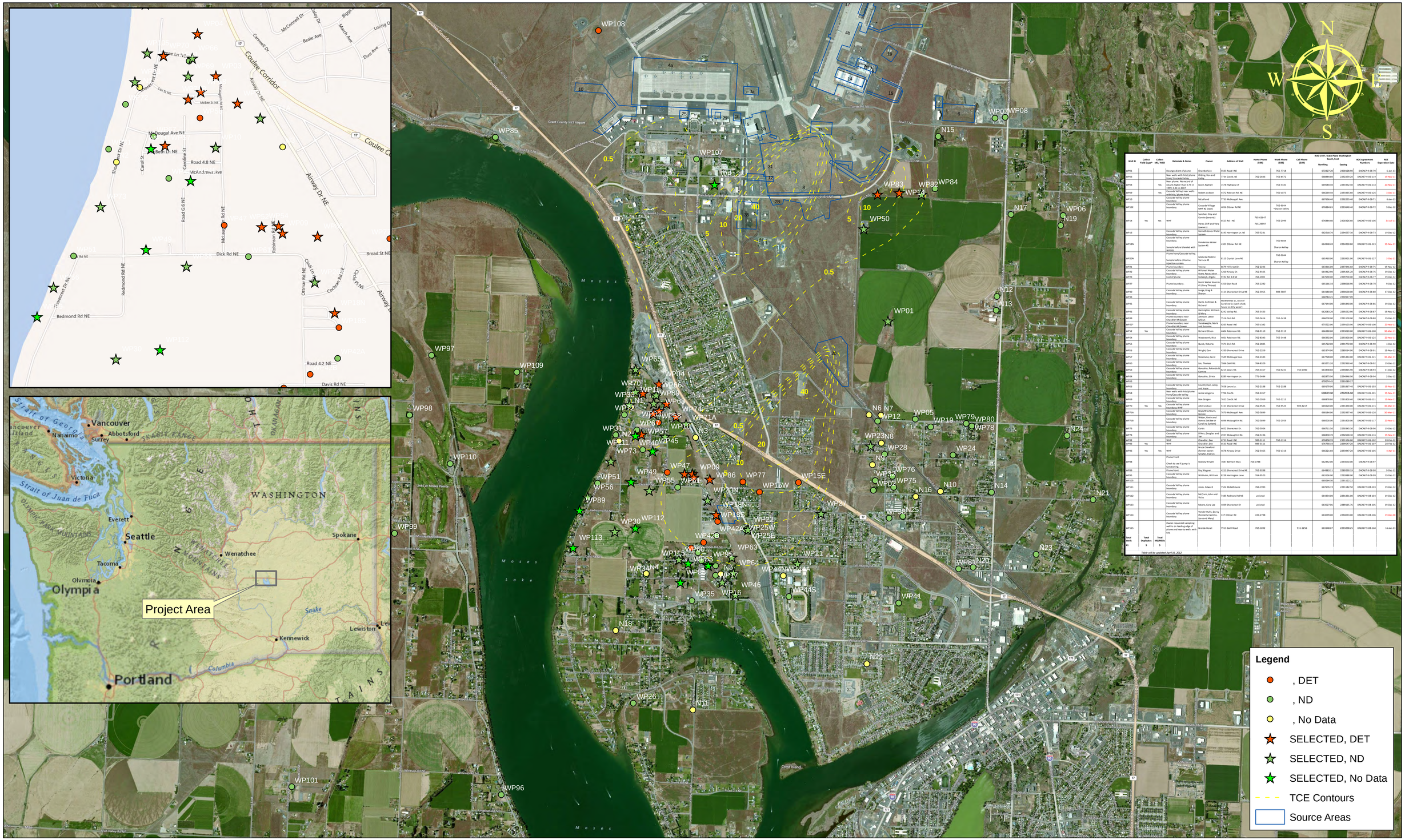
6.0 PROTECTION LEVEL

All sampling activities were conducted under Worker Protection Level D. For this project, personnel protective equipment included reflective orange safety vests, safety splash protection glasses, Nitrile gloves, and safety steel toe boots. New pairs of Nitrile gloves were donned prior to handling acid-preserved sample containers and when collecting water samples aton of samples at each monitoring well.

