Response Action Contract
for Remedial Response, Enforcement Oversight, and Non-Time Critical Removal Activities at Sites of Release or Threatened Release of Hazardous Substances in EPA Region VIII

U.S. EPA Contract No. EP-W-05-049

Field Oversight Report for 2009 Arkema EE/CA Investigation

Work Assignment No.:	**215-VOBB-10BX**
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Section 1
Introduction

Under Work Assignment 215-VOBB-10BX from U.S. Environmental Protection Agency (EPA), under EPA Region 8, Response Action Contract No. EP-W-05-049, Camp Dresser & McKee Inc. (CDM) was assigned to conduct oversight of field investigation activities at the Portland Harbor - Arkema Site (Site) located in Portland, Oregon.

CDM provided technical field oversight of the sediment sampling effort and geotechnical investigation conducted for the Arkema Early Action Engineering Evaluation/Cost Analysis (EE/CA) on behalf of Legacy Site Services, LLC (LSS), an agent for Arkema Inc. Sediment sampling was conducted by Integral Consulting Inc. (Integral) with subsequent geotechnical investigation performed by ARCADIS U.S., Inc. (ARCADIS). During sediment sampling, CDM collected split sediment samples in areas of interest to provide an independent verification of sampling and analysis performed by LSS and, ultimately, to support delineation of an appropriate removal action area (RAA).

This report summarizes the field oversight activities, including a discussion of deviations from the EE/CA Work Plan and Work Plan Addendum, and provides photo documentation. A summary of split sampling efforts and validated split sampling data are also provided.

1.1 Project Background

The Arkema Site is located on the southwest bank of the lower Willamette River (LWR) between river miles (RMs) 6.9 and 7.6, immediately upstream of the Burlington Northern Santa Fe (BNSF) railroad bridge. The property is located within Portland Harbor, which was designated a federal Superfund site by EPA in 2000 based on sediment contamination.

The chemicals of interest (COIs) at the Site include organochlorine pesticides (DDT, DDE, and DDD, collectively known as DDx), polychlorinated biphenyls (PCBs), semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), tributyl tin, and polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs).

1.2 Field Investigation Summary

The primary objective of the EE/CA characterization activities was to collect supplemental data for use in defining the extent of contaminated sediments both horizontally and vertically. Horizontal delineation will consist of identifying the 5 milligrams per kilogram (mg/kg) DDx RAA horizontal isocontour as cited in the May 23, 2008 Final Decision on Disputes from Dan Opalski, Director, Office of Environmental Cleanup (Opalski Decision). Vertical delineation will consist of determining the extent of COI contamination to screening level values or the bedrock surface. Sampling for sediment chemistry was conducted at a total of 37 borings. The

borings were denoted WB-30 through WB-66. CDM personnel were present during a majority of the chemistry sampling work on behalf of EPA to provide oversight of health and safety and field sampling activities as well as to collect split sediment samples.

The purpose of the geotechnical investigation was to determine the physical characteristics of the sediment to support the evaluation of dredging, capping, and containment technologies and other potential remedial activities at the Site. The geotechnical investigation consisted of standard penetration testing (SPT) using mud-rotary at three borings and cone penetration testing (CPT) at 13 borings. The SPT borings were denoted SPT-1 through SPT-3 and the CPT's were denoted CPT-1 through CPT-13. During SPT, disturbed split spoon samples were collected for visual classification and laboratory testing of sediment index properties, and relatively undisturbed samples were collected using Shelby tubes for advanced laboratory testing of shear strength and consolidation parameters. CDM personnel were present during a portion of the geotechnical investigation on behalf of EPA to provide oversight of health and safety and field sampling activities.

Two figures from Integral (both called Figure 2-1) are included in this document. The first Figure 2-1 shows actual sediment sample locations (note boring WB-59 was dropped from the investigation due to access issues). The second Figure 2-1 shows proposed chemistry and geotechnical exploration locations.

Section 2
Objectives and Scope of Field Oversight

2.1 Governing Documents

Activities at the Site were conducted by the potentially responsible party (PRP) in accordance with the EE/CA Work Plan, prepared by Parametrix for EPA dated May 11, 2007, and the Arkema Early Action EE/CA Work Plan Addendum, prepared by Integral for LSS, dated July 22, 2008. The two documents together, along with the two conditional approval letters, comprise the final EE/CA work plan for the Site and are referred to herein as the Arkema Work Plan. Appendices to the EE/CA Work Plan Addendum served as reference documents during the field sampling effort, specifically, the Field Sampling Plan (FSP) (Appendix A), Quality Assurance Project Plan (QAPP) (Appendix B), and Health and Safety Plan (HASP) (Appendix C).

Field oversight was conducted by CDM in accordance with the Sampling and Analysis Plan for Sediment Split Sampling (CDM SAP). The CDM SAP, dated August 6, 2009, consists of an FSP and QAPP and describes the sampling objectives, locations, measurement methods, project schedule, and quality assurance (QA) requirements for sampling and field investigation activities supporting the sampling oversight (CDM, 2009).

2.2 Objectives of Field Oversight

The primary objective of field oversight was to observe field activities for compliance with the LSS FSP/QAPP/HASP. Split sampling was also performed to collect sufficient independent data to allow for a completely independent assessment of the RAA boundary both horizontally and vertically.

Through daily reporting of field observations made by CDM, the EPA remedial project manager (RPM) was informed of the detailed status of the EE/CA field investigation. Further, oversight personnel provided the RPM with timely notification of issues that developed during the course of the investigation work, including possible deviations from the FSP and other planning documents. This information was important because it assisted the RPM in making decisions regarding any necessary changes in the data collection effort.

2.3 Field Investigation Schedule

The EE/CA investigation conducted by the Integral sampling team commenced on August 17, 2009, with a site safety meeting. Sediment sampling began on August 18, 2009, and continued through October 2, 2009. The geotechnical investigation was conducted by the ARCADIS sampling team from October 12, 2009, to October 23, 2009.

2.4 Oversight Personnel

Oversight was conducted by the following CDM personnel:

- Jennifer Jones, split sampling lead/field team support
- Brian Bennett, field team lead
- Shawn Oliveira, health and safety lead
- Lance Peterson, project manager

2.5 Split Sampling Program

The overall sampling strategy for the EE/CA investigation is to define the RAA boundary, both horizontally and vertically. LSS conducted sediment sampling for analytical testing in accordance with the Integral FSP. The split sampling program was conducted in accordance with the CDM SAP (CDM, 2009). CDM collected split samples for use in confirmation of the 5 mg/kg DDx horizontal contour assessment. Select split samples were also analyzed for the expanded COI analyte list for use in confirming vertical delineation. The sample collection depths were selected through computer analysis of existing LSS data using Environmental Visualization System (EVS) software.

2.5.1 Split Sampling Strategy

CDM was on site with the LSS sampling team for collection of split samples in the three types of characterization borings, as follows:

Waste Characterization Borings: Split sediment samples were collected at borings WB-35 and WB-42, in an area of known contamination. At both of these boring locations, the Integral sampling team collected two composite samples followed by discrete samples at 3-foot intervals below the bottom composite until bedrock was encountered. As described in the Integral QAPP, the composite samples will provide data for sediments that could require disposal as part of the removal action. At WB-35 the composites were from 0-10 feet and 10-20 feet; at WB-42 the composites were from 0-6 feet and 6-14 feet.

At WB-35, three discrete split samples and two composite split samples were collected. At WB-42, two discrete and two composite split samples were collected. Sample collection depths are shown in Table 1.

Analysis of the deeper composite split sample included asbestos, SVOCs, PCBs, dioxins/furans, tributyl tin, VOCs, and organochlorine pesticides, while the shallower composite split sample was analyzed only for asbestos. The discrete split samples were analyzed for SVOCs, PCBs, dioxins/furans, tributyl tin, VOCs, and organochlorine pesticides. Deviations from the CDM SAP are discussed in Section 4.

Vertical Characterization Borings: Split sediment samples were collected from borings WB-30 and WB-49, near the upstream and downstream ends of the nominal 5 mg/kg DDx plume, respectively. The Integral sampling team collected discrete samples at 2-foot intervals until bedrock was encountered. Discrete split samples were collected at three depths from WB-30, while discrete split samples were collected at five depths from WB-49, as shown in Table 1. Samples were analyzed for SVOCs,

PCBs, dioxins/furans, tributyl tin, VOCs, and organochlorine pesticides. In some instances, insufficient sample material was available to collect samples for all analyses. These deviations from the CDM SAP are discussed in Section 4.

Horizontal Characterization Borings: Split sediment samples were collected from the following eight borings (from upstream to downstream locations): WB-56, WB-34, WB-40, WB-60, WB-51, WB-63, WB-66, and WB-65. The Integral sampling team collected discrete samples at 2-foot intervals until bedrock was encountered. Split samples were collected at three depths at each boring, as shown in Table 1. The deepest sample from each boring was analyzed for SVOCs, PCBs, dioxins/furans, tributyl tin, VOCs, and organochlorine pesticides, while the samples collected at the upper two discrete depths were analyzed for organochlorine pesticides only. Any deviations from the CDM SAP are discussed in Section 4.

Additional split sediment samples were collected at horizontal characterization borings WB-40, WB-44 and WB-64. Specifically, core locations WB-40 (10-12 feet), WB-44 (2-4 feet) and WB-64 (0-2 feet) were collected for VOC analysis due to field evidence of contamination. Field evidence of contamination typically consisted of one or more of the following: sheen, odor, elevated photoionization detector (PID) readings. Further discussion is provided in Section 4.

Table 2 provides information on the laboratory analyses conducted for each split sample. A total of 35 split samples were collected for organochlorine pesticide analysis, 20 for PCB analysis, 23 for VOC analysis, 20 for SVOC analysis, 20 for dioxin and furan analysis, 20 for tributyltin analysis, and 4 for asbestos analysis. In addition, 31 split samples were archived at the EPA Manchester Environmental Laboratory.

2.5.2 Field Quality Assurance/Quality Control Samples

Quality Assurance/Quality Control (QA/QC) samples were collected by CDM in accordance with the CDM SAP. The following QA/QC samples were collected:

Field duplicates. At WB-30, WB-34, WB-51, and WB-66, a field duplicate split sample was collected for organochlorine pesticide analysis. The field duplicate sample from WB-30 was also analyzed for SVOCs and PCBs.

Trip blanks. Whenever sediment samples were collected for VOC analysis, a trip blank was also included in the cooler during shipment to the analytical laboratory. Trip blanks consisted of 40 mL vials filled to capacity with laboratory-supplied deionized (DI) water. A trip blank was placed into the cooler at the beginning of the field day and remained with the VOC sediment sample containers from time of collection to delivery to the laboratory. The trip blanks were submitted for VOC analysis along with each shipment of sediment samples analyzed for VOCs.

Matrix spike/matrix spike duplicates (MS/MSD). Extra volume was collected of one discrete sample each at WB-49 and WB-63. The MS/MSD sample from WB-49 was

analyzed for SVOCs, PCBs, and organochlorine pesticides, while the MS/MSD sample from WB-63 was analyzed for organochlorine pesticides only.

Table 3 lists information related to the QA/QC samples collected during the split sampling program. Field duplicate split samples were collected at a frequency of greater than 10% of the total samples collected for organochlorine pesticide analysis. As planned, one MS/MSD sample was collected for organochlorine pesticide analysis, and one MS/MSD sample was collected for the full suite of COIs (excluding dioxins/furans and asbestos). Due to low sample volume, the latter was not analyzed for VOCs or tributyltin, as discussed in Section 4.

2.5.3 Field Sample Custody and Documentation

The EPA Forms II Lite sample and chain-of-custody documentation procedure was used for field sample custody and documentation, as described in the following sections.

2.5.3.1 Sample Labeling and Identification

Prior to the start of sampling, CDM coordinated with EPA to obtain laboratory assignments through the EPA Contract Laboratory Program (CLP) for analyses of the split samples. EPA also provided CDM a list of CLP Sample Numbers that were used to identify split samples. Split samples collected for non-CLP analyses (asbestos and archive) and shipped to the EPA Manchester Environmental Laboratory were given an 8-digit number in accordance with EPA instructions.

Along with the EPA sample number, split samples were identified by station location using the sampling identification procedure described in the Integral FSP. Each split sample was assigned a station location, as follows:

ARK-WB-##-depth

Where: ARK = Arkema
WB = Boring
= Boring station number
Depth (e.g., 0-2 = 0 to 2 feet below sediment surface)

Trip blanks were assigned a station location starting with the sample collection date of the associated VOC samples in mm-dd-yy format, followed by the identifier "TB," and numbered sequentially. For example, the first trip blank associated with a VOC sample collected on August 18, 2009 was identified as 08-17-09-TB-1. Trip blanks were recorded on the chain of custody (COC) records when transported to the laboratory for VOC analyses.

Field duplicates were identified with the same labeling scheme as the trip blanks (e.g., 08-19-09-FD-1). The parent sample identification was documented in the log book and the field duplicate sample was submitted to the laboratory "blind."

Sample labels were produced using FORMS II Lite software and affixed to the appropriate sample containers. Sample labels were then secured with waterproof tape. All sample labels included the following information:

- Project number
- Case number
- Sample number
- Station location
- Analysis
- Unique container ID (preservative used)
- Sampling date
- Sampling time
- Sampler name

2.5.3.2 Chain of Custody Procedures

COC procedures followed the requirements of CDM SOP 1-2 for Sample Custody in accordance with the CDM SAP. FORMS II Lite software was used to generate all COC records for the split samples. A completed COC record accompanied each shipment of samples and was used as physical evidence of sample custody and control. Following each sample shipment, COC records were exported from FORMS II Lite in .xml format and then uploaded to the EPA Sample Management Office Superfund Customer Service Site at http://epasmoweb.fedcsc.com/scstr/.

2.5.3.3 Sample Packaging and Shipping

Samples were packaged and shipped following CDM SOP 2-1 Packaging and Shipping of Environmental Samples in accordance with the CDM SAP. All samples were placed in plastic bags and then in a cooler with ice and held at 4 ± 2 degrees Celsius. Custody seals were placed over two sides of the cooler and the lid was secured by tape. All samples were shipped by an overnight delivery service to the designated laboratory.

2.6 Field Documentation

Information and notations were recorded as required in a field logbook in accordance with CDM SOP 4-1 Field Logbook Content and Control and the CDM SAP. Field documentation consisted of an accounting of activities at the Site, noting any problems or deviations from the Integral FSP/QAPP/HASP and CDM SAP. The Split Sampling Lead maintained the field logbooks and submitted copies of the logbook on a regular basis to the CDM Project Manager for review, use in preparing field reports, and filing in the project files. Field notes are provided in Appendix A.

2.7 Photographic Documentation

Photographs were taken during field oversight in accordance with CDM SOP 4-2 Photographic Documentation of Field Activities. Photo-documentation by the CDM field oversight team included taking photos of boring locations, selected core samples

(especially where visual contamination was noted), field QA/QC procedures, health and safety compliance procedures, and any other instance determined necessary. Photographs taken during field oversight are provided in Appendix B.

Section 3
Observations

3.1 Summary of Work Performed

On August 10, 2009, prior to the mobilization for field activities, a field-planning meeting was conducted by the CDM project manager and attended by the CDM field staff and a member of the CDM QA staff. During the meeting, CDM field staff were provided information about the site, health and safety issues, the objectives and scope of field activities, governing documents for the field work, SOPs and required QC measures, the roles and responsibilities of staff involved, equipment and training needs, communication requirements, and schedule. CDM field staff obtained the required field supplies, including personal protective equipment (PPE), and reviewed the Arkema Health and Safety Plan (HASP) (Appendix C of the Arkema Work Plan Addendum) to determine health and safety protocols for performing Site work. The daily descriptions provided below present a general overview of activities performed during the environmental and geotechnical exploration fieldwork with a focus on locations where field evidence of contamination (sheen, odors, elevated PID readings) were noted.

3.1.1 Environmental Chemistry Sampling

The following field teams were on site during the reported periods:

Integral, Sediment Chemistry Sampling Team: August 17- October 2, 2009
CDM, Field Oversight and Sediment Split Sampling: August 17- October 1, 2009
Boart Longyear, Driller: August 17-October 2, 2009
Diversified Marine, Barge Operator: August 17-October 2, 2009

<u>August 17, 2009</u>
Eron Dodak, Integral Consulting sampling team leader, held a health and safety meeting at the Site. Personnel from Integral Consulting, CDM, Boart Longyear, Diversified Marine, and Sean Sheldrake, the EPA remedial project manager, attended the meeting. The Site history and hazards were described. The policies and procedures set forth in the Arkema Work Plan HASP were reviewed. Specifically, worker training and certifications, work zone controls, material handling concerns, drill rig safety, PPE, equipment and personnel decontamination, and overall communication between the various site personnel was discussed.

Additional observations by CDM's health and safety lead are provided in Section 3.2.

<u>August 18, 2009</u>
Sediment sampling commenced starting from the most downstream boring location and moving upstream. A sonic drill rig equipped with a large volume split spoon sampler (5-foot long, 4-inch diameter) was used to collect samples at boring WB-65. The sonic rig was positioned on a barge and the boreholes were drilled through a moon pool (access hole through the barge). Sample cores were collected continuously

to bedrock. There was no field evidence of contamination in the sediment cores. Due to poor recovery when collecting 5-foot interval samples, it was decided to collect 2-foot-interval samples on future borings. CDM collected split samples at the following core intervals: 6-8 and 8-10 feet below mudline (bml). Bedrock was encountered at approximately 18 feet bml at WB-65.

August 19, 2009
The split spoon was used to collect 2-foot sediment samples at boring WB-66 with good recovery. There was no field evidence of contamination in the sediment cores. CDM collected split samples at the following core intervals: 4-6, 6-8, and 8-10 feet bml. Bedrock was encountered at approximately 18 feet bml at WB-66.

Following completion of sampling at WB-66, sampling then began at WB-63. Sheen was observed on the surface of the first two core intervals at WB-63 (0-2 and 2-4 feet bml). While drilling for the 4-6 foot interval, the drillers noticed a drip from a hydraulic line and determined that the cause of the leak was a broken O-ring. Work was immediately stopped. The spill (estimated by Integral at 8 to 12 ounces) was observed on the drill rig, barge deck, and in the moon pool. Absorbent pads were used to clean up the spill.

Eron Dodak, Integral sampling team lead, determined that the leaking hydraulic fluid was the source of the sheen on the sediment samples from WB-63 and decided to relocate to the boring several feet away (but within the established 20-foot buffer around the pre-defined sample coordinates) and repeat sampling at WB-63 once the drill rig was repaired. The sediment samples already collected at WB-63 (0-2 and 2-4 feet bml) were held and later discarded.

Due to the presence of visible sheen in the sediment samples, the Integral sampling team employed a hexane rinse of the split spoon and composite mixing equipment following decontamination, in accordance with the Integral FSP.

Eron Dodak, Integral sampling team lead, reported the minor spill of hydraulic fluid to the U.S. Coast Guard. The Coast Guard did not anticipate any follow up action and felt that the procedures used to clean up the hydraulic fluid were appropriate. EPA also requested that Integral report the spill to Oregon Emergency Response System (OERS).