End of Field Sampling Report

APPENDIX A

Site and Well Location Map



Well ID	Collect Field Dupe*	Collect MS / MSD	Rationale & Notes	Owner	Address of Well	Home Phone (5dB)	Work Phone (5dB)	Cell Phone (5dB)	NAD 1927, State Plane Washington South, Feet Northing	Easting	RDE Agreement Numbers	RDE Expiration Date
WP01			Downgradient of plume	Chamberlain	5503 Road I NE		765-7718		672227.20	2300128.90	DACA67-0-08-70	6-Jan-13
WP03			Near wells with hits; plume front; Cascade Valley	Dishing, Ron and Kathy	7734 Cox Dr. NE	762-2836	762-8572		668884.80	2292239.20	DACA67-0-08-119	19-Nov-13
WP04		Yes	Near plume. No record of results higher than 0.75 in 2010 or 2011	Bacon Asphalt	3578 Highway 17		762-5181		669584.40	2291952.40	DACA67-0-08-118	20-Nov-13
WP05		Yes	Cascade Valley; near wells with hits; plume front	Robert Jackson	4572 Robinson Rd. NE		760-3073		666269.50	2293385.60	DACA67-0-08-126	3-Dec-13
WP10			Cascade Valley plume boundary	McFarland	7733 McDougall Ave.				667696.40	2292291.40	DACA67-0-08-71	6-Jan-13
WP13E			Cascade Valley plume boundary	Cascade Village MHP #2 (east)	4056 Ottmar Rd NE		760-9044 *Sharon Kelley		676884.65	2291646.40	DACA67-0-08-72	9-Dec-12
WP14	Yes	Yes	MHP	Sanchez, Elny and Connie (tenants)	6523 Rd. I NE	765-6364?	766-2999		679884.60	2300326.00	DACA67-0-08-106	31-Jul-13
WP16			Cascade Valley plume boundary	Perry, Cliff and Vera (owners)	6193 Harrington Ln. NE	765-5231			662518.70	2294557.80	DACA67-0-08-71	19-Dec-12
WP17			Cascade Valley plume boundary	Kennedy Jones Water System	4301 Ottmar Rd. NE		760-9044 Sharon Kelley		664948.20	2294230.80	DACA67-0-08-123	19-Nov-13
WP17Dh			Sample before blended with WP18S	Ponderosa Water System 4b								
WP17Dh			Plume front/Cascade Valley	Lakeview Mobile Terrace #3	8115 Crystal Lane NE		760-9044 Sharon Kelley		665460.00	2293901.00	DACA67-0-08-127	3-Dec-13
WP17Dh			Sample before chlorine injection system									
WP21			Plume boundary	Tetlow	8679 Hillcrest Dr.	762-2220			663155.00	2297246.60	DACA67-0-08-75	19-Nov-12
WP23			Cascade Valley plume boundary	Hillcrest Water Users Association	4260 Airway Dr.	762-9105			669442.90	2295405.20	DACA67-0-08-76	19-Dec-12
WP23			East of plume.	Nelsen, Angela	5192 Rd. 4 B NE	766-2501			667690.00	2298700.00	DACA67-0-08-77	19-Dec-12
WP27			Plume boundary.	Basin Water Sources #1 (Gary Thrasp)	4350 Star Road	765-2282			665166.10	2298818.90	DACA67-0-08-78	9-Dec-12
WP30			Cascade Valley plume boundary	Lange, Greg & Sherry	4114 Shoreacres Drive NE	762-5955	989-5807		664180.00	2296600.00	DACA67-0-08-80	17-Dec-12
WP31									668784.47	2296917.09		
WP32			Cascade Valley plume boundary	Hartz, Kathleen & Richard	9b Andrews St., east of Carolina St. (work shed, house on City water)				667144.00	2291848.00	DACA67-0-08-81	19-Dec-12
WP34			Cascade Valley plume boundary	Harrington, William & Mary	6242 Valley Rd.	765-5423			662589.20	2295692.90	DACA67-0-08-87	19-Nov-12
WP49			Plume boundary near Chandler Rd Green	Lanham, Lattie Jefferson	7516 Dick Rd.	762-5614	765-3438		666000.00	2291200.00	DACA67-0-08-88	19-Dec-12
WP50*			Plume boundary near Chandler Rd Green	Vandewege, Mark and Suzanne	6265 Road I NE	765-1382			675522.00	2299035.90	DACA67-0-06-100	20-Nov-13
WP52	Yes		Cascade Valley plume boundary	Richard Olson	4604 Robinson Rd.	762-9119	762-9119		664380.00	2293820.00	DACA67-0-06-108	30-Mar-13
WP54			Cascade Valley plume boundary	Wadsworth, Rick	4601 Robinson Rd.	762-8343	765-3448		666392.00	2293300.00	DACA67-0-06-125	20-Nov-13
WP55			Cascade Valley plume boundary	Quick, Roberta	7673 Dick Rd.	762-2885			669722.00	2295770.00	DACA67-0-08-82	4-Dec-12
WP56			Cascade Valley plume boundary	Wright, Don	4192 Shoreacres Drive	762-2259			663174.00	2285164.00	DACA67-0-08-91	19-Nov-12
WP57			Cascade Valley plume boundary	Shoemake, Carol	7649 McDougal Ave.	762-2443			667728.00	2295414.00	DACA67-0-06-121	30-Mar-13
WP60			Cascade Valley plume boundary	Lim, Thomas	7866 Dahl Rd.	764-8329			663271.20	2292960.40	DACA67-0-08-92	19-Dec-12
WP63			Cascade Valley plume boundary	Gonzalez, Rolando & Jessica	8215 Davis Rd.	765-3317	766-9241	750-1780	663438.60	2294865.90	DACA67-0-08-93	11-Dec-12
WP64			Cascade Valley plume boundary	Gonzalez, Silvia	8289 Harrington Ln.	771-3444			662875.90	2294594.90	DACA67-0-08-94	2-Dec-12
WP65									676076.47	2291688.17		
WP66			Cascade Valley plume boundary	Countryman, Leroy and Joyce	7638 Lenae Ln.	762-2188	762-2188		669179.00	2291867.40	DACA67-0-06-101	19-Nov-13
WP68			Near wells with hits/plume front/Cascade Valley	Jaime Longoria	7706 Cox St.	762-2457			668819.60	2292006.60	DACA67-0-06-101	19-Nov-13
WP69			Cascade Valley plume boundary	Don Grager	7653 Cox St. NE	762-2959	762-5213		668878.80	2291684.40	DACA67-0-06-131	19-Nov-13
WP70	Yes	Yes	Cascade Valley plume boundary	John Lindsay	5151 Shoreacres Drive	762-9525	762-9525	989-4217	668220.00	2291390.00	DACA67-0-06-115	30-Mar-13
WP71A			Cascade Valley plume boundary	Reed/Wachburn, Denise	7670 McDougall Ave.	762-5899			668184.00	2292997.40	DACA67-0-06-120	30-Mar-13
WP71B			Cascade Valley plume boundary	Weber, Kevin and Donna (McNear Cascade System)	4896 McLaughlin Rd.	762-5899	762-2959		668500.00	2291800.00	DACA67-0-08-117	20-Nov-13
WP73			Cascade Valley plume boundary	Curtis	4652 Shoreacres Dr.	762-5954			666715.50	2290345.30	DACA67-0-08-96	19-Dec-12
WP74			Cascade Valley plume boundary	O'Neis, Douglas and Teri	4937 McLaughlin Rd.	762-5196			668430.70	2292618.30	DACA67-0-06-116	19-Nov-13
WP75	Yes		MHP	Chandler, Dee	5715 Road I NE	989-3111	760-1316		679858.70	2301136.00	DACA67-0-06-102	28-Feb-13
WP82			MHP	Chandler, Dee	5619 Road I NE	989-3111			679785.10	2299547.20	DACA67-0-06-107	28-Feb-13
WP86	Yes	Yes	MHP	Bruce Crawford (owner-operator) Schaller, Patrick	4678 Airway Drive	762-5465	760-1316		666221.60	2293947.20	DACA67-0-06-105	4-Apr-13
WP88			Plume Front. Check to see if pump is working. Plume front	Rodney Wright	7847 Bertram Way	766-0788			662242.00	2293050.00	DACA67-0-08-97	
WP89				Ray Wagner	4213 Shoreacres Drive NE	762-9288			664883.11	2289290.10	DACA67-0-08-98	9-Dec-12
WP95			Cascade Valley plume boundary	Wittbuhn, William	4238 Harrington Lane	764-9521			663136.00	2293988.00	DACA67-0-08-99	19-Dec-12
WP105									669594.50	2295122.22		
WP111			Cascade Valley plume boundary	Jones, Edward	7524 McBeth Lane	766-1993			667976.19	2291182.50	DACA67-0-08-103	19-Dec-12
WP112			Cascade Valley plume boundary	McClure, John and Vicky	7685 Redmond Rd NE	unlisted			664334.00	2291131.00	DACA67-0-08-104	19-Dec-12
WP113			Cascade Valley plume boundary	Moore, Cora Lee	4035 Shoreacres Dr	unlisted			663527.00	2289111.76	DACA67-0-08-105	19-Dec-12
WP116			Cascade Valley plume boundary	Vander Hulst, Darcy (tenants Cassidy, Jace and Mary)	137 Ottmar Rd	431-2788			663099.00	2294033.00	DACA67-0-08-106	19-Dec-09
WP121			Owner requested sampling; well is on leading edge of plume and near to wells with hits	Brenda Horst	7913 Dahl Road	765-1892		931-1256	663548.07	2293298.25	DACA67-0-08-108	16-Jan-13
Total Wells 41	Total Duplicate 5	Total MS/MSD 5										