August 20, 2009
The drill rig was repaired and the barge was repositioned approximately 10 feet from the initial sampling location of boring WB-63 and 5 feet from the planned WB-63 coordinates. The split spoon was used to collect 2-foot sediment cores. There was no field evidence of contamination in the sediment cores with the exception of several flecks of sheen noted by the Integral sampling team in the surface sample. CDM collected split samples at the following core intervals: 4-6, 6-8, and 10-12 feet bml. Bedrock was encountered at approximately 17 feet bml at WB-63.

A small (approximately 4 inches long) Pacific lamprey was found in the 0-2-foot sample at WB-63. The lamprey was released into the river unharmed.

August 21, 2009
Sampling was commenced using the split spoon at boring WB-54. A small amount of sheen was observed in the 4-6-foot core. During collection of the 6-8-foot core sample, the driller noticed a hydraulic leak, originating from the same O-ring that failed on August 19, 2009. The release was estimated by Integral at 4 ounces of hydraulic fluid. The majority of the hydraulic fluid leaked onto the barge deck, however, a small quantity entered the moon pool. Drilling was terminated for the day and cleanup was immediately undertaken using absorbent pads. Eron Dodak, Integral sampling team lead, reported the minor spill of hydraulic fluid to the U.S. Coast Guard on August 21, 2009. The Coast Guard did not anticipate any follow up action and felt that the procedures used to clean up the hydraulic fluid were appropriate. Integral also notified the OERS of both spills on August 21, 2009. As a result of the OERS notification follow-up communication occurred between Integral and a representative of the Oregon Department of Environmental Quality (DEQ) which resulted in a determination that no further action was necessary.

Based on an inspection performed by Integral, the small release of hydraulic fluid did not enter the drill casing. Therefore, it was determined that the samples collected thus far at WB-54 were not compromised and sampling would continue at the same location once the drill rig was repaired.

August 24, 2009
Sampling was completed at boring WB-54 using the split spoon sampler at the same location sampled on August 21, 2009. Sampling started at a depth of 8-10 feet bml, as sampling of the shallower depth intervals had been completed on August 21, 2009. No further evidence of field contamination was noted. Bedrock was encountered at approximately 18 feet bml at WB-54.

Following completion of sampling at WB-54, the barge was repositioned and sampling commenced at WB-53. An attempt was made to use a solid core to collect a 10-foot sample. Sample recovery using the 10-foot core was poor, approximately 50 percent. The core was then tilted to the side and the sample was extruded onto a plastic tube (cut in half) lined with aluminum foil. The sediment came out quickly and it was difficult to move the plastic tube fast enough to properly lay out the sediment such that depth intervals could be determined. It was decided that this method was infeasible.

The attempt at utilizing a 10-foot core barrel for sediment sampling was the result of sloughing observed in the 2-foot cores obtained using the 5-foot long, 4-inch diameter split spoon sampler. Typical sediment cores collected using the split spoon consisted of 3-4 feet of sediment with the upper 1-2 feet considered slough. The sloughing is believed to be the result of the diameter of the sampler being less than the drill casing. The 10-foot core barrel was deemed not to result in a better sample than that obtained with the 5-foot split spoon, as the lower portion of the 2-foot sediment core obtained

using the split spoon is undisturbed and adequate volume is typically present to obtain samples.

Therefore, Integral decided to proceed with sampling using the split spoon. The barge was moved over approximately 5 feet from the original sampling location at WB-53 and sampling was repeated using the split spoon, with the second boring location identified as WB-53-2. A light sheen was noted in the 6-8-foot core at WB-53-2. Bedrock was encountered at approximately 16.3 feet bml at WB-53-2.

August 25, 2009
Sampling was conducted using the split spoon at boring WB-64, which was located onshore. There was a light sheen and slight odor in the 4-6-foot core, and a light sheen with no odor in the 10-12 foot bml core. CDM collected a split sample for VOC analysis from the 10-12-foot bml core. Bedrock was encountered at approximately 26.5 feet bml at WB-64.

August 26, 2009
Sampling was conducted using the split spoon at boring WB-55, which was located onshore. There was no field evidence of contamination noted in any of the sediment cores. Bedrock was encountered at approximately 21 feet bml at WB-55.

August 27, 2009
Sampling was conducted at boring WB-50. A "vibracore" sampling tube was used to collect a 10-foot sediment core. The thin aluminum vibracore tube was 12 feet long, 3 inches in diameter, with a plunger at the top and a "shoe" with thin flappers at the bottom that can easily move through the soft sediment at the surface of the river bottom. Upon pulling up the sample, the 12-foot tube was carried to the sample processing area and laid horizontally on the table. Metal cutting shears were used to cut the tube lengthwise in two places to open it up to get the sample. With the first try, there was only approximately 6 feet of sediment in the 12-foot tube. The shoe was clogged with sand. It was thought that when the tube hit stiffer sand around 6 feet below the mudline, the tube shoe was clogged, and further pushing did not collect any additional sample. Recovery was determined to be from 0-6 feet bml instead of the intended 0-10 feet bml. When the drillers attempted to set casing in the boring, they encountered a buried piling. As a result, it was decided to move over 6 feet and start WB-50 over.

Upon the second attempt at using the vibracore sampler, the same results occurred with recovery of only the top 0-6 feet of sediment. Sampling proceeded at this location and the samples from the first vibracore attempt were discarded. Sampling continued starting with the 6-8-foot bml core interval using the split spoon with 2-foot intervals. Integral instructed the driller to drive the vibracore in one smooth 10-foot run in future sampling to improve the chance of recovering a complete 10-foot core.

A light spotty sheen was noted in the 8-10-foot bml core following homogenization, and in the 10-12-foot sample near the bottom of the core. Bedrock was encountered at approximately 14.5 feet bml at WB-50.

August 28, 2009
Sampling was conducted at boring WB-51. The vibracore sampler was used with the goal of collecting the 0-10-foot bml core interval. The tube was advanced with a light vibration using the sonic rig in one continuous push. The sample tube was then cut open and 8 feet of sediment was recovered. The split spoon sampler was then used to collect the deeper, 2-foot core samples starting with the 8-10-foot sample. A spot of very light sheen was noted in the 10-12 foot bml core sample. Bedrock was encountered at approximately 21.5 feet bml at WB-51.

CDM collected split samples from the 4-6-, 6-8-, and 10-12-foot bml cores.

August 31, 2009
Sampling began at boring WB-62 using the vibracore sampler, however, basalt was encountered at 8.5 feet and the adapter for the vibracore tube was damaged and had to be repaired by the drillers. The vibracore sampler recovered the top 5 feet of sediment at WB-62. The split spoon was then used to collect the deeper samples. A light, spotty sheen was observed in the 6-8-foot bml core interval at WB-62. Bedrock was encountered at approximately 8.5 feet bml at WB-62.

Sampling then commenced at boring WB-61. The split spoon was used instead of the vibracore since it was anticipated that basalt would be encountered within 10 feet. There was no field evidence of contamination in any of the cores from WB-61. Bedrock was encountered at approximately 8 feet bml at WB-61.

A change in the protocol implemented on August 31, 2009 was that the Integral sampling team began collecting a sample for potential VOC analysis of every interval prior to core mixing. The rationale for this was that because PID readings are not taken until 10 minutes after sample collection, and meanwhile the core is being homogenized, if the PID reading is elevated, there would be no opportunity to then collect a VOC sample prior to mixing. Therefore, during subsequent sample collection, a VOC sample was collected prior to mixing, and if the PID reading was not elevated, the sample jar was discarded.

Integral had collected VOC samples in cores exhibiting sheen previously, however, these samples were held at the lab and not analyzed.

CDM discussed with Integral the representativeness of the portion of the 10-foot long vibracore sample that penetrated the dense sand located below softer sediment. Typically this softer sediment was about 6 feet thick so the vibracore penetrated 4 feet into the sand, however, the dense sand was unable to enter the shoe with thin flappers at the bottom of the tube. Eron Dodak, Integral sampling team lead, stated the sand was relatively homogeneous with 0-10% fines and did not contain any silt lenses. Thus, Eron Dodak stated the sand collapsed back into the void created by the vibracore tube and the 2-foot core samples subsequently obtained using the split spoon sampler in this zone were representative of native sediment.

September 1, 2009
Sampling began at boring WB-45 using the vibracore to successfully obtain the top 10 feet of sediment. The split spoon sampler was then used to collect 2-foot core samples. A light spotty sheen was noted in the 0-2-foot and 2-4-foot bml cores. Bedrock was encountered at approximately 14 feet bml at WB-45.

Sampling then commenced at boring WB-60 with the vibracore. The tube hit something hard at 1-2 feet bml and drilling stopped. The tube was pulled up and it was observed that the obstruction bent the tube and basalt was present in the tube. The barge was moved 4-5 feet to attempt to sample WB-60 again at a second location using the split spoon sampler. Cores were obtained from 0-2 feet and 2-3.7 feet bml, where basalt was encountered. CDM collected a split sample from the 2-3.7 foot bml core. Bedrock was encountered at approximately 8 feet bml at WB-60.

Following completion of WB-60, the drillers noticed a small crack in the hydraulic cylinder for the drill rig jaws. They estimated that 2 drops of hydraulic oil may have leaked onto the barge deck, but no oil was released to the moon pool or sediment sampling equipment. Integral deemed the leak to not be a reportable incident. The cracked part required replacement before drilling could resume.

September 2, 2009
Following successful repair of the small crack in the hydraulic cylinder for the drill rig jaws, sampling commenced at boring WB-44 using the vibracore sampler in the top 10 feet of sediment. Sheen was observed in the cores from 0-2, 2-4, and 4-6 feet bml. Integral collected a VOC sample from all 2 foot core sections in the upper 10 feet of sediment and CDM collected a VOC sample from the 2-4 foot core interval. WB-44 was the first boring that showed elevated PID readings (up to 10.3 ppm) and chemical odor. No field evidence of contamination was observed deeper than 10 feet. Bedrock was encountered at approximately 14 feet bml at WB-44.

September 3, 2009
Sampling commenced at boring WB-40 with the vibracore sampler to obtain the top 10 feet of sediment. Sheen was observed in the 0-2-foot and 2-4-foot bml core intervals and in the next deeper interval to about 4.5 feet. Integral collected a sample for VOCs from all 2-foot cores in the top 10 feet. CDM collected a VOC sample from the 0-2 foot and 4-6-foot bml cores. The 4-6-foot bml sample was discarded at the lab following instruction by CDM.

There was a chemical odor in all the 2-foot core samples to 10 feet bml, with PID readings up to 87.3 ppm. The split spoon sampler was then used to collect 2 foot cores. A chemical odor but no sheen was present in the 10-12-, 12-14-, and 14-16-foot bml cores. PID readings were elevated, up to 44.1 ppm. CDM collected a VOC sample from the 10-12-foot bml core. Bedrock was encountered at approximately 14.8 feet bml at WB-40.

CDM collected split samples as planned from the 2-4-, 4-6-, and 6-8-foot bml samples.

Sampling then commenced at boring WB-38 using the vibracore sampler. A light sheen was noted from 0-4.7 feet and a chemical odor from 0-9.3 feet. PID readings were elevated, up to 22.6 ppm. Bedrock was encountered at approximately 11.6 feet bml at WB-38.

September 4, 2009
Sampling commenced at boring WB-33 with the vibracore sampler. No sheen was observed in the 0-10-foot bml core, but there was a slight chemical odor in the 6-8-foot bml core, and a moderately strong chemical odor noted in the 8-10-foot bml core. PID readings were not elevated. The split spoon sampler was then used to collect core samples below 10 feet. A moderately strong chemical odor but no sheen was noted in the 10-12-, 12-14-, 14-16-, and 16-18-foot bml cores, the odor being less strong from 16-18 feet. PID readings were not elevated. Bedrock was encountered at approximately 19 feet bml at WB-33.

Sampling then began at boring WB-34 with the split spoon sampler, anticipating shallow depth to bedrock. No sheen but a chemical odor was noted in the 2-4-and 4-6-foot bml cores. PID readers were not elevated. Bedrock was encountered at approximately 6 feet bml at WB-34.

CDM collected split samples at WB-34 from all three planned intervals: 0-2, 2-4, and 4-6 feet bml.

In the afternoon, Erin Madden with Columbia Law P.C. observed sampling activities from Dock 2.

September 7, 2009
No work was conducted due to Labor Day holiday.

September 8, 2009
Sampling commenced at boring WB-47, located on the Arkema beach, using the split spoon sampler. A slight, indistinct odor was noted in the 16-18-, 18-20-, and 20-22-foot bml cores, but no sheen was evident and PID readings were not elevated. Poor recovery in several sample cores was attributed to the presence of debris (brick/glass) observed primarily in the upper 12 feet, preventing the flapper in the shoe of split spoon from closing which allowed the sandy sediment to fall out. Bedrock was encountered at approximately 23 feet bml at WB-47.

September 9, 2009
Sampling commenced at boring WB-52, located on the Arkema beach, using the split spoon. A light sheen was observed in the 2-4-, 6-8-, 8-10-, and 10-12-foot bml cores, and a weak chemical odor was noted in the 4-6-and 6-8-foot bml cores. PID readings were not elevated. Bedrock was encountered at approximately 18 feet bml at WB-52.

Sampling then commenced at boring WB-49, located in-water, using the vibracore sampler. During push of the vibracore tube, the cable that holds the plunger in place

snapped, so push was interrupted halfway through. The vibracore tube was removed, pressure washed/decontaminated for re-use as it was not damaged, and the cable repaired. The barge was then relocated a few feet to an undisturbed location and a second attempt was successful using the vibracore, followed by the split spoon for the samples greater than 10 feet bml. A light sheen was observed in the 0-2-, 2-4-, 4-6-, 6-8-, 8-10-, and 16-18-foot bml cores, along with a weak to moderate petroleum odor. In addition, very small, clear to light yellow globules of "oil" were noted in the 3-4-foot bml core interval. PID readings were not elevated. Bedrock was encountered at approximately 23.5 feet bml at WB-49.

CDM collected split samples from the 4-6-, 6-8-, 14-16- 20-22-, and 22-23.5-foot bml cores at WB-49.

<u>September 10, 2009</u>
Sampling commenced at boring WB-48 using the split spoon. An indistinct chemical odor was noted in the 2-4-, 4-6-, 6-8-, 8-10-foot bml cores, and a strong chemical odor was noted in the 10-12-foot bml core, with an elevated PID reading of 97.3 ppm. A weak chemical odor was also noted in the 12-14-foot bml core with a slightly elevated PID reading of 10.9 ppm. Bedrock was encountered at approximately 21.9 feet bml at WB-48.

Cam Wobus with Stratus Consulting was on board observing sampling from the support zone.

<u>September 11, 2009</u>
Sampling commenced at boring WB-58 using the split spoon sampler, as bedrock was expected to be shallow preventing the use the vibracore device. A weak chemical odor was noted in the 4-6-, 6-8-, 8-10-, 10-12-, 12-14-, and 14-15.2-, 16-18-, and 18-19.7-foot bml samples, but no sheen or elevated PID readings were observed.

A thick lens of gravel was present from 15.2-19.7 feet bml. Bedrock was encountered at approximately 19.5 feet bml at WB-58.

<u>September 14, 2009</u>
Sampling commenced at boring WB-57 using the vibracore tube for the upper 10 feet of sediment and the split spoon for the deeper cores. A weak to moderately strong chemical odor was noted in the 4-6-, 6-8-, 8-10-, 10-12-, 12-14-, and 14-16-foot bml cores, but no sheen or elevated PID readings were observed. Bedrock was encountered at approximately 27.6 feet bml at WB-57.

<u>September 15, 2009</u>
Sampling commenced at boring WB-56. Due to the proximity of the boring location to shore, the drill rig was driven off the barge onto the Arkema beach, then turned around and backed onto barge to sample through the secondary moon pool located nearer to the ramp end of the barge. The moon pool typically used is located near to the center of the barge. The vibracore sampler was used to attempt to collect the 0-10-foot bml core; however, recovery was low likely because of rocks and debris in the

surface sediment. The barge was repositioned a couple of feet from the original location and 2-foot cores were collected using the split spoon sampler. No field evidence of contamination was noted.

The drillers encountered a problem and samples were not collected beyond 24 feet bml at WB-56. Approximately 15 feet of steel casing was lost as the river stage fell due to tidal fluctuation. The front of the barge became grounded while the rear floated in the water. The drill casing became slightly bowed and the driller inadvertently unscrewed the steel casing at about 10 feet bml, leaving the lower 14 feet in the sediment. The driller attempted to jet the hole with water and reconnect the casing with no success. The sandy sediment in the upper 10 feet collapsed into the open hole and the driller was unable to grout the boring.

CDM collected split samples from WB-56 from the 10-11-, 14-16-, and 18-20-foot bml cores.

The plan for Wednesday September 16, 2009 was to move an estimated 10 feet from the WB-56 location and repeat sampling at WB-56 (as WB-56b). A field change request (FCR) was forthcoming since WB-56b was slightly greater that the 20 feet from the planned location (up to 20-foot move allowed under FCR-1). Sediment core collection would commence at WB-56b at the elevation equivalent of 24 feet below the mudline at WB-56. All samples from WB-56 were retained for analysis as the boring is located close to the planned location and the cores above 24 feet were not compromised. Sheen was observed on the Willamette River water surface near the barge. The Integral sampling team determined that the sheen was likely microbial, and not petroleum-related. EPA was notified and provided photos of the sheen. If the sheen persists, CDM planned to obtain a sample for evaluation to confirm a microbial origin.

<u>September 16, 2009</u>
Sampling was initiated at boring WB-56b, located approximately 10 feet from WB-56. The split spoon sampler was used, and the first core collected was from 20.7-22.7 feet bml, which is elevation equivalent to 24-26 feet bml at WB-56. No field evidence of contamination was noted in WB-56b, as with WB-56. Bedrock was encountered at approximately 47.5 feet bml at WB-56b.

<u>September 17, 2009</u>
The drillers attempted to drive the drill rig off the barge to sample at boring WB-59, however, it was determined that the beach sediments were too soft to support the rig. Sampling from the barge at WB-59 was infeasible, as the closest position the barge could reach from the downstream side of the salt dock was determined to be 92 feet from the proposed WB-59 location, and this would be only 39 feet from where WB-56 was drilled. The closest the barge could be positioned upstream of the salt dock was 156 feet from the proposed WB-59 location. At this point it was decided to move on to the proposed WB-30 location pending a decision on how to access WB-59.

CDM noted sheen on the river surface next to the barge, in approximately the same location (near WB-56) where sheen was observed on September 15, 2009. The sheen had a somewhat different appearance than on September 15, 2009, but was believed to again be of microbial origin. CDM took photos and collected a sample of the river water containing the sheen. The sample was shipped to CDM's Bellevue treatability laboratory for microscopic evaluation using a phase contrast microscope with 1000X magnification.

At 12:30 p.m. the barge was transported to Cathedral Park for miscellaneous tasks, including servicing the portable toilet, refueling the drill rig, and loading empty investigation-derived waste (IDW) drums onto the barge.

At 13:20 p.m. the barge was positioned at boring WB-30 to initiate sampling. A seep was noted on the Arkema beach, consisting of a brown liquid discharging out of the sand and running down to the river, creating a brown discoloration in the river approximately 200 feet long and 8 feet wide along the shoreline. There was no odor to the brown liquid, and it did not appear oily. A PID reading was taken at the seep and the result was 0.1 ppm, which is equivalent to background.

EPA and the DEQ were notified of the seep along the shore and follow-up information from EPA and ODEQ indicated the seep was previously sampled under ODEQ direction. The testing detected tannins/lignins which could explain the water color. Testing of upland groundwater chemistry has identified other parameters that could generate discolored water.

The vibracore sampler was used to collect the 0-10-foot bml core at WB-30, with deeper sampling to be continued the next day. No field evidence of contamination was observed in the cores obtained on September 17, 2009.

<u>September 18, 2009</u>
Sampling of boring WB-30 was completed using the split spoon sampler. No field evidence of contamination was observed. Bedrock was encountered at approximately 49.2 feet bml at WB-30.

Split samples were collected by CDM at 10-12, 26-28, and 40-42 feet bml.

Integral determined that due to the low river level as well as piling obstructions, it is not feasible to sample boring WB-59 as planned. The only feasible location for W-59 is near the upstream end of the salt dock, which is outside of the preliminary RAA boundary contained in the Arkema Statement of Work and therefore not ideal. Integral investigated the feasibility to rush the DDx analyses from WB-56, since analyses at WB-59 were contingent on the presence of DDx > 5 ppm at any interval at WB-56.

An evaluation by CDM's Bellevue lab of the September 17, 2009 river water sample containing sheen indicated no evidence of hydrocarbons in the sample based on microscopic observation. Hydrocarbons would have been indicated by spherical

droplets. There was evidence of algae and possibly diatoms and membranous matter possibly of decaying plant origin. Much of the brown sediment was not definitively identifiable but was consistent with non-hydrocarbon organic or inorganic solids.

September 21, 2009
Sampling was initiated at boring WB-31 using the vibracore sampler to collect the upper 10 feet of sediment, below which the split spoon was used. A slight chemical odor was noted in all samples to a depth of 12 feet bml and a light sheen was noted only in the 2-4-foot core. PID readings were not elevated. Per Field Change Request No. 4, a VOC sample was collected from the 2-4-foot bml core, as discussed in Section 4.2.1.

At 14:45 p.m., the drillers stopped work and informed Eron Dodak, Integral sampling team lead, that the drill casing was not lining up. The tide was going out and the drilling end of the barge had become beached while the tug end was still floating, causing the barge to tilt such that the casing was up against the side of the moon pool (as occurred at WB-56). Integral decided to abandon WB-31 as the drillers were unable to leave the casing in place overnight.

The barge would be moved a few feet into the water from WB-31 and a new borehole, WB-31b, was planned. Core collection at WB-31b was planned at an equivalent elevation below mudline to where WB-31 was terminated.

September 22, 2009
Drilling was initiated at boring WB-31b at a location approximately 10 feet from WB-31. Sampling began with the 24.7-26.7-foot bml core, equivalent to 30 feet bml at WB-31 where drilling was terminated on September 21, 2009. All sample cores were collected using the split spoon sampler. There was no field evidence of contamination observed. Bedrock was encountered at approximately 44.8 feet bml at WB-31b.

Sampling was then initiated at boring WB-32 using the vibracore sampler. Due to woody debris at the boring location, sample recovery using the vibracore was low so the split spoon was used for all core intervals. A slight to moderately strong chemical odor was noted in the 4-6-, 6-8-, 8-10-, and 10-12-foot bml cores, but no sheen or elevated PID readings were observed. Drilling was halted at 20 feet bml and the casing was left in the borehole overnight with a plan to resume drilling the next day.

September 23, 2009
Sampling was continued at boring WB-32 using the split spoon. No field evidence of contamination was observed in the samples collected.

A thick lens of gravel was present from 36-45 feet. Bedrock was encountered at approximately 45 feet bml at WB-32.

Sampling was then conducted at boring WB-46 using a split spoon sampler for all cores. WB-46 was located on the Arkema beach approximately 55 feet from the planned sampling location, as detailed in Field Change Request No. 6 (Appendix D).

A slight petroleum odor was noted in the 2-4-foot bml core. No other field evidence of contamination was observed. Bedrock was encountered at approximately 25 feet bml at WB-46.

September 24, 2009
Sampling was conducted at boring WB-43 using the split spoon. This boring is the most downstream of the waste characterization borings. A week chemical odor was noted in the 6-8-, 8-10-, 10-12-, 14-16-, and 16-18-foot bml cores and a strong petroleum odor was noted in the 12-14 foot bml core along with a light to moderate sheen. Elevated PID readings were noted in the 14-16-foot (15.9 ppm) and 16-18-foot bml (21.6 ppm) cores.

For the composite samples, an equal amount of sediment was collected from each 2-foot sample interval. Samples were held in a cooler on ice until all intervals going into the composite were collected, then sediment from each jar from each interval was placed into a mixing bowl and homogenized. Thus, the shallow composite sample (0-8 feet) is a composite of the 0-2-, 2-4- 4-6-, and 6-8-foot bml cores, while the deeper composite sample (8-18 feet) is a composite of the 8-10-, 10-12-, 12-14-, 14-16-, and 16-18-foot bml cores.

For the VOC composite samples, VOC samples were collected prior to mixing at each 2-foot interval. Two samples were collected for VOCs at each 2-foot interval. One sample was archived at the lab and the other was used for the VOC composite sample. The VOC composite sample was collected by adding an equal amount of sediment from each discrete VOC sample to combine into one composite VOC sample. The VOC composite was not mixed, but rather just an equal amount from each interval was placed into a jar with no headspace. Bedrock was encountered at approximately 19 feet bml at WB-43.

September 25, 2009
Sampling was commenced at boring WB-42, located on the Arkema beach. The drillers had cleared the large rocks and debris from the borehole location, but many small rocks remained on the surface. A split spoon sampler was used to collect all cores. Sampling was initiated using a straight shoe instead of the flapper shoe, due to the rocks, and it was decided to push four feet for the first core (0-4 feet bml) in order to improve sample recovery. Since recovery of the first attempt was poor, Eron Dodak, Integral sampling team lead, instructed the drillers to move over approximately 1 foot and try again, this time using the flapper shoe. The second attempt had even lower recovery.

Integral then decided to use a straight bit and 4-foot push, and if recovery was low again the material would be combined with another push approximately 1 foot away. The third attempt had fair recovery from 0-4 feet bml, and then fair recovery from 4-6 feet bml. (This borehole will be referred to as successful borehole 1). Integral needed a second borehole to obtain enough material for the 0-6-foot bml composite core. The next attempt at 0-4 feet bml was unsuccessful with very low recovery. A subsequent attempt was successful with fair recovery of both the 0-4-foot and 4-6-foot bml cores.

(This borehole will be referred to as successful borehole 2). Enough sample was obtained from combining material from successful boreholes 1 and 2 at the appropriate 2-foot intervals: 0-2, 2-4, and 4-6 feet for the 0-6-foot bml composite samples. Deeper cores were then collected from successful borehole 2 only. A second composite was collected from 6-14 feet bml (in addition to discrete 2-foot intervals at 6-8, 8-10, 10-12, and 12-14 feet). Starting at 14 feet, deeper cores were collected in 3 foot core intervals.

A chemical odor and light spotty sheen were noted in most core samples to a depth of 14 feet. The highest PID reading (240.3 ppm) was obtained from the 8-10-foot bml core. Although it was anticipated that chlorobenzene DNAPL would be observed at WB-42, there was no indication of DNAPL in the samples. Bedrock was encountered at approximately 26 feet bml at WB-42.

For the two composite cores (0-6 feet and 6-14 feet bml), the same sampling method was used by Integral as described above.

CDM collected split samples at WB-42 from the 0-6-foot bml composite, the 6-14-foot bml composite, and the 20-23- and 23-26-foot bml discretes.

<u>September 28, 2009</u>
Sampling was conducted at boring WB-41 using the split spoon sampler. A slight to moderately strong chemical odor was observed in the 4-6-, 6-8-, 8-10-, 10-12-, 12-14-, 14-17-, 17-20-, and 20-22.8-foot bml core intervals, and a light sheen was observed in the 12-14- and 14-17-foot core intervals. The highest PID reading (51.3 ppm) was detected in the 14-17-foot core. Bedrock was encountered at approximately 22.8 feet bml at WB-41.

For the two composite cores (0-6 feet and 6-14 feet bml), the same sampling method was used by Integral as described on September 24, 2009.

Sampling was then commenced at WB-39. The barge operator was able to position the barge to only within 25 feet of the planned WB-39 location, as the location is very close to shore and there are numerous large rocks, pilings, and debris on the surface there. The placement of WB-39 25 feet toward the river from the FSP coordinates was approved by EPA in Field Change Request No. 9 (Appendix D).

The split spoon sampler was used for all cores. A light spotty sheen was observed in the 2-4-foot core and a slight chemical odor was noted in the 2-4-, 4-6-, and 6-8 foot cores. Drilling of boring WB-39 was completed on September 29, 2009.
No oversight was conducted by CDM on September 29, 2009. The following information was obtained from Eron Dodak, Integral sampling team lead.

Sampling was continued at boring WB-39 using a split spoon sampler beginning with the 8-10-foot core sample. A chemical odor was noted in the 8-10-, 10-12-, 12-14-, 16-18-, 18-21-, and 21-24-foot bml cores, with a slight petroleum odor noted in the 14-16-foot sample. PID readings were elevated, with the highest PID reading (842.4 ppm)

taken of the 10-12-foot bml core. Bedrock was encountered at approximately 25.7 feet bml at WB-39.

Composite samples were collected as described on September 24, 2009 from the 0-8- and 8-18-foot bml cores.

Sampling was then conducted at boring WB-37 using the split spoon. A chemical odor was noted in all core intervals from 2-4 feet to 20-23 feet bml. PID readings were elevated up to 155.6 ppm (in the 10-12-foot bml core). Bedrock was encountered at approximately 22.9 feet bml at WB-37.

Composite samples were collected as described on September 24, 2009 from the 0-6- and 6-14-foot bml cores.

September 30, 2009
Sampling was conducted at boring WB-35 using the split spoon sampler. A weak to moderately strong chemical odor was noted in the 2-4-, 4-6-, 6-8-, and 14-16-foot bml cores. A light sheen was noted in the 4-6-, 10-12-, 14-16-, and 16-18-foot bml cores, and a heavier sheen with oil globules was observed in the 8-10- 12-14-, and 18-20-foot bml cores along with a moderate to strong petroleum odor. Bedrock was encountered at approximately 36.1 feet bml at WB-35.

Composite samples were collected as described on September 24, 2009 above from 0-10- and 10-20-foot bml cores.

CDM collected split samples from the 0-10-foot and 10-20-foot bml composites and the 20-23-, 23-26-, and 32-32-foot bml discrete cores.

October 1, 2009
Sampling was conducted at boring WB-36 using the split spoon. The placement of WB-36 approximately 25 feet toward the river from the planned coordinates due to shallow water conditions was approved by EPA in Field Change Request No. 10. A chemical odor was observed in all cores and a light sheen was noted in the 2-4-, 4-6-, 8-10-, 14-16-, 16-18-, and 28-31-foot bml cores. The highest PID reading was 675 ppm in the 16-18 foot bml core. Bedrock was encountered at approximately 41.9 feet bml at WB-36.

Composite samples were collected as described on September 24, 2009 from 0-10 and 10-22-foot bml cores.

The environmental chemistry sampling was concluded with the completion of boring WB-36. The barge would be moved to Cathedral Park to off-load items from the barge (drill rig, drums, etc.) on October 2, 2009. The geotechnical program described in the FSP was scheduled to begin on October 12, 2009.

Table 4 identifies the boring locations where photographs of the core samples were obtained.

3.1.2 Geotechnical Investigation

The following field teams were on site during the reported periods:

ARCADIS, Geotechnical Investigation Team: October 12-22, 2009
Van Dehey, CPT subcontractor: October 12-16, 2009
In Situ Engineering, CPT subcontractor: October 20, 2009
CDM, Field Oversight: October 12, 13, 17, and 20, 2009
Boart Longyear, Driller: October 12-22, 2009
Diversified Marine, Barge Operator: October 12-22, 2009

October 12, 2009

CDM personnel attended the health and safety meeting on the barge at Cathedral Park. The meeting was led by Jesse Starr, ARCADIS field team leader. Health and safety issues discussed were similar to those noted during the environmental chemistry investigation: slips, trips and falls, working around heavy equipment and drill rig, working on water, etc. In addition, the river water presented a biological (bacterial) hazard when it rains. Eron Dodak (Integral) also participated in the health and safety meeting and described the lessons learned from the environmental chemistry investigation. He discussed safety issues such as beach access from the upland portion of the site, and concerns about safety of loading heavy equipment onto the skiff. The same access point was to be used for the geotechnical investigation and the barge would be beached for easy on- and off- loading.

A mud-rotary drill rig positioned on the barge was used to complete the SPT geotechnical investigation boreholes. The SPT boreholes were drilled through the moon pool on the barge. The same mud-rotary rig was used to push the CPT through the moon pool. CPTs were to be performed continuously to bedrock or refusal. CDM discussed the planned method of CPT drilling with the lead driller and Van Dehey, the CPT subcontractor. A 5-inch diameter casing was first advanced approximately 4-5 feet into the sediment to provide lateral stabilization. Then a 2-inch diameter casing was installed within the 5-inch casing, but not advanced below the sediment surface. The cone penetrometer was then inserted inside the 2-inch casing to push through the sediment and collect the geotechnical data.

The barge was moved to a location planned for cone penetrometer testing (CPT-9). ARCADIS began using the GPS unit to obtain coordinates and ensure the barge moon pool was positioned at the right location. At 15:30 p.m. it was determined that the GPS unit was not operational and work would be stopped for the day. ARCADIS planned to obtain the GPS unit used by Integral during the environmental chemistry sampling.

Field Change Request No. 11 was prepared for the re-location of geotechnical investigation borings closer to existing borings of interest (from the 2003 investigation).

Additional observations by CDM's health and safety lead are provided in Section 3.2.

October 13, 2009
CDM performed health and safety oversight on Tuesday October 13, 2009. Observations are provided in Section 3.2. ARCADIS completed CPT investigations at CPT-7 and CPT-11. The approximate depth to bedrock at CPT-7 and CPT-11 is 9.5 feet and 7.9 feet bml, respectively.

October 14-15, 2009
CDM did not perform oversight on these dates. According to ARCADIS, CPT investigations were completed at the following locations with the noted approximate depth to bedrock (feet bml): CPT-6 (22.5 feet), CPT-8 (24 feet), CPT-9 (36.5 feet), and CPT-10 (30 feet) on October 14, 2009 and CPT-2 (10.5 feet), CPT-5 (6.5 feet), CPT-12 (14.3 feet), and CPT-13 (22.1 feet) on October 15, 2009.

October 16, 2009
CDM did not perform oversight on this date. According to ARCADIS, no CPT investigations were conducted as the CPT equipment malfunctioned due to excess moisture. ARCADIS was to replace the CPT subcontractor they were using with a new subcontractor to complete the three remaining CPT locations on October 20, 2009.

SPT (mud rotary) was completed at SPT-3. ARCADIS reported no difficulties completing the SP-3 boring as planned. Bedrock was encountered at approximately 26.9 feet bml at SPT-3.

October 17, 2009
CDM was on site to perform oversight. The drillers constructed a new larger decontamination station with more space to decontaminate the mud rotary casings and drill rods, etc. Drilling equipment used on October 16, 2009 to complete mud-rotary boring SPT-3 was decontaminated and SPT drilling began at SPT-1. Casing was first installed to 13 feet bml where it reached sediment competent enough to hold the casing in place. During casing installation, the top 4 feet of sediment was lost due to the casing dragging the soft sediment down. The top 4 feet was logged by ARCADIS as "void."

A 2-inch diameter, 1.5 feet long split spoon SPT sampler was then used to collect continuous cores for geologic logging. Recovery was typically very low (6 inches or ~30%) in soft sediment. In sandy sediment SPT recovery was much higher. Recovery of SPT samples was logged visually using shading on the boring log instead of quantitatively estimating the recovery as with the environmental sampling. PID readings were taken of each 1.5-foot SPT sample. One elevated PID reading (76.9

ppm) was recorded in the 17-18.5-foot bml core at SPT-1. All other PID readings were less than 10 ppm.

After each SPT core was collected, drillers flushed the casing with drilling mud (a bentonite mixture) and the split spoon was decontaminated using Alconox and water rinsing prior to collection of next core. Sediment samples were collected in plastic jars for future analysis of physical parameters per the Integral FSP.

A Shelby tube was driven at 13 feet bml to collect an undisturbed sample from 13-15 feet at SPT-1. The tube was inserted onto the end of a piston sampler that uses water pressure to push through the sediment. Once the sample was collected and Shelby tube was pulled up, the tube was capped on the bottom end by the drillers. The tube was then handed to ARCADIS crew, who inserted a plunger cap into the tube and pushed it down to seal the sediment in the tube, and capped the top end. The Shelby tube was then wrapped in bubble wrap and kept upright and secure to keep from disturbing the sample. A second Shelby tube was then used to collect an undisturbed sample from 15-17 feet bml. The drillers then advanced casing to 17 feet bml and the split spoon was used in order to visually observe the sample at this depth. Since sediment from 17-18.5 feet bml in the split spoon was determined to be cohesive, silty sediment, a third Shelby tube sample was then collected from 18.5-20.5 feet bml. Then the split spoon was used to collect the remaining samples to refusal. Blow counts were taken since sediment was firmer below 20 feet.

Basalt was encountered at approximately 22 feet bml at SPT-1. The driller then installed a diamond coring drill bit to begin rock coring. Rock coring was conducted in 5-foot intervals for a total of 20 feet (to 42 feet bml). Water was used to lubricate the diamond bit to enable it to cut through the rock. The water was first pumped out of the hole into IDW drums. Once fines were mostly gone, the water was recirculated within the borehole while rock coring was being conducted. CDM observed the top 5 feet of rock sample being collected and processed. ARCADIS completed rock coring and grouted up the SPT-1 borehole.

<u>October 18, 2009</u>
No oversight was performed by CDM on Sunday October 18, 2009. Information obtained from ARCADIS indicated that the last of three mud-rotary borings (SPT-2) was completed and two Shelby tube samples were collected in that boring. ARCADIS reported no difficulties completing the SPT-2 boring as planned. Basalt was encountered at approximately 39 feet bml at SPT-2.

<u>October 20, 2009</u>
CDM was on site October 20, 2009, to perform oversight. A replacement CPT subcontractor, In Situ Engineering, completed CPT-9R, which was a repeat of the CPT-9 boring completed on October 14, 2009, to compare results of the testing conducted by the two different CPT subcontractors. The distance between CPT-9 and CPT-9R was estimated by ARCADIS at 3.5 feet.