Table will be updated April 16, 2012

Wellfield Superfund Site
Moses Lake, Washington
Author: Edward B. Wilson
Date: March 23, 2012

APPENDIX B

Field Sampling Photos

Figure 1

Figure 2

Figure 1: Filter and plumbing arrangement shown in pump house at WP-14. Filter and plumbing arrangement shown in pump house at WP-70 prior to sample collection.

Figure 3

Figure 4

Figure 3: Sample collection from WP-70 house influent (post filter) sample valve.
Figure 4: WP-82 pump house filter and plumbing arrangement prior to sample collection.

Photographer: Joseph Marsh

US Army Corps of Engineers ®
Seattle District

Figure 5

Figure 6

Figure 5: WP-83 Pump House conditions prior to sample collection. Figure 6: WP-86 filter arrangement shown in crawlspace of house.

Figure 7

Figure 8

Figure 7: Flushing line prior to sample collection at WP-86. Figure 8: Crawlspace access hatch at WP-86.

Photographer: Joseph Marsh

US Army Corps of Engineers
Seattle District

Figure 9

Figure 10

Figure 10: Katie King collects sample in pump house at WP-04. Figure 11 with insert shows sample location and sampling at WP-66.

Figure 11

Figure 12

Figure 11: WP-69 sample collected from backyard tap near helicopter parts (arrow).

Figure 12: sample collection from front exterior house tap at WP-03.

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Photographer: Joseph Marsh

Figure 13

Figure 14

Figure 13: WP-68 Sampling from front tap. Figure 14: Preparations for sampling in WP-71B pump house. Door to pump house must be unlocked by "well master".

Figure 15

Figure 16

Figure 15: Sampling front tap at WP-74 (Owner asked us to sample tap at well house next year) . Figure 16: Sampling tap at corner of house at WP-57.

Photographer: Katie King/Joseph Marsh

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Figure 17

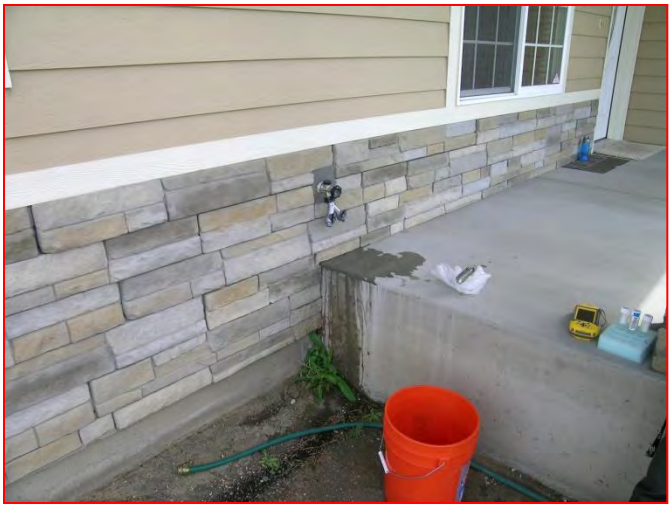

Figure 18

Figure 17: Closest tap to pump house at WP-111 was front of house at [redacted] Project team should verify if the Right of Entry permit covers this property or just the pump house that may be on the adjacent property. Figure 18: Joseph Marsh collects a sample at WP-10 along block wall on east side of building.

Figure 19

Figure 20

Figure 19: WP-45 sampling location adjacent to wellhead between shed and garage. Figure 20: Sample collection at front tap (east side of house) at WP-73.

Photographer: Joseph Marsh/Katie King

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Figure 21

Figure 22

Figure 21: Flushing water from the tap at WP-49 looking southwest. Figure 22: Water flowing during flow rate and temperature measurements at WP-49.

Figure 23

Figure 24

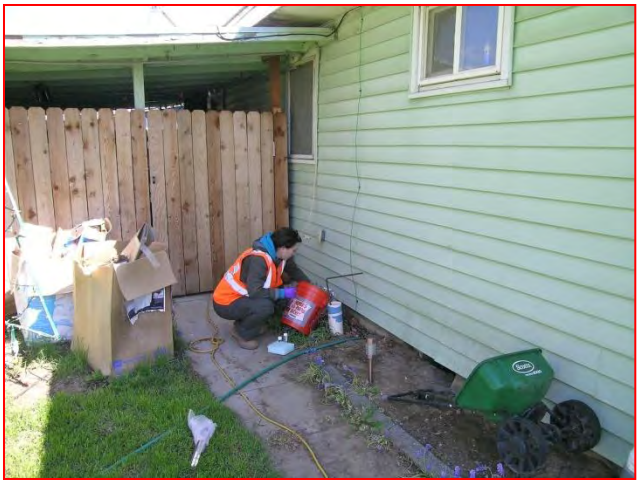

Figure 23: Tap water temperature monitoring for stabilization in the backyard at WP-55.
Figure 24: Sample collection at the alternate backyard location at WP-09 due to dangerous electrical wiring in the front yard.