Sampling was completed at CPT-1, CPT-4, and CPT-3 (in that order). The CPT testing proceeded as planned, Each CPT test took less than one half-hour to complete. The basic procedure was as follows: the drillers installed a pilot casing to stiff material (usually 4-6 feet bml) and the CPT was assembled using the amount of rods needed to set the cone at the top of mudline. The CPT assembly consisted of cone penetrometer and drill rods with cord threaded through each running from the cone penetrometer to the computer on the barge deck. A second "depth counter" instrument was attached to the drill rig and a cord fed the depth information to the computer as the cone penetrometer was pushed into the sediment. As it was pushed through the sediment the cone penetrometer collected real-time data on the physical parameters of the sediment. The CPT engineer watched the computer screen to determine when refusal was reached, which was easily observed: the tons per square feet value increased quickly as the force needed to push the cone penetrometer increased when it encountered bedrock. The CPT engineer then stopped the sampling and saved the data on the computer. The drillers pulled up the CPT equipment and pilot casing and decontaminated them using a low pressure wash and Alconox scrub. The barge was then moved to the next location and the procedure was repeated.

With the completion of the CPT testing, the geotechnical investigation was complete. ARCADIS demobilized and off-loaded equipment and materials from the barge on October 23, 2009.

3.2 Health and Safety Program

Oversight of health and safety during implementation of the EE/CA field sampling was carried out by a CDM industrial hygienist during the initial week of both the environmental chemistry sampling and the geotechnical investigation. Additional health and safety observations were made by CDM field staff conducting oversight throughout both phases of the field work. This section provides a summary of health and safety observations.

Based on CDM health and safety lead's comprehensive health and safety assessment conducted on August 18 and 19, 2009, the first two days of environmental chemistry sampling, field operations during environmental chemistry sampling were determined to be in compliance with the requirements as defined in the HASP (see Appendix C).

A subsequent health and safety assessment was performed by the CDM health and safety lead on October 12 and 13, 2009, the first two days of the geotechnical investigation. Based on this assessment, the geotechnical investigation operations were determined to be in compliance with the requirements as defined in the HASP (see Appendix C).

3.2.1 Health and Safety Meetings

A health and safety meeting was held at the Site on August 17, 2009, prior to the start of environmental chemistry sampling. The Integral team lead, Eron Dodak, led the meeting attended by field staff from CDM, Boart Longyear, Diversified Marine, and

the EPA RPM. During the meeting, the policies and procedures set forth in the Integral HASP were reviewed. Upon completion of mobilization and set-up activities, a drill rig safety meeting was held where safe walking zones were established, kill switches were identified, and material handling issues were discussed.

In addition, Eron Dodak led health and safety briefings each morning during the environmental chemistry sampling to reiterate health and safety concerns and provide any new information.

On October 12, 2009, prior to the start of the geotechnical investigation, the ARCADIS team lead, Jesse Starr, led a health and safety meeting to review the health and safety procedures in the Arkema Work Plan. At the meeting, Eron Dodak also discussed lessons learned during the environmental chemistry sampling. The lead driller provided a brief safety discussion regarding the particular hazards of the drill rig, expected areas of operation, kill switches, fuel storage, and location of spill kits. ARCADIS and Boart Longyear were observed to perform a safety inspection of the barge, drill rig, and associated equipment prior to start of operations. First aid kit and automated external defibrillator were also noted in tote under table near spill kit. Daily health and safety briefings were also held each morning during the geotechnical investigation.

3.2.2 Use of Personal Protective Equipment (PPE)

In accordance with the Integral HASP, proper PPE for both the environmental chemistry sampling and geotechnical investigation was modified Level D, requiring Tyvek (or rain gear made of heavy material with long sleeves and long pants), hard hat, safety glasses, nitrile gloves and heavy work gloves (when handling heavy drilling equipment), steel-toed boots, and hearing protection when needed. In addition, a personal floatation device (PFD) was required to be worn at all times over water.

On August 19, 2009, the second day of environmental chemistry sampling, CDM health and safety lead observed that there was inadequate containment during decontamination of sampling equipment. The drillers were using a pressure washer for decontamination and were being exposed to the overspray on their face and neck. In addition, decontamination fluid was not properly contained within the constructed tarped area. CDM informed Integral and the equipment decontamination operation was temporarily halted. CDM recommended that an additional containment area be constructed to contain the overspray caused by the pressure washer. In addition, CDM recommended that personnel wear a face splash shield when using the pressure washer to ensure they are adequately protected. The recommendations were agreed upon by Integral and the drill team. The lead drilling personnel immediately departed the work area in order to purchase additional face splash protection and materials to construct an enhanced containment area. CDM's recommendations were fully implemented.

On a few occasions during the environmental chemistry sampling, drillers were observed not wearing nitrile gloves when handling drill rig controls or making repairs to the rig. CDM instructed Eron Dodak, Integral sampling team lead, to reiterate to all personnel the need to wear proper PPE at all times. In addition, during the initial week of sampling, one of the drillers was observed wearing his PFD on the inside of his Tyvek. As the driller was utilizing a foam PFD, this was deemed acceptable, however, those wearing inflatable PFDs were required to wear them on top of their Tyvek at all times.

Used PPE was properly disposed of within the exclusion zone as IDW. Leather gloves used throughout the field work were also disposed of at the end of the investigation or earlier if excessively soiled.

3.2.3 Slip, Trip, and Fall Hazards

During the first week of environmental chemistry sampling, the CDM health and safety lead identified a trip hazard due to the location of the generator and the soil mixing machine. This was immediately communicated to all personnel and the area was demarcated with caution tape.

Also during the initial week of environmental chemistry sampling, CDM stated concerns about the hazards associated with accessing the beach from the steep riverbank containing rough terrain such as loose and slippery rocks and debris. This was a serious hazard, especially when field personnel were transporting sampling materials and heavy equipment down the steep slope of the riverbank and along the sandy beach. A bobcat was utilized to transport some of the heavy equipment on the beach area. Use of the small skiff boat to transport personnel and equipment to the barge also presented hazards in that it required lifting heavy equipment into the boat while standing on an unstable surface in shallow water.

A stairway at Dock 2 for access to the beach from the upland portion of the site was chosen on September 1, 2009, that provided the least steep descent. This reduced the tripping hazard associated with use of the other access points and was closer to the area where the barge was able to be beached for loading and off-loading equipment.

On September 11, 2009, a new policy was instituted for access to the barge. Instead of using the skiff to transport equipment, a shallow area on the beach between Dock 1 and 2 where the barge could be “beached” close to shore was used each day to eliminate the use of the skiff and enable personnel to carry heavy equipment onto the barge directly. It was decided that the barge operator would lower only one spud to moor the barge and Eron Dodak, Integral sampling team lead, would ensure the location where the spud is lowered is not near a planned sediment boring (primarily WB-39 or WB-42). The skiff was still used to carry individual personnel to and from the barge from shore as needed during the day.

3.2.4 Weather Hazards

During the initial weeks of the environmental chemistry sampling, there was a health and safety concern due to high temperatures (90-100+°F). CDM requested that Eron Dodak, Integral sampling team lead, emphasize the need to take frequent breaks and stay hydrated to avoid heat stress or stroke. On August 20, 2009, a second shade tent was erected to provide additional shade due to hot, sunny weather.

On August 24, 2009, Integral made a decision to switch from Tyvek to aprons to increase comfort level working in heat. The aprons covered only the front and not the arms of field personnel. EPA subsequently instructed on August 25, 2009, that all personnel return to wearing Tyvek to ensure there would be no exposure to contaminants.

An additional hazard identified during the start of the geotechnical investigation in mid-October 2009 was related to the inclement weather that was expected, including strong winds and rain. Lightning was also discussed, and it was determined that if any lightning was observed, work was to be temporarily stopped until conditions improved. Due to the arrangement of the drill rig and barge spud , the potential for lightning strikes was strongly considered.

On October 13, 2009, two tent structures were placed on the barge in order to provide some relief from the weather during the course of the day. Due to strong wind, concern was expressed over the stability of the anchoring system used for the tent structures. The situation was discussed with ARCADIS personnel who used additional strapping and cement blocks to adequately secure the tent structures.

Section 4
Deviations

4.1 Summary of Field Change Requests

Pursuant to the Integral FSP, significant field changes were required due to conditions encountered at the Site during field activities. These changes were documented in FCR forms. Issues that arose during the EE/CA fieldwork were discussed in the field/over the phone between Integral or ARCADIS, and those items that were deemed significant were documented in an FCR for EPA's review and approval. Specific EPA-approved FCRs are provided in Appendix D.

In summary, ten FCRs were required during the environmental chemistry sampling and one FCR during the geotechnical investigation. The conditions that warranted FCRs were different and determined site-specifically. Two of the FCRs (one from Integral and one from ARCADIS) resulted in allowing a blanket modification to exploration locations (20 feet for environmental and 50 feet for geotechnical) without formally notifying EPA. Six of the FCRs involved relocation of environmental borings beyond the 20-foot blanket radius. One FCR involved adding a sediment sampling tool, one FCR involved guidance regarding whether it would be required to collect a VOC sample, and one FCR deleted boring WB-59 from the field program.

4.2 Deviations in Sampling Approach/Technique

This section describes deviations in sediment sampling approach and/or technique by the Integral sampling team and CDM from the Integral FSP and CDM SAP, respectively.

4.2.1 Environmental Chemistry Sampling by Integral

The only major deviation from the Integral FSP was related to the collection and analysis of VOC samples in locations where there was field evidence of contamination. In accordance with the FSP, the Integral sampling team collected a sample for VOC analysis only when there was field evidence of contamination (e.g., a sheen, odor and/or elevated PID reading). However, no analysis was scheduled for VOCs pursuant to the Integral FSP outside of the waste characterization composite cores. The archive sample from each 2-3-foot sediment core was deep frozen at -20 °C pursuant to the Integral FSP and are available for analysis of the expanded analyte list (SVOCs, PCBs, and Dioxins/Furans) for a period of one year from the date of collection. VOCs are also included on the expanded analyte list, however, due to the limited VOC holding time before analysis (2 weeks), the collection and analysis of VOCs occurred between EPA and LSS during the EE/CA fieldwork. In addition to the EPA-scheduled VOC analyses, the following cores were analyzed for VOCs:

WB-64, 10-12-foot bml core, analyzed by EPA for VOCs due to the presence of a light sheen

WB-44, 2-4-foot bml core, analyzed by EPA for VOCs due to the presence of a sheen and chemical odor

At WB-40, 0-2-foot bml core, analyzed by EPA for VOCs due to the presence of 87.3 ppm on the PID, noticeable sheen, and chemical odor

WB-38, 2-4-foot bml core, analyzed by LSS for VOCs due to the presence of 22.6 ppm on the PID, chemical odor, light spotty sheen
WB-33, 12-14-foot bml core, analyzed by LSS for VOCs due to the presence of 10.3 ppm on the PID and a chemical odor

WB-48, 10-12-foot core, analyzed by LSS for VOCs due to the presence of 97.3 ppm on the PID and a chemical odor

On August 31, 2009, Integral began collecting a sample for potential VOC analysis of every interval prior to core mixing. The VOC sample was retained until the PID reading was taken. If the PID reading was elevated, the VOC sample was submitted to the lab to be held at 4°C until further instruction. If the PID reading was not elevated above 10 ppm, the VOC sample was discarded in an IDW drum. Thus, if the sample exhibited a sheen, but the PID reading was not elevated, the VOC sample was discarded. The rationale for this presented by Integral was that the sheen was thought to be unrelated to a COI at the Arkema site.

On September 1, 2009, CDM requested, and Integral agreed, that from that point forward VOC samples would be submitted to be held at the lab if a sheen was noted, so that it would be possible to analyze the sample for VOCs, if needed (within the 2-week holding time). CDM would also collect VOC samples from cores exhibiting sheen to preserve the ability to obtain VOC data from these areas. This change in sampling approach was documented and approved in FCR-4 (Appendix D).

4.2.2 Split Sampling by CDM

Deviations from the CDM SAP occurred mainly due to low sample volume available following collection of sediment samples by Integral. In addition, CDM collected additional VOC samples from sediment cores that exhibited field evidence of contamination, including sheen, odor and/or elevated PID readings.

For the most part, field QA samples were collected in accordance with the CDM SAP. As planned, one MS/MSD sample was collected for organochlorine pesticide analysis, and one MS/MSD sample was collected for the full suite of COIs (excluding dioxins/furans and asbestos). However, due to low sample volume, the latter was not analyzed for VOCs or tributyltin.

Other deviations from the CDM SAP are as follows:

At WB-65, split sampling was planned from 4-6-, 6-8-, and 8-10-foot bml cores; the 4-6-foot sample could not be obtained due to poor recovery.

At WB-63, due to poor sample recovery, split sampling from the 8-10-foot bml core was not possible. A split sample was obtained from the next core interval (10-12-foot bml interval).

At WB-64, CDM collected a supplemental split sample for VOC analysis of the 10-12-foot bml core due to the presence of a light sheen.

At WB-51, CDM was unable to collect a split sample from the 8-10-foot bml core as planned due to poor recovery. Split samples were collected at 10-12-foot bml core interval instead.

At WB-60, CDM planned to obtain split samples from the 4-6- and 8-10-foot bml cores, which was not possible due to the presence of shallow basalt bedrock.

At WB-44, CDM collected a supplemental split sample for VOC analysis of the 2-4-foot bml core due to the presence of a sheen and chemical odor.

At WB-40, CDM collected additional samples for VOC analysis due to field evidence of contamination. VOC samples were collected from the 0-2-, 4-6-, and 10-12-foot bml cores. The 0-2-foot bml core exhibited 87.3 ppm on the PID, noticeable sheen, and chemical odor. The 4-6-foot bml core sample was scheduled for VOC analysis but was discarded at the lab in favor of analyzing the 10-12-foot bml core as this core exhibited more field evidence of contamination (44.1 ppm on the PID and chemical odor) than the 4-6-foot core which exhibited 21.4 ppm on the PID and minor sheen (from 4-4.5 feet) and chemical odor.

At WB-49, five discrete split samples were collected instead of the planned three. CDM collected an unplanned VOC sample from the 4-6-foot bml core due to the presence of oil globules. In addition, split samples were collected at 20-22-foot bml core for the full suite of analysis since there was not enough sample volume for the full suite (except VOCs) from the 22-23.5-foot bml core (where bedrock was encountered). Thus, the deepest sample was from 22-23.5-foot bml core instead of the planned 22-24-foot bml core because of shallow bedrock. Due to low sample volume available from 22-23.5-foot bml core, only a VOC sample was obtained there.

At WB-56, CDM collected a split sample from the 10-11-foot bml core instead of the planned 10-12-foot bml core because the driller was unable to collect a sediment core from the 11-12-foot bml interval.

At WB-30, due to poor recoveries at the planned split sample locations and the thicker than expected sediment, the split sample depths were shifted downward by 2 feet. Also, the Integral sampling team collected 3-foot cores instead of 2-foot cores (2-foot cores were inadvertently listed in the CDM SAP). As a result, split samples were collected from the following depths: 10-12 feet bml (instead of 8-10 feet), 26-28 feet bml (instead of 22-24 feet), and 40-42 feet bml (instead of 38-40 feet).

At WB-42, CDM collected split samples at 20-23 feet bml (instead of 24-26 feet) and 23-26 feet bml (instead of 30-32 feet), as 3-foot cores were collected by Integral instead of 2-foot cores. Also, only two discrete splits were collected instead of three as planned, because bedrock was encountered at a more shallow depth than anticipated.

At WB-35, CDM collected split samples at 20-23 feet bml (instead of 28-30 feet), 23-26 feet (instead of 34-36 feet), and 32-35 feet (instead of 38-40 feet), as Integral collected 3-foot cores, not 2-foot cores. Also, since sediment was thicker than anticipated, the split sampling depths were adjusted downward. No archive sample was collected at the 20-23-foot or 23-26-foot bml depths, as there was not enough sample volume available.

Section 5
Split Sampling Data Summary

Validated split sampling analytical data are presented in Appendix E. A data usability report is presented in Appendix F and tabulated split sample analytical data are presented in Appendix G.

Section 6
References

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_____. 2009b. Arkema Early Action EE/CA Work Plan Addendum Appendix C Health and Safety Plan. Prepared for Legacy Site Services LLC. May 15, 2009.

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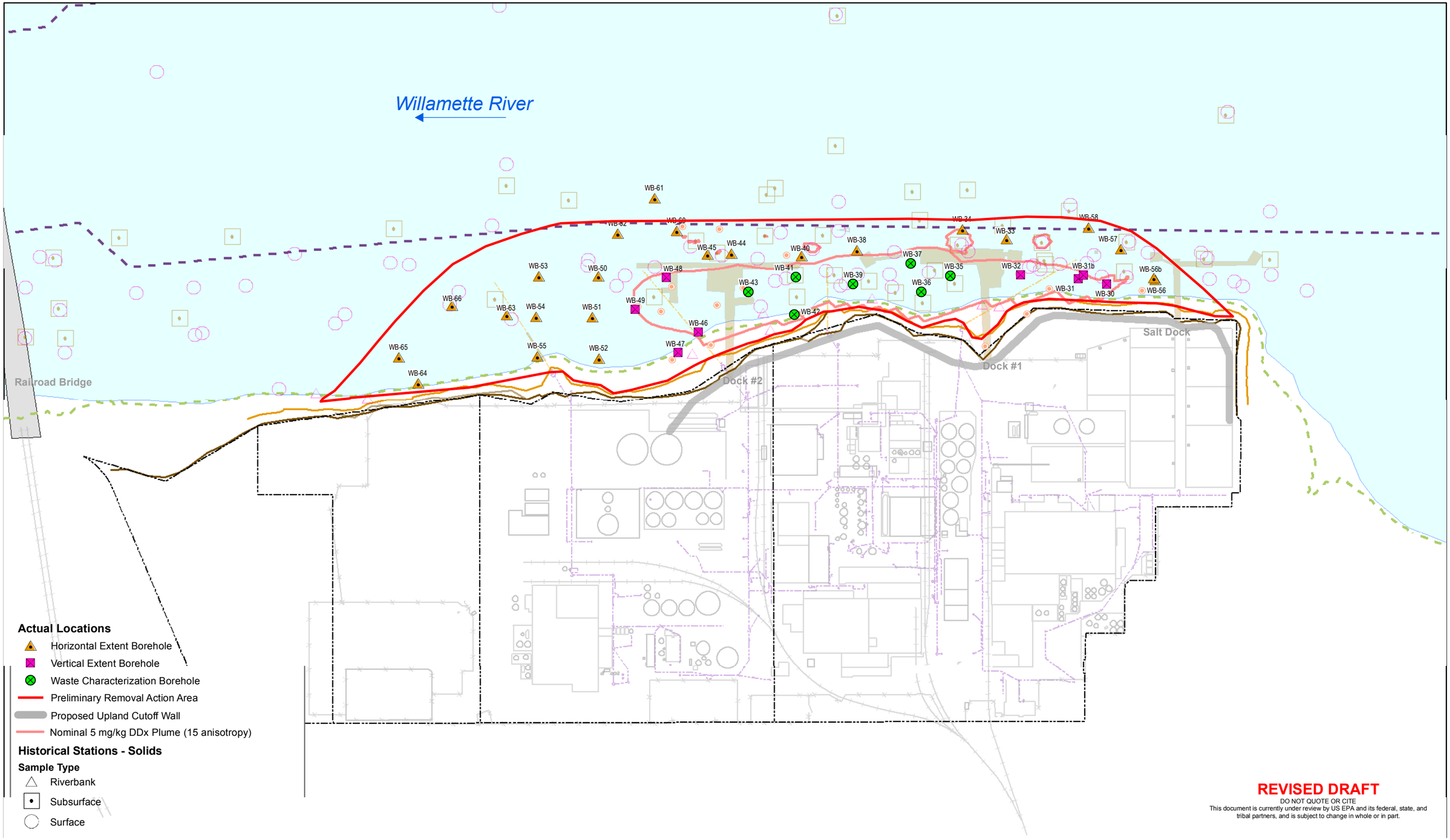
Figures



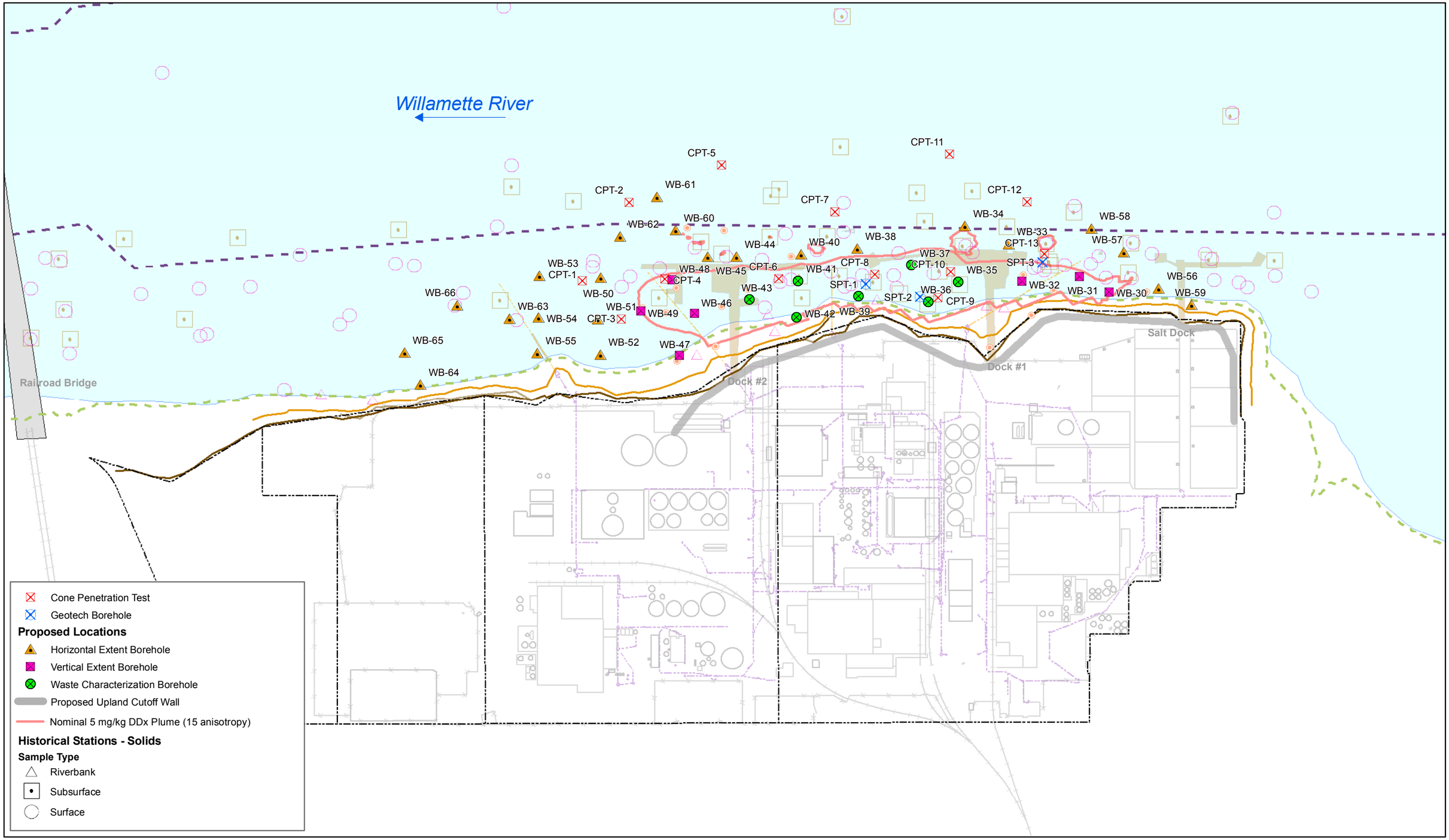
integral consulting

0 100 200 400 Feet

FEATURE SOURCES:
Bathymetric Information: Multibeam bathymetric survey conducted by David Evans and Associates, Inc. from February 6 - March 6, 2004.
Contours were derived from a Digital Terrain Model (DTM) based on a three-foot grid of multibeam data.
Vertical Datum: North American Vertical Datum of 1988(NAVD88).
Horizontal Datum: North American Datum of 1983 - 91 adjusted (NAD83/91), State Plane Coordinate System (SPCS), Oregon North Zone.
Units: International Feet.
Basemap: Basemap features updated in 2006 by David Evans and Associates. Ordinary high water line, top of bank, and other site features surveyed in April 2006.
Most buildings and structures on the Arkema site have been demolished or removed.
OHW and Top of Slope lines were created from the April 2006 DEA survey, the +12ft contour line was derived from the combined lidar/bathymetry grid.
Lot Lines: Created by importing pdf file from ERM, georeferencing to CAD lines (RMS error = 2.3042) and heads-up digitizing the lot lines.

- E-Sewer-L
- Storm Drain
- 12ft Contour
- Bridges
- Navigation Channel
- River
- Property and Lot Boundaries
- Docks and Structures 2005
- Ordinary High Water
- Top of Bank

Figure 2-1
Arkema EE/CA
Actual Sediment Sampling Locations



integral consulting inc.

0 100 200 400 Feet

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E-Sewer-L
Storm Drain
12ft Contour
Bridges
Navigation Channel
River
Property and Lot Boundaries
Docks and Structures 2005
Ordinary High Water
Top of Bank

Figure 2-1
Arkema EE/CA
Proposed Sediment Sampling Locations

Tables

Table 1. Split Sample Location and Depth Information					
Sampling Date	**Boring Type**	**Boring ID**	**Bedrock Depth (ft blm)**	**Sampling Depth (ft blm)**	**Sample Type**
9/30/2009	Waste Characterization	WB-35	36.1	0-10	Composite
				10-20	Composite
				20-23	Discrete
				23-26	Discrete
				32-35	Discrete
9/25/2009	Waste Characterization	WB-42	26	0-6	Composite
				6-14	Composite
				20-23	Discrete
				23-26	Discrete
9/18/2009	Vertical Characterization	WB-30	49.2	10-12	Discrete
				26-28	Discrete
				40-42	Discrete
9/9/2009	Vertical Characterization	WB-49	23.5	4-6	Discrete
				6-8	Discrete
				14-16	Discrete
				20-22	Discrete
				22-23.5	Discrete
9/4/2009	Horizontal Characterization	WB-34	11.6	0-2	Discrete
				2-4	Discrete
				4-6	Discrete
9/3/2009	Horizontal Characterization	WB-40	14.8	0-2	Discrete
				2-4	Discrete
				4-6	Discrete
				6-8	Discrete
				10-12	Discrete
9/2/2009	Horizontal Characterization	WB-44	14	2-4	Discrete
8/28/2009	Horizontal Characterization	WB-51	21.5	4-6	Discrete
				6-8	Discrete
				10-12	Discrete
9/15/2009	Horizontal Characterization	WB-56	47.5	10-11	Discrete
				14-16	Discrete
				18-20	Discrete
9/1/2009	Horizontal Characterization	WB-60	8	2-3.7	Discrete
8/20/2009	Horizontal Characterization	WB-63	17	4-6	Discrete
				6-8	Discrete
				10-12	Discrete
8/25/2009	Horizontal Characterization	WB-64	26.5	10-12	Discrete
8/18/2009	Horizontal Characterization	WB-65	18	6-8	Discrete
				8-10	Discrete
8/19/2009	Horizontal Characterization	WB-66	18	4-6	Discrete
				6-8	Discrete
				8-10	Discrete

Note:
ft blm – feet below mudline.

Table 2. Split Sample Laboratory Analyses

Sampling Date	Boring ID	Bedrock Depth (ft blm)	Sampling Depth (ft blm)	Organochlorine Pesticides	PCBs	VOCs	SVOCs	Dioxins and Furans	Tributyltin	Asbestos	Archive
8/18/2009	WB-65	18	6-8	1							1
8/18/2009	WB-65		8-10	1	1	1	1	1	1		1
8/19/2009	WB-66	18	4-6	1							1
8/19/2009	WB-66		6-8	1							1
8/19/2009	WB-66		8-10	1	1	1	1	1	1		1
8/20/2009	WB-63	17	4-6	1							1
8/20/2009	WB-63		6-8	1							1
8/20/2009	WB-63		10-12	1	1	1	1	1	1		1
8/25/2009	WB-64	26.5	10-12			1					1
8/28/2009	WB-51	21.5	4-6	1							1
8/28/2009	WB-51		6-8	1							1
8/28/2009	WB-51		10-12	1	1	1	1	1	1		1
9/1/2009	WB-60	8	2-3.7	1							1
9/2/2009	WB-44	14	2-4			1					
9/3/2009	WB-40	14.8	0-2	1		1					
9/3/2009	WB-40		2-4	1							
9/3/2009	WB-40		4-6	1							
9/3/2009	WB-40		6-8	1	1		1	1	1		1
9/3/2009	WB-40		10-12			1					
9/4/2009	WB-34	11.6	0-2	1							1
9/4/2009	WB-34		2-4	1							1
9/4/2009	WB-34		4-6	1	1	1	1	1	1		1

Note:
ft blm – feet below mudline.

Table 2 Continued. Split Sample Laboratory Analyses

Sampling Date	Boring ID	Bedrock Depth (ft blm)	Sampling Depth (ft blm)	Organochlorine Pesticides	PCBs	VOCs	SVOCs	Dioxins and Furans	Tributyltin	Asbestos	Archive
9/9/2009	WB-49	23.5	4-6			1					
9/9/2009	WB-49		6-8	1	1		1	1	1		1
9/9/2009	WB-49		14-16	1	1	1	1	1	1		1
9/9/2009	WB-49		20-22	1	1		1	1	1		1
9/9/2009	WB-49		22-23.5			1					
9/15/2009	WB-56	47.5	10-11	1							1
9/15/2009	WB-56		14-16	1							1
9/15/2009	WB-56		18-20	1	1	1	1	1	1		1
9/18/2009	WB-30	49.2	10-12	1	1	1	1	1	1		1
9/18/2009	WB-30		26-28	1	1	1	1	1	1		1
9/18/2009	WB-30		40-42	1	1	1	1	1	1		1
9/25/2009	WB-42	26	0-6							1	
9/25/2009	WB-42		6-14	1	1	1	1	1	1	1	1
9/25/2009	WB-42		20-23	1	1	1	1	1	1		1
9/25/2009	WB-42		23-26	1	1	1	1	1	1		1
9/30/2009	WB-35	36.1	0-10							1	
9/30/2009	WB-35		10-20	1	1	1	1	1	1	1	1
9/30/2009	WB-35		20-23	1	1	1	1	1	1		
9/30/2009	WB-35		23-26	1	1	1	1	1	1		
9/30/2009	WB-35		32-35	1	1	1	1	1	1		1
			Total analyses	**35**	**20**	**23**	**20**	**20**	**20**	**4**	**31**

Note:
ft blm – feet below mudline.

Table 3. Field QA/QC Split Samples				
Sampling Date	**Boring ID**	**Sampling Depth (ft bml)**	**QA/QC Type**	**Analyses**
8/18/2009	WB-65	-	Trip Blank	VOCs
8/19/2009	WB-66	6-8	Field Duplicate	Organochlorine Pesticides
8/19/2009	WB-66	-	Trip Blank	VOCs
8/20/2009	WB-63	6-8	MS/MSD	Organochlorine Pesticides
8/20/2009	WB-63	-	Trip Blank	VOCs
8/25/2009	WB-64	-	Trip Blank	VOCs
8/28/2009	WB-51	6-8	Field Duplicate	Organochlorine Pesticides
8/28/2009	WB-51	-	Trip Blank	VOCs
9/2/2009	WB-44	-	Trip Blank	VOCs
9/4/2009	WB-34	2-4	Field Duplicate	Organochlorine Pesticides
9/4/2009	WB-34	-	Trip Blank	VOCs
9/9/2009	WB-49	-	Trip Blank	VOCs
9/9/2009	WB-49	14-16	MS/MSD	SVOCs, PCBs, Organochlorine Pesticides
9/15/2009	WB-56	-	Trip Blank	VOCs
9/18/2009	WB-30	-	Trip Blank	VOCs
9/18/2009	WB-30	26-28	Field Duplicate	SVOCs, PCBs, Organochlorine Pesticides
9/25/2009	WB-42	-	Trip Blank	VOCs
9/30/2009	WB-35	-	Trip Blank	VOCs

Note:
ft blm – feet below mudline

Table 4. Sample Core Photo Identification			
Boring ID	**Sampling Date**	**Field Evidence of Contamination (Y/N)**	**Photo ID**
WB-65	8/18/2009	N	August 18, 2009 photo #7, 8, 9
WB-66	8/19/2009	N	August 19, 2009 photo #4, 5, 9
WB-63	8/20/2009	Y	August 20, 2009 photo #6, 9, 12, 15, 19, 20, 21
WB-54	8/21/2009 and 8/24/09	Y	August 21 2009 photo #194, #194 edit
WB-53	8/24/2009	Y	August 24, 2009 photo #1, 5, 6, 7, 9, 18
WB-64	8/25/2009	Y	August 25, 2009 photo #7, 12, 13
WB-55	8/26/2009	N	August 26, 2009 photo #5, 10, 11, 12, 17, 18
WB-50	8/27/2009	Y	August 27, 2009 photo #14, 15, 20, 21
WB-51	8/28/2009	Y	August 28, 2009 photo #9, 12
WB-62	8/31/2009	Y	N/A
WB-61	8/31/2009	N	August 31, 2009 photo #6
WB-45	9/1/2009	Y	N/A
WB-60	9/1/2009	Y	September 1, 2009 photo #4
WB-44	9/2/2009	Y	September 2, 2009 photo #4
WB-40	9/3/2009	Y	September 3, 2009 photo #4, 9
WB-38	9/3/2009	Y	N/A
WB-33	9/4/2009	Y	September 4, 2009 photo #2
WB-34	9/4/2009	Y	September 4, 2009 photo #5, 10
WB-47	9/8/2009	Y	September 8, 2009 photo #6, 10
WB-52	9/9/2009	Y	N/A
WB-49	9/9/2009	Y	September 9, 2009 photo #10, 11
WB-48	9/10/2009	Y	September 10, 2000 photo #4
WB-58	9/11/2009	Y	September 11, 2000 photo #4, 9, 10
WB-57	9/14/2009	Y	September 14, 2009 photo #6, 10
WB-56	9/15/2009	N	September 15, 2009 photo #11, 12
WB-56b	9/16/2009	N	September 16, 2009 photo #8
WB-30	9/17/2009 and 9/18/09	N	September 18, 2009 photo #6, 11
WB-31	9/21/2009	Y	N/A
WB-31b	9/22/2009	N	September 21, 2009 photo #6
WB-32	9/22/09 and 9/23/2009	Y	September 22, 2009, photo #11
WB-46	9/23/2009	Y	September 23, 2009 photo #9, 10
WB-43	9/24/2009	Y	September 24, 2009 photo #5
WB-42	9/25/2009	Y	September 25, 2009 photo #2, 4, 7, 8
WB-41	9/28/2009	Y	N/A

Table 4 Continued. Sample Core Photo Identification			
Boring ID	**Sampling Date**	**Field Evidence of Contamination (Y/N)**	**Photo ID**
WB-39	9/28/09 and 9/29/09	Y	N/A
WB-37	9/29/2009	Y	N/A
WB-35	9/30/2009	Y	September 30, 2009 photo #1, 7, 8, 12, 13
WB-36	10/1/2009	Y	October 1,2009 photo #4, 16, 17,18

Appendix A
Field Notes

Appendix B
Field Oversight Photographs

Appendix C
Health and Safety Inspection Reports

CDM Daily Field Safety Report 8/17/09 - 8/18/09

8/17/09

Safety Kickoff discussion provided by Integral. Major points of emphasis related to program requirements such as worker training and certifications, work zone controls, material handling concerns, drill rig safety, PPE, equipment and personnel decontamination, and overall communication between the various site personnel.

8/18/09

Safety summary

Per conversation with Sean Sheldrake (USEPA) last night after the safety kickoff meeting, he would like for Integral to emphasize heat stress/stroke to the work crew at tomorrow's daily safety briefing.

Daily safety briefing included heat stress and heat stroke related information, PPE, material storage, drill rig safety, and working over water.

The main issues observed during initial mobilization were related to transporting sampling materials and equipment down the steep slope of the bank and eventually onto the barge. This was discussed with Integral, and it was decided that a bobcat will be utilized to transport equipment on the beach area, and an alternative access point will be used that has significantly less tripping hazards.

Upon completion of mobilization and set-up activities, a drill rig safety meeting was held where safe walking zones were established, kill switches identified, and material handling issues were discussed.

Workers were doing a nice job with PPE compliance, it should be noted that one of the driller's is wearing his PFD on the inside of his tyvek to avoid possibly getting it caught up in drill rig moving parts.

A warm zone was demarcated where workers can strip down tyvek to rest and drink water.

Due to the location of the generator and the soil mixing machine, a trip hazard was identified by the crew which was immediately communicated to all personnel, and was demarcated with caution tape.

Sean Sheldrake wanted to ensure that leather gloves used by the drilling workers were going to be disposed of as contaminated material as described in the site approved HASP.

This feedback was provided to Integral, and was discussed with the drill rig personnel.