Photographer: Joseph Marsh/Katie King

US Army Corps of Engineers ®
Seattle District

Figure 25

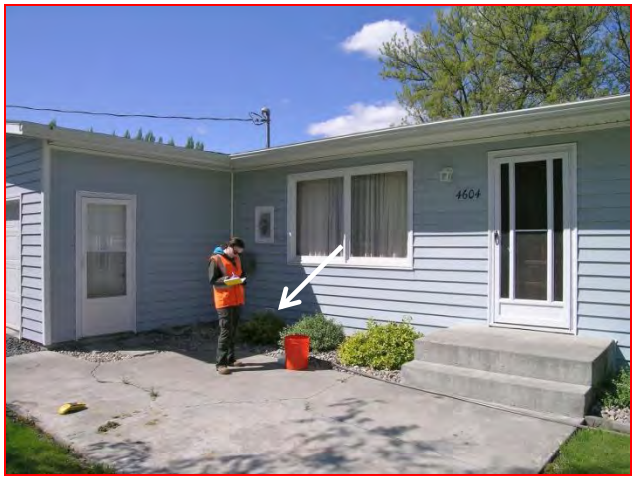

Figure 26

Figure 25: Katie King records sample point GPS coordinates at the front of WP-52. Sampling tap is under the electric service meter to the left of the front door (arrow). Details shown in figure 26.

Figure 27

Figure 28

Figure 27: Water line flushing from short riser tap at WP-54 (tap shown at arrow). Figure 28: Water line flushing prior to sampling at WP-56.

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Photographer: Joseph Marsh/Katie King

Figure 29

Figure 30

Figure 29: Photo shows preparation of field blank samples from laboratory-prepared sample.
Figure 30: sampling preparations at WP-89 near wellhead on the north side of the house.

Figure 31

Figure 32

Figure 31: Samples were collected from a hose on the south side of the pump house at home owners' insistence (home owner must turn on the water from the pump house).
Figure 32: Water tap sample point to the right of the front door at WP-33.

Photographer: Joseph Marsh

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Figure 33

Figure 34

Figure 33: Sampling point shown at northwest corner of shed in backyard of WP-116. Figure 34: waterline flushing at the northwest corner of WP-117 prior to sample collection.

Figure 35

Figure 36

Figure 35: WP-71A sampling point at right side of front porch shown at arrow. Figure 36: WP-50 sampling tap located under drum in foreground.

Photographer: Joseph Marsh/Blair Kinser

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Seattle District

Figure 37

Figure 38

Figure 37: Sample collection by Tom Gardner-Clayson at WP-50. Figure 38: WP-27 on left front of house, left side of front door. GPS receiver and graduated cylinder shown ready for use.

Figure 39

Figure 40

Figure 39: WP-01 sample point shown on side of house at arrow. Figure 40: Sampling from tap at side of house at WP-23.

Photographer: Blair Kinser

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Figure 41

Figure 42

Figure 41: Waterline flushing prior to sampling at WP-21 (arrow). Figure 42: WP-16 sample tap shown at arrow at left front of house.

Figure 43

Figure 44

Figure 43: Sample collection at WP16. Figure 44: Sample location (behind bush as shown at arrow) at WP-64.

Photographer: Blair Kinser

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Seattle District

Figure 45

Figure 46

Figure 45: Sample collection from front of house at WP-95. Figure 46: WP-63 sample point on riser pipe adjacent to shed.

Figure 47

Figure 48

Figure 47: View of WP-63 residence from street. Sample point to the left of photo.
Figure 48: Sample packaging for shipment to lab via Fedex.

Photographer: Blair Kinser

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Seattle District

Figure 49

Figure 50

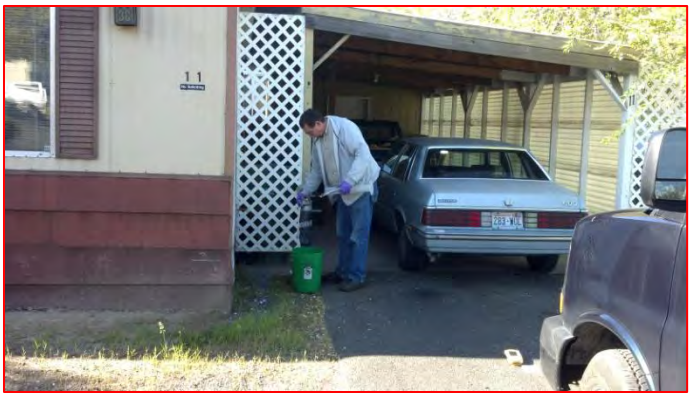

Figure 49: WP-22 sampling point located on side of house. Figure 50: Sampling conducted at WP-20N from side of house near car port.

Figure 51

Figure 52

Figure 51: WP-18N pump house access. Figure 52: WP-18S pump house access.

Photographer: Blair Kinser

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Seattle District

Figure 53

Figure 54

Figure 53: Location of WP-13E sampling tap shown at arrow on side of building. Figure 54: WP-114 sampling point in front of business shown at arrow.

Figure 55

Figure 56

Figure 55: Sample at WP-115 collected from tap next to pump house. Figure 56: Samples being collected at WP-60 from corner of building.

Photographer: Blair Kinser

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Seattle District

Figure 57

Figure 58

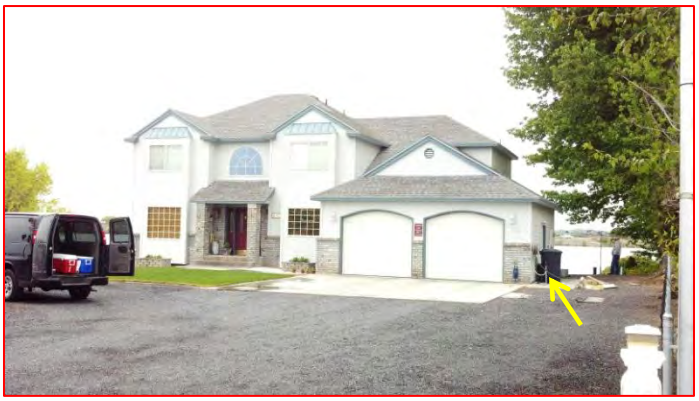

Figure 57: Sample collected at WP-88 at corner of house. Figure 58: Sample point is corner standpipe tap next to garage at WP-30 (arrow).

Figure 59

Figure 60

Figure 59: WP-112 Sample Point in front of house (arrow).

Figure 60: Sampling location at WP-113 in front of shed (arrow).

Photographer: Blair Kinser

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Seattle District

Figure 61

Figure 62

Figure 61: Tom Gardner-Clayson talks to homeowner at WP-72. Sampling tap is located on house wall at arrow. Figure 62: Pump house at WP-05. Sample tap is located on side of pump house indicated by arrow.

Figure 63

Figure 63: Preparations for water sample collection shown at sample tap outside of WP-05 pump house.

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Photographer: Blair Kinser

APPENDIX C

Field Notes

Moses Lake Wellfield
Superfund Site
Whole House Filter sampling
Special data Gathering event
5 MARCH 2012
Joseph Marsh

Groundwater Sampling Table

Sample ID	LOCATION	VOC 8260B 5030B	
12MLW00AWP14	WP14 well influent	3	
12MLW00BWP14	WP14 Between filters	3	
12MLW00CWP14	WP14 House influent	9	Extra Vol for MS/MSD
12MLW20CWP14	WP14 House influent	3	Field Dupe
12MLW00A WP70	WP70 well infl.	3	
12MLW00B WP70	Between filters	3	
12MLW00C WP70	House infl.	3	
12MLW00A WP82	WP82 Well infl.	3	
12MLW00B WP82	Between filters	3	
12ML W00C WP82	House infl.	3	
12MLW00A WP83	WP83 well infl.	3	
12MLW00B WP83	Between Filters	3	
12ML W00C WP83	House infl.	3	
12MLW20C WP83	House Infl. Dup.	3	Field Dupe.
12MLW00A WP86	WP86 Well infl.	3	
12MLW00B WP86	Between filter	3	
12ML W00C WP86	House infl.	3	
12MLW0305TB	Trip Blank	3	

Field Notes begin on page 4

All Samples placed in cooler "Red white"

SAMPLE COLLECTION DATE	TIME	REMARKS
3-5-12	1330	aerated
3-5-12	1340	Leaky valve
3-5-12	1350	Sticky Valve
3-5-12	1325	Fieldupe
3-5-12	1612	ok
3-5-12	1620	ok
3-5-12	1632	ok
3-5-12	1245	
3-5-12	1252	→ points up outlet weels changed.
3-5-12	1305	
3-5-12	1417	45° up angle outlet
3-5-12	1428	
3-5-12	1438	
3-5-12	1452	Field dupe "UP" outlet
3-5-12	1528	
3-5-12	1537	
3-5-12	1542	
3-5-12	1510	Trip Blanks

Moses Lake Wellfield 3-5-2012
Superfund Site
WHF Groundwater Samples - data gathering
Field Activity Notes

1130 - Arrive Moses Lake - Lunch Break
called [redacted] for Approval
of early start at WP 82 + WP 83
She says yes. [redacted] approves also.
Rob Lobos + Dennis Falk arrive

1221 hrs. setup at WP82
*Photos 301 to 296 show well
filterhouse details (shed) Sample
ports marked in black marker
Bag zip tied to well effluent discharge
- which is oriented in up direction - to
engage to prevent flooding floor
well influent water temp = 15.71°C
flow rate excess Samples collected,
Volume est. 3gal/s over 3 min.
Same for Mid + House Eff.
effluent - 1.5gal. discharged

*Lead Tank 30psi
Lag tank 36psi

Mob to 1305 → Temp 15.50°C flow 6 gal/min
WP-14 [redacted] - photos taken 1310 hrs.
difficult access to ports 10 min flush
Notes: Mid Valve Leaks - EPA
crew went to buy + install plug
Well influent - aerated - micro
bubbles, Lower House ~~infl.~~ eff.
Sticks - tough to get watercol

1355 - Depart [redacted]

1400 hrs. Mob to WP 83
Setup + flushing - Approx 4 min
per port. Temp. = 15.12°C, flow 800 ml/m
House effluent port points straight up!
well influent out at 45° Angle - Mid
filter is straight down
tank pressures 44 PSI Lead 48 PSI Lag
Five Minute flushing
Samples collected - well influent
difficult due to 45° up angle of
outlet valve, mid filter out -
drains down, House effluent
drains up - difficult to control

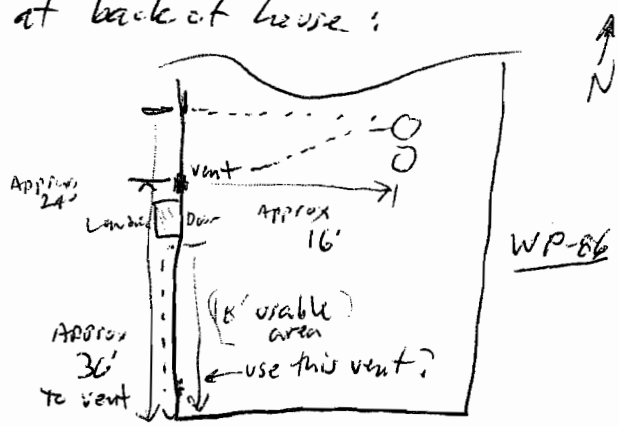
1438 - Work Complete at WP-83
- Sample management - time
+ information checked on sample
Log + Placed (written in Pen) on
sample coolers.

1515 - meet [redacted] - she (WP-86)
Signs right of Entry form
purging line for 10 min.
at approx. 500 ml/min
Temp at well influent Valve
= 13.58°C
Lag pressure reads 61 PSI →

3-5-2012

Samples collected at WP-86
well influent too high disch. pressure
- cannot regulate w/o losing Volatiles
Same for Mid filter port. House
effluent port ok because correct
Valve installed * Limited
working space - cannot stand up
in here!

Measurements for filter shed
at back of house:



Mob to WP 70.

1607 - at WP-70
checked in with Resident
found good condition in well house
A, B + C ports marked +
good low flow w/o aeration
achieved at all - Best Location est

3-5-2012

10 min. flush (500 ml/min) - Temp 15.40°C
water clear after initial
white cloudy appearance in each
samples collected from each
port. All good low-flow rates!

1640 - Depart site
- Label and bag all sample vials
vials placed on ice in shipping
cooler.