CDM Daily Field Safety Report 8/17/09 - 8/18/09

Figure 1. Calibration of PID 8/18/09

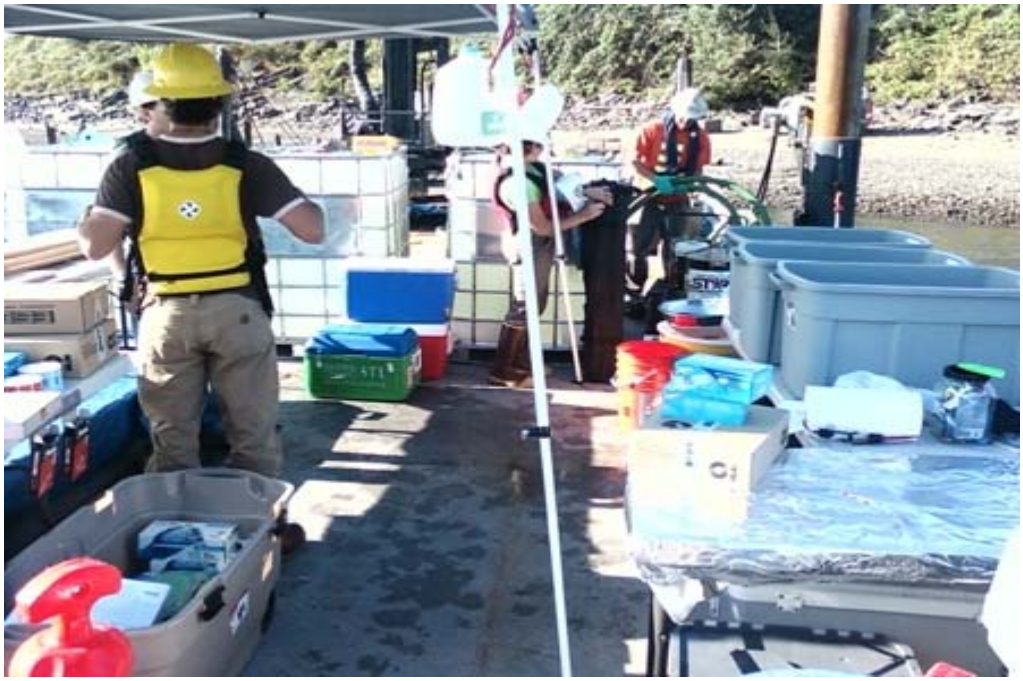


Figure 2 Workers performing initial setup 8/18/09

CDM Daily Field Safety Report 8/17/09 - 8/18/09

Figure 3 Sonic Drill Rig and Casing 8/18/09

Figure 4 Sediment Sampling Activities 8/18/09

CDM Daily Field Safety Report 8/17/09 - 8/18/09

Safety Net Inspection Review

The following tables provide a summary of the SafetyNet inspections performed at the Arkema Field Site on 8/17 and 8/18/09.

The SafetyNet system employs a user-friendly platform to quickly and efficiently record observations of field activities. Checklists are stored on a PDA device and are used by H&S personnel to evaluate work progress and compliance with the Site HASP. Observations of activities are objectively treated as either safe or unsafe. Safe observations are uploaded to the server and tracked accordingly. Unsafe observations are treated as an open issue that must be corrected. Information related to the unsafe observation, such as the type and severity of the hazard, recommended corrective action, party responsible for implementing the corrective action, and the timeframe required to complete the corrective action, must be entered. Unsafe observations (i.e., open issues) remain open until a corrective action had been confirmed. The time duration of open issues is also tracked.

The SafetyNet inspections allow for a comprehensive assessment of all program elements required under the Site HASP.

Based on this assessment, the Arkema Field operations are being performed in compliance with the requirements as defined in the Site HASP.

Inspection Type	Inspections	Observations	Unsafe Conditions	% Safe
Safety	7	180	5	97.2%

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
Administration	Summary	18	0	18	100.0%
	Document pre-const mtgs	1	0	1	100.0%
	Emergency action plan	2	0	2	100.0%
	Emergency communication plan	2	0	2	100.0%
	First Aid/CPR trained person	2	0	2	100.0%
	First aid kit availible	3	0	3	100.0%
	Freq/reg safety inspections	1	0	1	100.0%
	MSDS manual	2	0	2	100.0%
	Safety manual	2	0	2	100.0%
	Safety meetings	1	0	1	100.0%
	Visitor PPE available	2	0	2	100.0%
Drilling Operations	Summary	44	2	42	95.5%
	Activity hazard analyis	1	0	1	100.0%
	All guards in place	2	0	2	100.0%

CDM Daily Field Safety Report 8/17/09 - 8/18/09

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
	Atmospheric monitoring	2	0	2	100.0%
	Bore hole secure	1	0	1	100.0%
	Checks per D.O.T./ project	1	0	1	100.0%
	Containters labeled/stored	3	0	3	100.0%
	Emp aware of med fac locat.	2	0	2	100.0%
	Empl. trained in oper proc	1	0	1	100.0%
	Equipment clean	2	0	2	100.0%
	Exclusion zone for drill rig	2	0	2	100.0%
	Fluid leaks contained	1	0	1	100.0%
	Fuel properly labeled	1	0	1	100.0%
	Fuel stored in non-flam loc	2	0	2	100.0%
	High voltage lines	1	0	1	100.0%
	Hydraulic hose condition	2	0	2	100.0%
	IDW handling/drum lifting	2	0	2	100.0%
	Knoledge of shut dwn switch	2	0	2	100.0%
	Leaks on rig	1	0	1	100.0%
	MSDS sheet available	1	0	1	100.0%
	Material handling	2	2	0	0.0%
	OSHA-req. hazcom train	2	0	2	100.0%
	Rig set up	1	0	1	100.0%
	Shut down devices	3	0	3	100.0%
	Smoking policy observed	2	0	2	100.0%
	Welds, bolts, pins condition	1	0	1	100.0%
	Wire rope condition	1	0	1	100.0%
	Work area organized	2	0	2	100.0%
Electrical	Summary	7	1	6	85.7%
	Cords in good condition	2	0	2	100.0%
	Cords protected from traffic	2	1	1	50.0%
	GFCI's used	3	0	3	100.0%
Environmental	Summary	11	0	11	100.0%
	Containers labeled	2	0	2	100.0%
	Dust Control Adequate	2	0	2	100.0%
	Haz material properly stored	2	0	2	100.0%
	Spill containment adequate	1	0	1	100.0%
	Spill kit available	2	0	2	100.0%
	Spill response awareness	2	0	2	100.0%
Fire Protection	Summary	7	0	7	100.0%
	Ext charged and inspected	2	0	2	100.0%

CDM Daily Field Safety Report 8/17/09 - 8/18/09

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
	Fire suppression equip avail	2	0	2	100.0%
	Proper fuel containers used	3	0	3	100.0%
Hazard Communications	Summary	8	0	8	100.0%
	Copy of program	2	0	2	100.0%
	Employees trained	2	0	2	100.0%
	MSDS' (site specific)	2	0	2	100.0%
	Proper labels on containers	2	0	2	100.0%
Housekeeping	Summary	8	1	7	87.5%
	Clear access to bldg/site	1	0	1	100.0%
	Proper material storage	1	0	1	100.0%
	Slip, trip, fall hazards	2	0	2	100.0%
	Trash in protected cont	1	0	1	100.0%
	Walkways clear	3	1	2	66.7%
Medical / Emergency	Summary	4	0	4	100.0%
	1st Aid/CPR on site	1	0	1	100.0%
	1st aid kit	1	0	1	100.0%
	Emergency action plan	1	0	1	100.0%
	Eye wash	1	0	1	100.0%
Motorized Equipment	Summary	2	0	2	100.0%
	Back up alarm functioning	1	0	1	100.0%
	Operator appears competent	1	0	1	100.0%
P.P.E.	Summary	66	1	65	98.5%
	Glasses / face shields	12	0	12	100.0%
	Gloves	1	1	0	0.0%
	Hard Hats	17	0	17	100.0%
	Hearing protection	7	0	7	100.0%
	Proper Clothing	12	0	12	100.0%
	Work Boots	17	0	17	100.0%
Site / Public Protection	Summary	5	0	5	100.0%
	Adequate drinking water	1	0	1	100.0%
	Adequate lighting	1	0	1	100.0%
	Adequate toilets	1	0	1	100.0%
	Adequate washing facilites	1	0	1	100.0%
	Company rep present	1	0	1	100.0%

CDM Daily Field Safety Report 8/17/09 - 8/18/09

OSHA Recordables/Lost Time Today = 0	**OSHA Recordables/Lost Time To Date = 0**

CDM Daily Field Safety Report 8/19/09

Health and Safety Summary

8/19/09

Sean Sheldrake provided feedback regarding the need to ensure that the driller's wear leather gloves while operating the drill rig, and to ensure that all personnel wear PFD's at all times while on the barge and accompanying skiff.

At 9:30 AM, it was observed that there was an inadequate containment of split spoon decontamination efforts in between samples. The driller constructed a tarped area to catch decontamination fluids, but the split spoon was being pressure washed on an elevated platform, and the tarped area was not containing the overspray generated during pressure washing.

At approximately 10:30 AM, the driller's continued to spray off the split spoon in the same manner. Additionally, when they were pressure washing the valve at the bottom of the spoon, contaminated decontamination water was observed spraying back into the face of the driller. The equipment decontamination operation was temporarily halted to discuss with Integral and the drill team. The following recommendations were made:

1) Construct additional overspray containment in the equipment decontamination area to prevent overspray from leaving the containment area.
2) Use of a face splash shield during decontamination to ensure the workers are adequately protected.

The recommendations were agreed upon by Integral and the drill team. The drill team safety lead immediately departed the work area in order to purchase additional face splash protection that will be used for subsequent decontamination efforts. Additionally, a basic plan for additional overspray protection was discussed, and materials were being procured.

The drill rig operator was observed working the control panel without leather gloves. A discussion was held with Integral and the drill team to communicate the need for them to comply with the PPE requirements as defined in the site HASP. I provided a recommendation to Erin (Integral) that if the drill rig control panel operator does not need leather gloves while operating the panel, than the HASP should be amended to include this, but otherwise they must comply with the existing HASP. Erin mentioned that he would amend the HASP, but in the meantime the driller agreed to wear leather gloves.

CDM Daily Field Safety Report 8/19/09

Overall Safety Summary

Based on a review of the Arkema Field Sampling effort, all program elements are in place to the degree required by Federal OSHA standards and the site HASP as documented in the daily safety review inspections.

I would recommend an additional safety review after the field operations have been performed for another several weeks.

Figure 1 Core logging and sampling activities

CDM Daily Field Safety Report 8/19/09

Figure 2 Use of sediment mixing apparatus

Figure 3 Split spoon handling

CDM Daily Field Safety Report 8/19/09

Safety Net Inspection Review

The following tables provide a summary of the SafetyNet inspections performed at the Arkema Field Site on 8/19/09.

The SafetyNet system employs a user-friendly platform to quickly and efficiently record observations of field activities. Checklists are stored on a PDA device and are used by H&S personnel to evaluate work progress and compliance with the Site HASP. Observations of activities are objectively treated as either safe or unsafe. Safe observations are uploaded to the server and tracked accordingly. Unsafe observations are treated as an open issue that must be corrected. Information related to the unsafe observation, such as the type and severity of the hazard, recommended corrective action, party responsible for implementing the corrective action, and the timeframe required to complete the corrective action, must be entered. Unsafe observations (i.e., open issues) remain open until a corrective action had been confirmed. The time duration of open issues is also tracked.

The SafetyNet inspections allow for a comprehensive assessment of all program elements required under the Site HASP.

Inspection Type	Inspections	Observations	Unsafe Conditions	% Safe
Safety	3	93	4	95.7%

Category	Sub-Category	Observations	Conditions	
			Unsafe Conditions	Safe Conditions
Administration	Summary	9	0	9
	Emergency action plan	1	0	1
	Emergency communication plan	1	0	1
	First Aid/CPR trained person	1	0	1
	First aid kit availible	1	0	1
	Freq/reg safety inspections	1	0	1
	MSDS manual	1	0	1
	Safety manual	1	0	1
	Safety meetings	1	0	1
	Visitor PPE available	1	0	1
Drilling Operations	Summary	24	2	22
	All guards in place	1	0	1
	Checks per D.O.T./ project	1	0	1
	Containters labeled/stored	1	0	1
	Emp aware of med fac locat.	1	0	1
	Empl. trained in oper proc	1	0	1
	Equipment clean	1	0	1
	Exclusion zone for drill rig	1	0	1

CDM Daily Field Safety Report 8/19/09

Category	Sub-Category	Observations	Conditions	
			Unsafe Conditions	Safe Conditions
	Fluid leaks contained	1	0	1
	Fuel properly labeled	1	0	1
	Fuel stored in non-flam loc	1	0	1
	High voltage lines	1	0	1
	Hydraulic hose condition	1	0	1
	IDW handling/drum lifting	1	0	1
	Knoledge of shut dwn switch	1	0	1
	MSDS sheet available	1	0	1
	Material handling	2	2	0
	OSHA-req. hazcom train	1	0	1
	Rig set up	1	0	1
	Shut down devices	1	0	1
	Smoking policy observed	1	0	1
	Welds, bolts, pins condition	1	0	1
	Wire rope condition	1	0	1
	Work area organized	1	0	1
Electrical	Summary	3	1	2
	Cords in good condition	1	0	1
	Cords protected from traffic	1	1	0
	GFCI's used	1	0	1
Environmental	Summary	6	0	6
	Containers labeled	1	0	1
	Dust Control Adequate	1	0	1
	Haz material properly stored	1	0	1
	Spill containment adequate	1	0	1
	Spill kit available	1	0	1
	Spill response awareness	1	0	1
Fire Protection	Summary	3	0	3
	Ext charged and inspected	1	0	1
	Fire suppression equip avail	1	0	1
	Proper fuel containers used	1	0	1
Hazard Communications	Summary	4	0	4
	Copy of program	1	0	1
	Employees trained	1	0	1
	MSDS' (site specific)	1	0	1
	Proper labels on containers	1	0	1
Housekeeping	Summary	3	0	3
	Slip, trip, fall hazards	1	0	1

CDM Daily Field Safety Report 8/19/09

Category	Sub-Category	Observations	Conditions	
			Unsafe Conditions	Safe Conditions
	Trash in protected cont	1	0	1
	Walkways clear	1	0	1
P.P.E.	Summary	36	1	35
	Glasses / face shields	7	0	7
	Gloves	1	1	0
	Hard Hats	7	0	7
	Hearing protection	7	0	7
	Proper Clothing	7	0	7
	Work Boots	7	0	7
Site / Public Protection	Summary	5	0	5
	Adequate drinking water	1	0	1
	Adequate lighting	1	0	1
	Adequate toilets	1	0	1
	Adequate washing facilites	1	0	1
	Company rep present	1	0	1

OSHA Recordables/Lost Time Today = 0	**OSHA Recordables/Lost Time To Date = 0**

Arkema Daily Field Safety Report
October 12-13, 2009

Health and Safety Summary

10/12/09

The safety kickoff meeting was held at 10:00 hours, and was attended by representatives from Boart Longyear, Integral, Arcadis, and CDM. The HASP was reviewed with all personnel present, with proper signatory requirements fulfilled.

Working over water, slips, trips, and falls, as well a chemical hygiene were major points of emphasis of the safety kickoff meeting. Required PPE, as well as equipment and personnel decontamination was discussed among site entities. The potential for bacterial contamination in the Willamette River was also discussed.

Boart Longyear provided a brief safety discussion regarding the particular hazards of the drill rig, their expected areas of operation, kill switches, fuel storage and location of spill kits.

Arcadis and Boart Longyear were observed to perform a safety inspection of the barge, drill rig, and associated equipment prior to start of operations. First aid kit and AED were also noted in tote under table near spill kit.

No work operations were performed on 10/12/2009 due to the inability of the GPS unit to function as needed.

Please refer to the attached inspection report presented below those details individual inspection observations.

Figure 1-Drill Rig and spill kit containment

Arkema Daily Field Safety Report
October 12-13, 2009

Figure 2 Drill Rig containment and drum handling dolly.

10/13/09

Daily activities started with the daily safety meeting at 07:30 AM. A thorough review of site communications, emergency planning, drilling safety, exclusion and support zone set-up, PPE, as well as equipment and personnel decontamination procedures was performed during the meeting.

Additional hazards were discussed related to the inclement weather that was expected for the day, as strong winds, and rain were expected throughout the day. Lightning was also discussed, and it was determined that if any lightning was observed, work was to be temporarily stopped until conditions improved. Due to the arrangement of the drill rig and "spud" masts on the barge, the potential for lightning strikes was strongly considered.

Two tent structures were placed on the barge in order to provide some relief from the weather during the course of the day. Due to the strong wind conditions, concern was expressed over the stability of the anchoring system used for the tent structures. The situation was discussed with Arcadis personnel who used additional strapping and cement blocks to adequately secure the tent structures.

Use of PPE during the course of the day was excellent, and housekeeping was very well maintained. Equipment decontamination of CPT casing and rods was observed to be adequate between sample locations.

Arkema Daily Field Safety Report
October 12-13, 2009

Please refer to the attached inspection report presented below those details individual inspection observations.

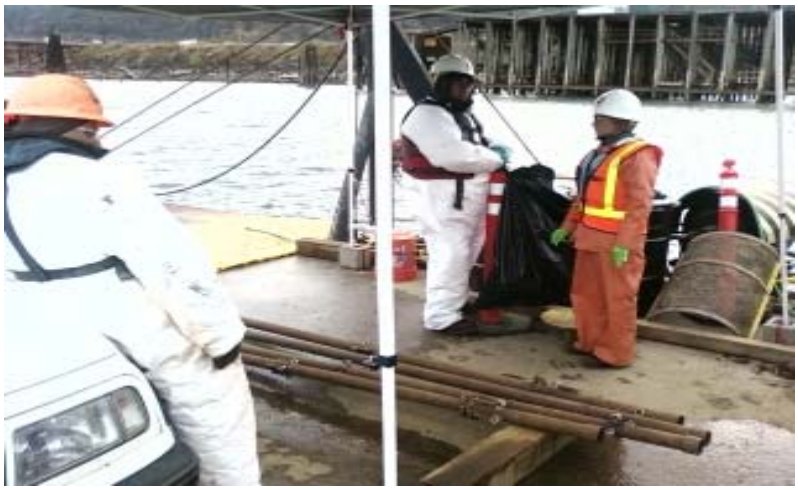


Figure 3 Exclusion Zone and Decontaminated Pipe Casing

Figure 4 Equipment Decontamination Area

Arkema Daily Field Safety Report
October 12-13, 2009

Inspection Type	Inspections	Observations	Unsafe Conditions
Safety	4	86	0

Category	Sub-Category	Observations	Conditions	
			Unsafe Conditions	Safe Conditions
Administration	Summary	16	0	16
	Document pre-const mtgs	2	0	2
	Emergency action plan	1	0	1
	Emergency communication plan	1	0	1
	First aid kit available	2	0	2
	Freq/reg safety inspections	1	0	1
	MSDS manual	2	0	2
	Safety manual	1	0	1
	Safety meetings	2	0	2
	Visitor PPE available	2	0	2
	Visitor sign-in form	2	0	2
Drilling Operations	Summary	35	0	35
	All guards in place	2	0	2
	Atmospheric monitoring	2	0	2
	Containers labeled/stored	3	0	3
	Emp aware of med fac locat.	2	0	2
	Emp know accident report pro	1	0	1
	Empl. trained in oper proc	1	0	1
	Equipment clean	2	0	2
	Exclusion zone for drill rig	3	0	3
	Fluid leaks contained	1	0	1
	Fuel properly labeled	1	0	1
	High voltage lines	1	0	1
	Hydraulic hose condition	1	0	1
	IDW handling/drum lifting	1	0	1
	Knowledge of shut dwn switch	2	0	2
	MSDS sheet available	2	0	2
	OSHA-req. hazcom train	1	0	1
	Rig set up	2	0	2
	Shut down devices	1	0	1

Arkema Daily Field Safety Report
October 12-13, 2009

Category	Sub-Category	Observations	Conditions	
			Unsafe Conditions	Safe Conditions
	Smoking policy observed	1	0	1
	Trip hazards	1	0	1
	Wire rope condition	1	0	1
	Work area organized	3	0	3
Environmental	Summary	7	0	7
	Containers labeled	1	0	1
	Spill containment adequate	2	0	2
	Spill kit available	2	0	2
	Spill response awareness	2	0	2
Fire Protection	Summary	3	0	3
	Ext charged and inspected	1	0	1
	Fire suppression equip avail	1	0	1
	Proper fuel containers used	1	0	1
Hand And Power Tools	Summary	3	0	3
	Cord in good condition	1	0	1
	Ground prong in place	1	0	1
	Proper tool for the job	1	0	1
Hazard Communications	Summary	4	0	4
	Copy of program	1	0	1
	Employees trained	1	0	1
	Inventory list	1	0	1
	MSDS' (site specific)	1	0	1
Housekeeping	Summary	2	0	2
	Clear access to bldg/site	1	0	1
	Proper material storage	1	0	1
P.P.E.	Summary	16	0	16
	Glasses / face shields	4	0	4
	Hard Hats	4	0	4
	Proper Clothing	4	0	4
	Work Boots	4	0	4

Appendix D
Field Change Requests

FIELD CHANGE REQUEST (FCR) FORM

Project Name: Arkema EE/CA Project No.: C167.1103
Client: Legacy Site Services Request No.: FCR-1

To: Lance Peterson, CDM Date: August 13, 2009

Field Change Request Title: Station Location Shifts of up to 20 ft

Description:

There are a number of obstructions within the EE/CA sediment characterization area including old pilings, concrete, and other debris. In addition, the width of the barge (24 ft) will not allow drilling activities to occur closer than 12 ft from obstructions such as pilings since the moon pool is located in the approximate center of the barge. As a result, station locations may need to be shifted to accessible areas.