1900 - end of Day

3-6-2012

1210 Hand Deliver one sample cooler
to ARI. return to D.O. @ 1300 hrs.
end of sampling project

Moses Lake Wellfield Program
Residential Water Sampling
(Superfund)

Team #1
Joseph Marsh
Katie King
(24 wells)

2012 EVENT TEAM 1

SAMPLE ID	2012 DATE	SAMPLE TIME	Analysis	VOCs 524.3 3 x 40ml VOA w/ HCl pres.	
12MLW001WP04	5-1	0840		9	with MS/MSD
12MLW201WP04	5-1	0850		3	Field Dupe
12MLW001WP66	5-1	0930		9	w/ MS MSD
12MLW201WP66	5-1	0945		3	Field Dupe
12MLW001WP69	5-1	1006		9	with MS MSD
12MLW201WP69	5-1	1015		3	Field Dupe
12MLW001WP03	5-1	1032		3	
12MLW001WP68	5-1	1049		3	
12MLW001WP71A	5-1	1112		3	
12MLW001WP71B	5-1	1137		3	
12MLW001WP74	5-1	1159		9	with MS MSD
12MLW201WP74	5-1	1218		3	FD
12MLW001WP57	5-1	1334		3	
12MLW001WP111	5-1	1424		3	
12MLW001WP10	5-2	0819		3	
12MLW001WP45	5-2	0834		3	
12MLW001WP73	5-2	0858		3	
12MLW001WP49	5-2	0928		3	
12MLW001WP55	5-2	1012		3	
12MLW001WP09	5-2	1054		3	
12MLW001WP52	5-2	1110		3	
12MLW001WP54	5-2	1122		3	

Moses Lake Wellfield 2012
TEAM 1 SAMPLING TABLE continued

SAMPLE ID	2012 DATE	TIME	VOCs 524.3 3 x 40ml VOA w/ HCl
12MLW001WP56	5-2	1318	3
12MLW001WP89	5-3	0808	3
12MLW001WP65	5-3	0829	3
12MLW001WP33	5-3	0852	3
~~12MLW001WP47~~			3
~~12MLW001WP61~~		Not used	3
~~12MLW001WP25W~~			3
~~12MLW001WP44A~~			3
12MLW001WP116	5-3	0909	3
12MLW001WP117	5-3	0934	3
↓ Trip Blanks ↓			
12MLW0501TB	5-1	1015	3
12MLW0502TB	5-2	0830	3
12MLW0501TB2	5-1	1530	3
12MLW0503TB	5-3	0810	3
Field Blank ↓			
12MLW0501FB	5-2	0905	3

MOSES LAKE WELLFIELD PROGRAM
Residential Water Sampling (Superfund)

2012 EVENT — TEAM 2

Team #2
Tom Gardner-Clayson, Blair Kinser
(23 wells)

SAMPLE ID	(2012) DATE	TIME	Analysis VOC 524.3 3 x 40 ml VOA w/ HCl	
12MLW001WP50	5-1	0830	3	
12MLW001WP01	5-1	0950	3	
12MLW001WP27	5-1	0925	3	
12MLW001WP23	5-1	1031	3	
12MLW001WP114	~~5-1~~ 5-2	1300	3	
12MLW001WP21	5-1	1200	3	
12MLW001WP16	5-1	1330	3	
12MLW001WP64	5-1	1348	3	
12MLW001WP63	5-1	1500	3	
12MLW001WP22	5-2	0844	3	
12MLW001WP20N	5-2	0905	3	
12MLW~~001~~ 201WP18N~~S~~	5-2	0953	9	with MS MSD
12MLW~~001~~ 201WP18N~~S~~	5-2	1110	3	P ~~F.D.~~
12MLW001WP13E	5-2	1140	3	
12MLW001WP95	5-1	1410	3	
12MLW001WP115	5-2	1330	3	
12MLW001WP60	5-2	1345	3	
12MLW001WP88	5-2	1400	3	
12MLW001WP30	5-3	0810	3	P
12MLW201WP30	5-3	0810	3	F.D. → should have been a fictitious time.
12MLW001WP112	5-3	0830	3	

Moses Lake Wellfield 2012

Team 2 Sample Table continued

SAMPLE ID	(2012) DATE ~~TIME~~	TIME	Analysis VOC 524.3 3 x 40 ml VOA with HCl	
12MLW001WP113	5-3	0857	3	
12MLW001WP72	5-3	0920	3	
12MLW001WP05	5-3	0949	3	
12MLW001WP11	Not Sampled	–	3	
12MLW001WP31		–	3	
12MLW001WP34		–	3	
12MLW001WP35		–	3	
12MLW001WP42A		–	3	
12MLW001WP42B		–	3	
~~12MLW201WP18S~~				
12MLW201WP18N	5-2		3	* Field dupe at WP18N

Field Activity Notes (Team 1)
(Note: Team 2 Notes in separate Field Book)
DATE: 5-1-2012 weather: Clear cool
Team: Joseph Marsh (Team Leader)
Keotie King
Note: Locations for today's sampling verified and Right's of Entry forms signed. (Photo 4047)
0810 - Arrive at WP-04 former Basin Asphalt now known as Granite - "Well House Key" needed
Samples collected in wellhouse at wellhead faucet. Flow rate = 1.8L/min Temp. = 62°F
Well house GPS coordinates:
[redacted]

0840 Sample collection time. (Photo 4048)

0916 - Mob. to WP-66 Front N. corner of house - faucet Flow rate = 5L. (Photo 4049-4050)
water temp. = Approx ~~5L~~ 58°F
GPS coordinates. [redacted]
water clear - No issues. flush for 10 min
0930 Sample time, Mob to WP69
GPS coord. of faucet
[redacted]
(~~Photo 4051~~) No photo
Water flowrate. 2.1 Liter/min.
Water temp. 65°F

5-1-2012 cont. Team 1
- working at WP69
1006 - ready - sample collection time.
1027 - flushing line at WP03 (~~No photo~~ ~~4052, 4054~~)
GPS coordinates of faucet in front of house
[redacted]
flow rate = 2.4L/min. Temp. = 53°F
Sample time = 1032 (Photo 4051) No problems
Mob. to WP68 (Photos 4052 4054) (~~Camera malfunction~~) (~~No Photo~~)
1040 - @ WP68
GPS coordinates of faucet in front of house
[redacted]
flow rate = 2.7L/min temp = 57°F
sample time = 1049
Mob. to WP-71A → (No Photos)
1102 - @ WP-71A
GPS coordinates of faucet @ ~~the side of the house~~ ~~4052~~ ~~4054~~
rightside of the front porch
[redacted]
flow rate = 2.8L/min temp = 59°F
sample time: 1112 - No problems noted
Mobilize to WP-71B - well house opened by Well owner. Photo 4055
→

Moses Lake well fields

5-1-2012 Team 1

1121 - WP71B photo 4056

Well house = blue house w/ door in far right corner of the yard

GPS coordinates of faucet in well house [redacted]

send results to: [redacted]

→ "Well master"

flow rate: 2 L/min temp: 61°F

Sample time: 1137 No problems

1150 - Mobilize to WP-74 (Photo 4057, 4058)

GPS Coordinates at front faucet [redacted]

water flow rate = 1.8 Liter/min

water temp = 59° F

1159 Sample collection time

Note: owner arrives + says to collect samples from well house faucet (freeze proof) Next year like contractors have.

1222 - Lunch Break

1315 - mob to WP-57 (Photo 4060)

5-1-2012 Team 1

GPS Coordinates for right front corner of house. [redacted]

water flow rate = 1.2 L/min.

water temp after flushing = 58°F

1334 = Sample time

water clear No issues, collected at right front tap. hose removed.

Mob to well WP 111 located behind + NW of [redacted] (May be Macbeth St.?)

(No Right of Entry for this particular house. - owner of well signed ROE.) Taking samples from front tap on house.

water flow = 3 L/min water temp = 60°

GPS Coordinates: [redacted]

sample time = 1424 hrs.

Ecology Well ID Tag # on well casing is APT084 (Photo 4062, 4063)

- preparing to ship samples - completing COC forms - re-icing coolers

Samples from both teams shipped out today at 1530 hrs. at Grant County Airport Fedex Station - 2 coolers with trip blanks in both.

1630 - END of Day 1

Moses Lake Wellfield project
2012 Sampling
Team 2

5-2-2012

0800 - Arrive at WP-10 (Photo 4064, 4065)
Sample point = faucet - outside
Water flow rate = 18L/min Water Temp = 62°F
Sample collection time 0819
faucet on front of building facing the street
→ in the middle of the building
GPS coordinates:
[redacted]

Mob to WP45
0826 - arrive @ WP-45 (Photo 4066)
Sample point: spigot in front of small shed, behind garage
GPS: [redacted]
flow rate: 4L/min temp: 59° F
sample time: 0834
* owner of blue house next door didn't know what we were doing here * They are on a different well for their water.
0845 - arrive at WP-73 (Photo 4067)
Samples to be collected at front faucet on E. side of House (Front)
GPS coordinates:
N [redacted]
water flow = 1.5 Liters/min.
water temp = 57° F

5-2-2012 Team 1 Notes

0858 - Sample collection time at WP-73
Finish up + Mob to WP 49
0913 - showing up early at WP-49 (Photos 4068-4072)
GPS Coordinates
[redacted]
Water flow rate = 5L/min - 10 min. flush
Water temp = 59°F
Sample Collection Point: faucet ~~west~~ east of pump house
*faucet behind wellhouse, between two spruce trees → nearly under one tree
- supplies water for two houses
0928 = sample time
Mob to WP-55
- arrive at WP-55 (Photos 4073-4076)
GPS Coordinates [redacted]
Water flow rate = 4.2L/min.
Water temperature = 53°F
Sample collected from: S side faucet on house
1012 Sample Collection time
difficult to control flow during sampling. Depart property,
1045 - Mob to WP-09 - faucet in front of house - too dangerous - wires + batteries Nearby - using faucet in back yard near house (Photos 4077, 78)

Moses Lake

5-2-2012 Team 1

- GPS coordinates at WP-09
Sample point =
[redacted]
water flow rate = 1.8 L/min
water temp = 54°F

1056 = Sample collection time

1104 → @ WP-52 (Photos 4079, 4080)

Sample point: Front of house faucet
GPS: [redacted]
Water flow rate: 3L/min temp: 55°F
→ sample point below electric meter
sample time = 1110

1110 → mob to WP-54 (Photos 4081-4083)

Sample point: Front of house, faucet
GPS [redacted]
flow rate: 2.4L/min temp: 54°F
sample time = 1122

Lunch

1310 Mob to WP-56 (sampling early)
~~GPS~~ - could not contact owner in-person or by phone, so collecting sample at front left corner of house, (Photo 4084-4085)
GPS = [redacted]

(Note: Photo 4086 is Field Blank prep.)

5-2-2012 cont. Team 1

Sample flow rate = 2.8 Liter/min.
Sample temp = 58°F

1318 - Sample collection time at WP-56

1500 - dropped of one cooler with samples from both teams for overnight delivery (priority) via Fedex to ARI.

1600 - end of day (Teams review sample locations for tomorrow)

5-3-2012 Team 1

0800 - Arrive at WP-89 after buying ice to cool samples. (Ahead of schedule) owner not home.

Sample Point = ↓ (Photo 4087)
GPS
[redacted]
→ Faucet next to well on North side of the house, to the left of the fenced back yard, next to tree stump
flow rate = 2.4 L/min temp = 55°
Sample time = 0808

Mobilize to WP-65

- 0820 - arrive early @ WP-65 →

5-3-2012 Team 1

WP-65 details (photo 4088)

Sampling location = S. side well house - faucet operated by home owner

GPS Coordinates

[redacted]

Sample Water flow rate = 3.3L/min

Water temperature = 48°

- Sample collection time = 0829

* Home owner Not happy - we arrived early

- Well house locked, needed opening by owner & turn the water on
- blue well house next to house sample taken from hoses out of well house
- need to coordinate w/ owner to open gate & well house & turn water on, (she wants lab results - report)

0840 - MOD TO WP-33

↳ 0850

(photo 4089)

Sampling location: faucet in front of the house, to right of front door

GPS:

[redacted]

flow rate: 3L/min temp: 58°

sampletime: 0852

MOD TO WP-116 @0901 (photo 4090)

sampling point: faucet coming out of well house to the northwest side of the house → PDOP = 4.42

GPS:

[redacted]

flow rate: 3L/min temp: 54°

Sample time: 0909

0925 ~~arrive MOD to~~ arrive @ WP-117 (photos 4091, 4092)

sampling point: faucet on NW corner of house.