Recommended Change:

All station location shifts of up to 20 ft from the coordinates listed in the Arkema EE/CA field sampling plan (dated May 15, 2009) can be done without formal notification of EPA or CDM representatives. Shifts greater than 20 ft will require formal notification of EPA and/or CDM representatives.

Eron Dodak, R.G.		August 13, 2009
Field Operations Lead (or designee)	Signature	Date

Approval:

David Livermore, R.G.		August 13, 2009
Project Manager	Signature	Date

Distribution:
LSS Project Manager
Integral Project Manager
Field Operations Lead
QA Officer
Project File
Other:

FIELD CHANGE REQUEST (FCR) FORM

Project Name: Arkema EE/CA Project No.: C167.1103
Client: Legacy Site Services Request No.: FCR-2

To: Lance Peterson, CDM Date: August 13, 2009

Field Change Request Title: Move Station WB-46 Approximately 60 ft to the West

Description:

Station WB-46 is located in an area that is inaccessible to the barge selected for the EE/CA sediment characterization work. Overhead clearance of 70 ft is required for the barge to accommodate the spud anchoring system. The overhead clearance beneath the walkway on Dock 2 (located near borehole WB-48) is too short to accommodate the barge. The water depth and presence of Outfall 003 will not accommodate the barge traveling to the station from a downstream direction.

Recommended Change:

Move station WB-46 approximately 60 ft west so it is on the west side of Outfall 003.

Eron Dodak, R.G.		August 13, 2009
Field Operations Lead (or designee)	Signature	Date

Approval:

David Livermore, R.G.		August 13, 2009
Project Manager	Signature	Date

Distribution:
LSS Project Manager
Integral Project Manager
Field Operations Lead
QA Officer
Project File
Other:

FIELD CHANGE REQUEST (FCR) FORM

Project Name: Arkema EE/CA Project No.: C167.1103
Client: Legacy Site Services Request No.: FCR-3

To: Sean Sheldrake, EPA Date: September 11, 2009

Field Change Request Title: Use of a 3-inch diameter aluminum vibracore sampler

Description:
The top 4-8 ft of sediments at the Arkema site are generally very soft. Firmer sandy sediments are typically encountered at depths ranging from approximately 4-8 ft below mudline. The drilling contractor is unable to run 6-inch diameter casing with the rotosonic rig until they drill several feet into sand, which has a bearing capacity sufficient to support the casing. The soft upper sediments can not support the weight of the casing (the casing would drop through the "moon pool" on the barge and would be nearly impossible to retrieve). If casing is not used, sediment samples collected with the split spoon sampler may have excessive amounts of "slough" (sediments from upper intervals that are incorporated into the sampler as it is pushed through the uncased sediments). The casing provides an open borehole for the sediment samples to be collected, which significantly reduces slough in the sampler. Use of the vibracore sampler will also save time and increase production.

Recommended Change:
At boreholes where the sediment thickness is expected to be at least 10 ft, a 3-inch diameter aluminum vibracore sampler may be used to collect sediment samples from mudline to 10 ft below mudline for chemical analysis. The vibracore sampler will not be used in areas where shallow bedrock is expected or concrete or other debris is present, which may damage the sampler.

Eron Dodak, R.G. September 11, 2009
Field Operations Lead (or designee) Signature Date

Approval:

David Livermore, R.G. September 11, 2009
Project Manager Signature Date

Distribution:
LSS Project Manager
Integral Project Manager
Field Operations Lead
QA Officer
Project File
Other:

FIELD CHANGE REQUEST (FCR) FORM

Project Name: Arkema EE/CA Project No.: C167.1103
Client: Legacy Site Services Request No.: FCR-4

To: Sean Sheldrake, EPA Date: September 11, 2009

Field Change Request Title: Guidance on Sample Collection if Field Evidence of Contamination is Observed

Description:

A light sheen and some low-level photo-ionization detector (PID) hits have been observed in some sediment samples collected as part of the 2009 EE/CA sediment investigation. The field sampling plan does not provide specific guidance on when additional VOC sample jars will be collected based on field evidence of contamination. This field change request form provides guidance on when additional jars that will be filled based on the presence of a sheen or an elevated PID measurement.

Recommended Change:

If sample volume is sufficient, an additional 4 oz (VOC) jar will be collected to be archived at the laboratory for potential chemical analysis if a sheen or a PID measurement greater than 10 ppm is observed. The 4 oz jar will be archived at the analytical laboratory at 4 degrees Celsius.

Eron Dodak, R.G.		September 11, 2009
Field Operations Lead (or designee)	Signature	Date

Approval:

David Livermore, R.G.		September 11, 2009
Project Manager	Signature	Date

Distribution:
LSS Project Manager
Integral Project Manager
Field Operations Lead
QA Officer
Project File
Other:

FIELD CHANGE REQUEST (FCR) FORM

Project Name: Arkema EE/CA Project No.: C167.1103
Client: Legacy Site Services Request No.: FCR-5

To: Sean Sheldrake, EPA Date: September 21, 2009

Field Change Request Title: Abandon 15 ft of Casing at WB-56 and move to WB-56b to complete borehole.

Description:
At borehole WB-56, the barge was positioned close to the relatively steep riverbank. The drill rig was also positioned on the back moon pool, located at the base of the barge ramp, to advance the borehole within 15 ft of the FSP borehole coordinates. During drilling, the tide dropped and the end of the barge (directly beneath the drill rig) settled on the relatively steep riverbank and moved the barge about 6 inches, which caused misalignment of the casing. The drilling crew attempted to move both the barge and the drill rig several times to try to realign the casing. During the process of unthreading the uppermost section of casing, the bottom 15 ft of casing became unthreaded and separated. The drillers tried repeatedly to reconnect the bottom 15 ft of casing, but were unsuccessful. This section of casing is located approximately 10-25 ft below mudline (bml) and had to be left in the abandoned borehole. The remaining casing was removed and the upper 10 ft of borehole was allowed to close naturally by sloughing.

Recommended Change:
Drilling and sampling in WB-56 was successfully completed to 24 ft bml. To complete this borehole to bedrock the barge platform will need to be moved approximately 10-12 ft east of WB-56 so the barge does not rest on the steep riverbank at low tide. This adjacent borehole, WB-56b, will be about 25-30 ft from the coordinates in the FSP, which requires EPA approval according to FCR-1. At the new WB-56b location, the mudline elevation is approximate 3.3 ft lower than at WB-56. Samples at WB-56b, therefore, will be collected beginning at 20.7 ft bml (which corresponds to the elevation of 24 ft bml at WB-56). The samples from WB-56 and WB-56b will be analyzed in accordance with the requirements for WB-56 in the FSP.

Eron Dodak, R.G. September 21, 2009
Field Operations Lead (or designee) Signature Date

Approval:

David Livermore, R.G. September 21, 2009
Project Manager Signature Date

Distribution:
LSS Project Manager
Integral Project Manager

Field Operations Lead
QA Officer
Project File
Other:

FIELD CHANGE REQUEST (FCR) FORM

Project Name: Arkema EE/CA Project No.: C167.1103
Client: Legacy Site Services Request No.: FCR-6

To: Sean Sheldrake, EPA Date: September 21, 2009

Field Change Request Title: Move Station WB-46 to the Riverbank Adjacent to Outfall 003

Description:

As noted in FCR-2, station WB-46 is located in an area that is inaccessible to the barge selected for the EE/CA sediment characterization work. Overhead clearance of 70 ft is required for the barge to accommodate the spud anchoring system. The overhead clearance beneath the walkway on Dock 2 (located near borehole WB-48) is too short to accommodate the barge. The water depth and presence of Outfall 003 will not accommodate the barge traveling to the station from a downstream direction.

FCR-2 proposed moving station WB-46 approximately 60 ft west so it is on the west side of Outfall 003. However, further reconnaissance showed the water depth was too shallow (1-2 ft deep at low tide) to accommodate the barge at this location. In addition, concrete debris and a submerged piling were observed in this area (the barge pivoted on an object thought to be a submerged piling when trying to position on WB-46). The combination of the shallow draft and submerged objects represent a risk for puncturing the barge hull when the tide drops during drilling.

Recommended Change:

Move station WB-46 approximately 50-60 ft from its original location toward the riverbank, parallel to Outfall 003, so it can be drilled from the riverbank.

Eron Dodak, R.G. September 21, 2009
Field Operations Lead (or designee) Signature Date

Approval:

David Livermore, R.G. September 21, 2009
Project Manager Signature Date

Distribution:
LSS Project Manager
Integral Project Manager
Field Operations Lead
QA Officer
Project File
Other:

FIELD CHANGE REQUEST (FCR) FORM

Project Name: Arkema EE/CA Project No.: C167.1103
Client: Legacy Site Services Request No.: FCR-7

To: Sean Sheldrake, EPA Date: September 22, 2009

Field Change Request Title: Abandon WB-31 and move to WB-31b to complete borehole.

Description:
The barge was positioned on borehole WB-31 parallel to Outfall 001, which is at an angle to the riverbank. The drill rig was positioned on the moon pool located on the base of the barge ramp so the borehole could be drilled as close as possible to the riverbank. The moon pool was positioned within about 12 ft of the coordinates in the FSP, which is within the 20 ft borehole tolerance allowed by FCR-1. As the tide dropped, the upstream corner of the barge (directly beneath the drill rig) became beached. The wakes from the river traffic and the wind in combination with one corner of the barge being beached caused the barge/moon pool to move about 4-6 inches, misaligning the casing. The barge could not be moved a short distance to realign the casing because one corner of the barge was beached. The casing was removed and the borehole was grouted. The tugboat captain did not feel comfortable with leaving the barge so close to Outfall 001 overnight, so it was moved away from the outfall.

Recommended Change:
Drill borehole WB-31b approximately 5 ft toward the river from WB-30. The distance from the FSP coordinates for WB-31 should be within the 20 ft tolerance allowed by FCR-1. The mudline elevation will be approximately 5 ft lower at the new borehole location, so the sample intervals will be adjusted so we begin sampling at an elevation equivalent to 30 ft bml at WB-31. The samples from WB-31 and WB-31b will be analyzed in accordance with the requirements for WB-31 in the FSP.

Eron Dodak, R.G.		September 22, 2009
Field Operations Lead (or designee)	Signature	Date

Approval:

David Livermore, R.G.		September 22, 2009
Project Manager	Signature	Date

Distribution:
LSS Project Manager
Integral Project Manager
Field Operations Lead
QA Officer
Project File

Other:

FIELD CHANGE REQUEST (FCR) FORM

Project Name: Arkema EE/CA Project No.: C167.1103
Client: Legacy Site Services Request No.: FCR-8

To: Sean Sheldrake, EPA Date: September 23, 2009

Field Change Request Title: Preliminary results for WB-65; Abandon installation of WB-59.

Description:
The drill rig and barge could not be maneuvered to the FSP coordinate location for WB-59 because of shallow water and subaqueous obstructions. Access by land was also attempted, but the sediment in this area is saturated with water and would not support the drill rig. Alternative accessible locations were scouted by the barge and tug crew. Two alternative locations are shown on the attached map. The downstream location is located very close to the existing location for WB-56 (i.e., <30 ft away). The upstream location is approximately 100 ft upstream and outside of the Consent Order preliminary RAA boundary. Another lateral location within the Consent Order preliminary RAA boundary is near the downstream end of the Salt Dock, which is also very near borehole WB-57 which was completed on September 14th. In the FSP, WB-59 was proposed as a "step out" borehole and the samples in WB-59 were to be collected, archived, and analyzed depending on the results of WB-56. The purpose of this "step out" borehole was to provide additional definition to the 5 mg/kg boundary if any sediment samples in WB-56 exceeded 5 mg/kg. None of the alternative WB-59 locations summarized above are ideally situated as a 5 mg/kg DDx "step out" borehole.

After conversations with CDM, Integral requested the "preliminary screen" results from TestAmerica's (TA's) analysis of the six DDT isomers for the WB-56 samples. These are the same preliminary screen results that TA uses to identify the proper extraction volume for the final, calibrated pesticide analysis on the sample. The preliminary draft results of the "initial screening" analyses are attached. These initial screening analyses are not the final DDT results for WB-56; however, based on TA's experience with the sediment samples analyzed to date, they are expected to be reasonably close to the final results. The second page of TA's report provides the appropriate qualifications for the results. Some of the important points include, 1) although TA has had good success correlating the preliminary screen results with final extractions, the final results are based on a separate aliquot and could be affected by sample heterogeneity, 2) preliminary screen analyses are not subject to sample cleanup procedures, and 3) a single chromatographic column is used for the preliminary screen analyses. For these and other reasons the final results for each of these samples will vary from the preliminary screen results attached. One other factor will affect the final results. The sample moisture content is needed to calculate the total DDx concentration based on the sample dry weight. Because the individual sample moisture contents are not yet available, an estimated wet weight of 50 percent was assumed in calculating the dry weight total DDx concentration for all samples. This generalized assumption is still consistent with the moisture content data that are available for samples analyzed, to date, for the EE/CA investigation.

Based on these qualifications, the preliminary screen results from WB-56/56b indicate that the total DDx concentration is more than likely less than 5 mg/kg in all depth intervals at this location. The highest concentration reported is 2.52 mg/kg dry weight in the 0-2 ft below

mudline (bml) interval. The next highest total DDx concentrations are 0.36 mg/kg in the 2-4 ft bml sample and 0.10 mg/kg dry weight in the 4-6 ft bml interval. Most of the samples below 8ft bml did not have DDx detections. Note that the detection limit for the final calibrated DDT analyses will be lower than shown on these preliminary screens.

Based on these preliminary results from WB-56/56b, it is likely that once the final analytical results are obtained none of the samples will exceed 5 mg/kg, and no further analyses at WB-59 would be necessary.

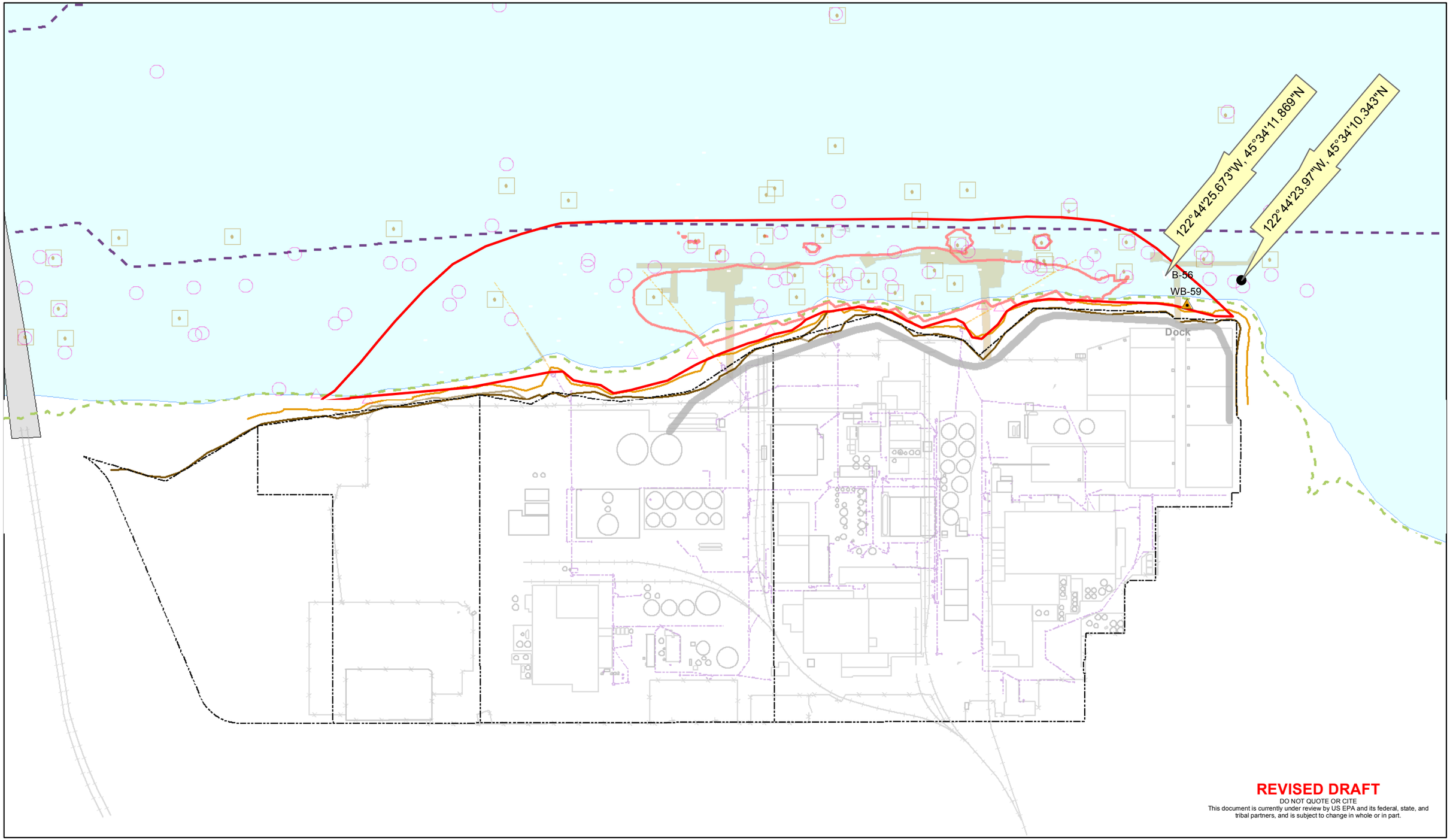
Recommended Change:
Remove the installation of WB-59 from the drilling program. This recommendation is based on the following rationale, 1) The FSP proposed location of WB-59 is inaccessible by barge or by land, 2) alternative locations are either outside of the preliminary RAA near the upstream end of the Salt Dock (>100 ft from the proposed location) or near the downstream end of the Salt Dock near already drilled boreholes, WB-56 and WB-57, 3) WB-59 is a proposed "step out" borehole that was to provide additional information on the extent of total DDx should any of the sediment samples from WB-56 exceed a total DDx concentration of 5 mg/kg, and 4) the preliminary draft DDx results from WB-56/56b indicate that the total DDx concentration is unlikely to exceed 5 mg/kg (on a dry weight basis) and the highest concentration DDx sample is the surface interval.