GPS:

[redacted]

flow rate: 3L/min temp: 53°

Sample time: 0934

- ~~One of~~
- all three trip blanks for 5-3 @ 0810 have bubbles 12ML W0503TB → photo 4093

Drop off Last cooler @ 1130

Head back to Seattle

End of project - [illegible]

"Rite in the Rain"®

ALL-WEATHER

LEVEL

No. 311

MOSES LAKE WELLFIELD
Project
2012 Field Sampling
Team 2:

Tom Gardner-Clayson
Blair Kinser

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

Name Blair C Kinser (Recorder)
Tom Clayson (Sampler)
Address 4835 E Marginal Way
Seattle Wa
Phone (707) 496-1224

Project Moses Lake Wellfield
Project

Clear Vinyl Protective Slipcovers (Item No. 30) are available for this style of notebook.
Helps protect your notebook from wear & tear. Contact your dealer or the J. L. Darling Corporation

Moses Lake Wellfield Project
Residential Water Sampling (Superfund)

2012 EVENT TEAM 2

SAMPLE ID	(2012) DATE	TIME	VOC 524.3 3 x 40 ml w/ HCl	
12MLW001WP50	May 1	0830	3	
12MLW001WP01	May 1	~~0945~~ 0962 ~~0945~~ ~~0910~~ BCK	3	
12MLW001WP27	May 1	0925	3	
12MLW001WP23	May 1	~~1030~~ 1031 BCK	3	
12MLW001WP114	May 2	1200 BCK	3	
12MLW001WP21	May 1	~~1110~~	3	
12MLW001WP16	May 1	~~1230~~ 1330 BCK	3	
12MLW001WP64	May 1	1308	3	
12MLW001WP63	May 1	1500	3	
12MLW001WP22	May 2	0844	3	
12MLW001WP20N	May 2	0905	3	
12MLW001WP18 ~~S~~ ~~BCK~~	May 2	0953	9	MS-MSD
12MLW001WP18N ~~S~~	May 2	1110	~~3~~ 6 BCK	Field dupe
12MLW001WP13E	May 2	1140 BCK	3	
12MLW001WP95	May 1	~~1355~~ 1410	3	
12MLW001WP115	May 2	1330	3	
12MLW001WP60	May 2	1345	3	
12MLW001WP86	May 2	1400	3	
12MLW001WP30	May 3	0810	3	Primary
12MLW201WP30	May 3	0810	3	Field dupe

Moses Lake Wellfield 2012
Team 2 sample table continued...

SAMPLE ID	2012 DATE	TIME	VOC 524.3 3 x 40 mL VOA with HCl
12MLW001WP112	May 3	0830	3
12MLW001WP113	May 3	0857	3
12MLW001WP72	May 3	0920	3
12MLW001WP05	May 3	0949	3
12MLW001WP11			
12MLW001WP31			
12MLW001WP34			
12MLW001WP35			
12MLW001WP42A			
12MLW001WP42B			

Field Activity Notes (Team 2)
(Note: Team 1 Notes in Separate Field Book)
DATE: May 1-3 weather: Sunny
TEAM: Blair Kinser & Tom Clayson

- Arrive on site WP-50 0820
Weather Sunny w/ wind 5-10mph
Pic #1

GPS (N) Northing (W) Easting
[redacted]

4L/min 15min.
Temp 74° F

- Arrive on Site WP-27 0910
Weather Sunny wind 2-5mph
Pic # 2

GPS N W
[redacted]

5L/min 5min
Temp 61° F

- Arrive on site WP-01 0945
Weather Sunny wind 5-10mph
Pic #3

GPS N W
[redacted]

10 L/min 5min
59° F

Arrive on Site WP23 1020
Weather Sunny wind 8-12mph
Pic #4

GPS
[redacted]

20L/min 8 min
60° F 5

WGS1984

[redacted]

Arrive on site WP 21 1140
Weather Sunny wind 5 mph
Pic #5

GPS [redacted]

10 L/min 5 min
60° F
Sampled on/off house
house pump house was
locked & a do not disturb
sign was up

Arrive on Site WP16 1320
Weather Sunny wind 3.5 mph
~~GPS~~ PIC #6

GPS [redacted]

6 L/min 7 min
61° F

Arrive on Site WP 64 1340
Weather Partly Cloudy wind 5 mph
Pic #7

GPS [redacted]

15 L/min 6 min
62° F

Arrive on site WP 45 1355
Weather Partly cloudy wind 5 mph
Pic #8

GPS [redacted]

10 L/min 6 Min
59° F

Arrive on site WP 63 1455
Weather partly sunny wind @ 5mph
Pic# 9

GPS [redacted]

40L/min 5min
59°F

* May 2, 2012

Arrived on site WP 22 0815
Weather Sunny Slight wind
Pic# 10

GPS [redacted]

* Set up Coolers 22 L/min 5 min
58°F

Sample Time 0844

Arrive on site WP-20N 0856
Weather sunny No wind
Pic # 11

±6.3m

GPS [redacted]

12 BCK L/min 5 min
61° Sample 0905

Arrive on site WP 18 N 0916
Weather sunny 2-5 mph
Pic #12

±6.2 m

GPS [redacted]

Sample Time ~~0955~~ BCK 1110
20 L/min 5 min
61 °F

0935 S

Arrive on site WP 18 ~~[illegible]~~
Weather Sunny Wind 2-5mph
Pic# 12.2

±6m

GPS [redacted]

25 L/min 5 min
59 °F

Sample 0953

First Sample Aerated

~~Arrive on site WP18N~~
~~Weather Sunny Wind 2-5mph~~

Arrive on site WP13E @ 1122
Weather sunny slight wind 0-2mph
Pic# 13

±6.1m

GP [redacted]

20 L/min 5 min
58 °F
Sampling 1140

Arrive on site WP114 @ 1245
Weather Partly Cloudy Wind 2-5mph
Pic # 14

±6m

GPS [redacted]

5 L/min 8 min
59 °F

Sample Time 1300

Arrive on site WP115 @ 1320
Weather Partly Cloudy Wind 2-5mph
~~Pic#15~~ Pic#15

GP [redacted]

40 L/min 3 min
2.54°F

High pressure causing aeration of samples / well was running
Sampling Time 1330

Arrive on site WP113 0840
Weather slight rain No wind
Pic # 20

GPS [redacted]

15 L/min 5 min
59 °F

Sample Time 0857

Arrive on site WP72 0910
Same
Pic #21

GPS [redacted]

15 L/min 5 min
60 °F

Sampling Time: 0920

Arrived on site WP08 0940
Same
Pic #22 ± 5.8 m

GPS [redacted]

25 L/min 5 min
61 °F

Uses softener system which was turned off for sampling Flushed through sprinkler system

Sampling Time 0949