Eron Dodak, R.G.	_____	September 23, 2009
Field Operations Lead (or designee)	Signature	Date

Approval:

David Livermore, R.G.	_____	September 23, 2009
Project Manager	Signature	Date

Distribution:
LSS Project Manager
Integral Project Manager
Field Operations Lead
QA Officer
Project File
Other:



integral consulting

0 100 200 400 Feet

FEATURE SOURCES:
Bathymetric Information: Multibeam bathymetric survey conducted by David Evans and Associates, Inc. from February 6 - March 6, 2004.
Contours were derived from a Digital Terrain Model (DTM) based on a three-foot grid of multibeam data.
Vertical Datum: North American Vertical Datum of 1988(NAVD88).
Horizontal Datum: North American Datum of 1983 - 91 adjusted (NAD83/91), State Plane Coordinate System (SPCS), Oregon North Zone.
Units: International Feet.
Basemap: Basemap features updated in 2006 by David Evans and Associates. Ordinary high water line, top of bank, and other site features surveyed in April 2006.
Most buildings and structures on the Arkema site have been demolished or removed.
OHW and Top of Slope lines were created from the April 2006 DEA survey, the +12ft contour line was derived from the combined lidar/bathymetry grid.
Lot Lines: Created by importing pdf file from ERM, georeferencing to CAD lines (RMS error = 2.3042) and heads-up digitizing the lot lines.

- E-Sewer-L
- Storm Drain
- 12ft Contour
- Bridges
- Navigation Channel
- River
- Property and Lot Boundaries
- Docks and Structures 2005
- Ordinary High Water
- Top of Bank

Figure 2-1
Arkema EE/CA
Proposed Sediment Sampling Locations

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

September 23, 2009

Ms. Abbie Spielman
Integral Consulting Inc.
319 SW Washington Street
Suite 1150
Portland, OR 97204

Re: Arkema Project, Preliminary Pesticide Results

Dear Ms. Spielman:

Enclosed are preliminary analytical results for the following samples that were received by TestAmerica Burlington on September 22nd, 2009.

Lab Sample ID	Client Sample ID	Collected
15541-1	ARK-WB-56-0-2	09/15/09
15541-2	ARK-WB-56-2-4	09/15/09
15541-3	ARK-WB-56-4-6	09/15/09
15541-4	ARK-WB-56-6-8	09/15/09
15541-5	ARK-WB-56-8-10	09/15/09
15541-6	ARK-WB-56-10-11	09/15/09
15541-7	ARK-WB-56-12-14	09/15/09
15541-8	ARK-WB-56-14-16	09/15/09
15541-9	ARK-WB-78-14-16	09/15/09
15541-10	ARK-WB-56-16-18	09/15/09
15541-11	ARK-WB-56-18-20	09/15/09
15541-12	ARK-WB-56-20-22	09/15/09
15541-13	ARK-WB-56-22-24	09/15/09
15540-1	ARK-WB-56b-20.7-22	09/16/09
15540-2	ARK-WB-56b-22.7-24	09/16/09
15540-3	ARK-WB-56b-24.7-26	09/16/09
15540-4	ARK-WB-56b-26.7-28	09/16/09
15540-5	ARK-WB-56b-28.7-30	09/16/09
15540-6	ARK-WB-56b-30.7-32	09/16/09
15540-7	ARK-WB-56b-32.7-34	09/16/09
15540-8	ARK-WB-56b-34.7-36	09/16/09
15540-9	ARK-WB-56b-36.7-38	09/16/09
15540-10	ARK-WB-56b-38.7-40	09/16/09
15540-11	ARK-WB-56b-40.7-42	09/16/09
15540-12	ARK-WB-56b-42.7-44	09/16/09
15540-13	ARK-WB-56b-44.7-46	09/16/09
15540-14	ARK-WB-56b-46.7-47	09/16/09

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

The results presented in this report reflect preliminary screen analyses for the listed samples. One gram of sample was extracted into ten milliliters of solvent, and analyzed against a calibration standard containing all six DDX isomers, each at a concentration of 80 ug/L. The concentration of this standard is well above the formal analysis calibration range, as it was designed just to indicate if samples required a reduced extraction volume. This scenario results in a nominal wet-weight reporting limit of 800 ug/Kg, or 0.8 mg/Kg, however detections are possible well below this level. Assuming the samples may be up to 50% solid, the approximate dry weight reporting limit for each isomer is 1600 ug/Kg or 1.6 mg/Kg. The following spreadsheet summarizes the results for each sample.

Based on these results, all samples in this group will be formally extracted using twenty grams of sample. Although TestAmerica has had good success correlating the preliminary screen results with the final extractions, it is important to note that the final analyses are performed on a separate aliquot of sample, and the possibility of heterogeneity in the samples does exist. Additionally, the preliminary screen analyses are not subjected to cleanup procedures, and the analysis is accomplished on a single chromatographic column. Final results will vary slightly, but should be within the magnitude reported here.

If there are any questions regarding this submittal, please contact me at 802 660-1990.

Sincerely,

Jim Madison
Project Manager

Preliminary Screen Results
Arkema WB-56 and WB-56b

Lab Sample ID	Client Sample ID	2,4'-DDD mg/Kg	2,4'-DDE mg/Kg	2,4'-DDT mg/Kg	4,4'-DDD mg/Kg	4,4'-DDE mg/Kg	4,4'-DDT mg/Kg	Total mg/Kg
15541-1	ARK-WB-56-0-2	0.105	0.26	0.0405	0.17	0.185	0.5	**1.26 mg/Kg wet (approx. 2.52 mg/Kg dry)**
15541-2	ARK-WB-56-2-4	0.029	0.014	0.024	0.05	0.0125	0.05	**0.18 mg/Kg wet (approx. 0.36 mg/Kg dry)**
15541-3	ARK-WB-56-4-6	0.02	ND	0.0125	0.0195	0.0065	0.013	**0.052 mg/Kg wet (approx. 0.10 mg/Kg dry)**
15541-4	ARK-WB-56-6-8	ND	ND	ND	0.0075	ND	0.008	**0.016 mg/Kg wet (approx. 0.031 mg/Kg dry)**
15541-5	ARK-WB-56-8-10	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15541-6	ARK-WB-56-10-11	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15541-7	ARK-WB-56-12-14	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15541-8	ARK-WB-56-14-16	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15541-9	ARK-WB-78-14-16	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15541-10	ARK-WB-56-16-18	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15541-11	ARK-WB-56-18-20	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15541-12	ARK-WB-56-20-22	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15541-13	ARK-WB-56-22-24	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-1	ARK-WB-56b-20.7-22	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-2	ARK-WB-56b-22.7-24	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-3	ARK-WB-56b-24.7-26	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-4	ARK-WB-56b-26.7-28	ND	ND	ND	0.004	ND	ND	**0.004 mg/Kg wet (approx 0.008 mg/Kg dry)**
15540-5	ARK-WB-56b-28.7-30	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-6	ARK-WB-56b-30.7-32	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-7	ARK-WB-56b-32.7-34	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-8	ARK-WB-56b-34.7-36	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-9	ARK-WB-56b-36.7-38	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-10	ARK-WB-56b-38.7-40	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-11	ARK-WB-56b-40.7-42	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-12	ARK-WB-56b-42.7-44	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-13	ARK-WB-56b-44.7-46	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)
15540-14	ARK-WB-56b-46.7-47	ND	ND	ND	ND	ND	ND	< 0.80 mg/Kg wet (< approx. 1.6 mg/Kg dry)

ND = Not Detected

FIELD CHANGE REQUEST (FCR) FORM

Project Name: Arkema EE/CA Project No.: C167.1103
Client: Legacy Site Services Request No.: FCR-9

To: Sean Sheldrake, EPA Date: September 28, 2009

Field Change Request Title: Move location of WB-39 25 ft from riverbank.

Description:
The steep riverbank and a cutoff piling were located in the general vicinity of the FSP station coordinates for WB-39, which prevented the barge from being positioned at this station this afternoon. Because there is a steep bank in this location, there is also a concern about positioning the barge too close to the riverbank which could cause a misalignment of the casing when the river stage drops as a result of tidal fluctuations (such as what occurred with boreholes WB-31 and WB-56). CDM was notified immediately of the access issues related to WB-39.

Recommended Change:
Drill borehole WB-39 approximately 25 ft toward the river from the FSP coordinates. The drill rig will be positioned on the moon pool located on the base of the barge ramp so the borehole can be drilled as close as possible to the riverbank. The proposed location is considered as close to the riverbank as possible given river stage fluctuations and the steep riverbank in this vicinity. A move of greater than 20 ft from the FSP coordinates requires a field change request (FCR) according to FCR-1.

Eron Dodak, R.G.		September 28, 2009
Field Operations Lead (or designee)	Signature	Date

Approval:

David Livermore, R.G.		September 28, 2009
Project Manager	Signature	Date

Distribution:
LSS Project Manager
Integral Project Manager
Field Operations Lead
QA Officer
Project File
Other:

FIELD CHANGE REQUEST (FCR) FORM

Project Name: Arkema EE/CA Project No.: C167.1103
Client: Legacy Site Services Request No.: FCR-10

To: Sean Sheldrake, EPA Date: September 30, 2009

Field Change Request Title: Move location of WB-36 approximately 25 ft from riverbank.

Description:
A combination of the shallow water depth and Dock 1 structure prevent the barge from being positioned at the FSP station coordinates for WB-36. The barge will need to be positioned in deeper water away from the shoreline to provide enough draft for drilling WB-36.

Recommended Change:
Drill borehole WB-36 approximately 25 ft toward the river from the FSP coordinates. The drill rig will be positioned on the moon pool located on the base of the barge ramp so the borehole can be drilled as close as possible to the riverbank. The proposed location is considered as close to the riverbank as is physically possible to maneuver given the shallow water depths at this location. A move of greater than 20 ft from the FSP coordinates requires a field change request (FCR) according to FCR-1.

Eron Dodak, R.G. September 30, 2009
Field Operations Lead (or designee) Signature Date

Approval:

David Livermore, R.G. September 30, 2009
Project Manager Signature Date

Distribution:
LSS Project Manager
Integral Project Manager
Field Operations Lead
QA Officer
Project File
Other:

FIELD CHANGE REQUEST (FCR) FORM

Project Name: Arkema EE/CA Project No.: MN000609.0001.00007
Client: Legacy Site Services Request No.: FCR-11

To: Sean Sheldrake, EPA Date: October 12, 2009

Field Change Request Title: Flexibility for Changing Geotechnical Exploration Locations.

Description:
The locations of the co-located CPTs and SPTs were originally selected to be immediately adjacent to existing boring locations from the 2003 investigation (WB-9, WB-11, and WB-23). This was done so that geotechnical data can be collected targeting specific soil layers present at the site. In the process of transferring the locations of the co-located explorations from a drawing that was marked up by hand to a table with target coordinates, the new exploration locations ended up too far apart from each other and too far from the selected 2003 locations.

Recommended Change:
Move the co-located explorations closer to the existing boring locations to increase the likelihood that the new explorations will encounter similar conditions as the 2003 borings. This may require moving the explorations from the target locations provided in the field sampling plan by up to about 30 feet. Generally, we recommend that ARCADIS be provided the flexibility to move exploration locations by up to 50 feet without further field change requests. Changing exploration locations may become necessary if obstruction or other constraints in the field do not allow access to the target locations. Alternative locations will be approved by ARCADIS' engineer prior to advancing the explorations and will generally be selected in the best interest of the project to collect representative and meaningful geotechnical data for engineering purposes.

Carsten Becker	Carsten Becker	October 12, 2009
Engineer	Signature	Date

Approval:

Kristi Maitland	Kristi Maitland	October 12, 2009
Project Manager	Signature	Date

Distribution:
LSS Project Manager
Integral Project Manager
ARCADIS Project Manager
Field Operations Lead
QA Officer
Project File
Other:

Appendix E
Split Sampling Laboratory Validation Reports

Select from Validation Reports Listed Below

E-1 Data Validation Report for SVOCs, PAHs, Pesticides, and PCB Analyses for SDGs JBPM4 and JBQZ5

E-2 Data Validation Spreadsheet for SVOCs, PAHs, Pesticides, and PCB Analyses for SDG JBPM4

E-3 Data Validation Spreadsheet for SVOCs, PAHs, Pesticides, and PCB Analyses for SDG JBQZ5

E-4 Data Validation Report for SVOCs, PAHs, Pesticides, and PCB Analyses for SDG JBQ27

E-5 Data Validation Report for VOC Analyses for SDGs JBQ14, JBPJ4 and JBPL8

E-6 Data Validation Report for VOC Analyses for SDG JBR06

E-7 Data Validation Report for Dioxins and Furans Analyses for SDGs JBPJ7, JBQ12, JBQ37 and JBQZ6

E-8 Data Validation Report for Tributyltin Analyses for SDGs JBPJ8, JBPN3, JBQ33 and JBQZ7

E-9 Case Narrative for Asbestos Analysis, Project Code TEC-943B

E-10 Asbestos Split Sampling Analytical Laboratory Report

Appendix F
Data Usability Report

CDM

Appendix G
Tabulated Split Sampling Analytical Data

Table 1: Split Sampling Sediment Data - Semivolatile Organic Compounds

Sample Code	JBPJ6		JBPK3		JBPL1		JBPM0		JBPM9		JBQ11		JBQ16		JBQ20	
Sample Name	ARK-WB-65-8-10		ARK-WB-66-8-10		ARK-WB-63-10-12		ARK-WB-51-10-12		ARK-WB-40-6-8		ARK-WB-34-4-6		ARK-WB-49-6-8		ARK-WB-49-14-16	
Sample Date	8/18/2009		8/19/2009		8/20/2009		8/28/2009		9/3/2009		9/4/2009		9/9/2009		9/9/2009	
Chemical Name																
Semi-Volatile Organic Compounds (µg/kg)																
1,1'-Biphenyl	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
1,2,4,5-Tetrachlorobenzene	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
1,2,4-Trichlorobenzene	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
1,2-Diphenylhydrazine	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2,2'-oxybis(1-Chloropropane)	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2,3,5,6-Tetrachlorophenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2,3,4,6-Tetrachlorophenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2,4,5-Trichlorophenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2,4,6-Trichlorophenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2,4-Dichlorophenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2,4-Dimethylphenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2,4-Dinitrophenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2,4-Dinitrotoluene	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2,6-Dinitrotoluene	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2-Chloronaphthalene	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2-Chlorophenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2-Methylnaphthalene	5.0	J	35	J	1.4	J	1.9	J	4.8		3.7	J	2.5	U	2.6	U
2-Methylphenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2-Nitroaniline	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
2-Nitrophenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
3,3'-Dichlorobenzidine	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
3-Methylphenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
3-Nitroaniline	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
4,6-Dinitro-2-methylphenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
4-Bromophenyl-phenylether	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
4-Chloro-3-methylphenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
4-Chloroaniline	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
4-Chlorophenyl-phenylether	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
4-Methylphenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
4-Nitroaniline	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
4-Nitrophenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Acenaphthene	7.4	J	170		2.1	J	2.6	J	6.4		3.8	U	2.5	U	2.6	U
Acenaphthylene	11	J	26	J	3.4	J	2.7	J	6.7		3.8	U	2.5	U	2.6	U
Acetophenone	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Aniline	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Anthracene	14		95	J	7.4	J	8.1		14		3.8	U	2.5	U	2.6	U
Atrazine	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Benzaldehyde	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Benzo(a)anthracene	110	J	180		80	J	71	J	86		24		8.0		7.9	
Benzo(a)pyrene	170		230		160	J	36	J	89		5.0		2.5	U	3.5	
Benzo(b)fluoranthene	110	J	200		130	J	38	J	78		8.7		2.5	U	2.6	U
Benzo(g,h,i)perylene	160		250		44	J	36	J	16		4.7		2.8		2.2	J
Benzo(k)fluoranthene	130		170		94	J	51	J	41	J	3.9	J	2.5	U	2.6	U
Benzoic acid	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Benzyl alcohol	240	U	290	U	220	U	230	U	220	UJ	320	UJ	210	UJ	210	UJ
bis(2-Chloroethoxy)methane	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
bis(2-Chloroethyl)ether	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U

Table 1: Split Sampling Sediment Data - Semivolatile Organic Compounds

Sample Code	JBPJ6		JBPK3		JBPL1		JBPM0		JBPM9		JBQ11		JBQ16		JBQ20	
Sample Name	ARK-WB-65-8-10		ARK-WB-66-8-10		ARK-WB-63-10-12		ARK-WB-51-10-12		ARK-WB-40-6-8		ARK-WB-34-4-6		ARK-WB-49-6-8		ARK-WB-49-14-16	
Sample Date	8/18/2009		8/19/2009		8/20/2009		8/28/2009		9/3/2009		9/4/2009		9/9/2009		9/9/2009	
Chemical Name																
Semi-Volatile Organic Compounds (µg/kg)																
bis(2-Ethylhexyl)phthalate	240	U	290	U	220	U	150	J	220	U	92	J	110	J	51	J
Butylbenzylphthalate	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Caprolactam	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Carbazole	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Chrysene	120		270		83	J	45	J	120		32		16		12	
Dibenz(a,h)anthracene	61	J	73	J	17	J	6.7		7.1		3.6	J	2.3	J	2.2	J
Dibenzofuran	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Diethylphthalate	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Dimethylphthalate	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Di-n-butylphthalate	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Di-n-octylphthalate	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Fluoranthene	150		840		35	J	45	J	42		25		2.5	U	5.6	
Fluorene	7.6	J	140	J	2.1	J	2.7	J	5		3.8	U	2.5	U	2.6	U
Hexachlorobenzene	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Hexachlorobutadiene	240	U	290	U	220	U	230	U	45	J	320	U	210	U	210	U
Hexachlorocyclopentadiene	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Hexachloroethane	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Indeno(1,2,3-cd)pyrene	140		180		47	J	38	J	14		3.3	J	2.2	J	2.6	U
Isophorone	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Naphthalene	13	J	79	J	4.2	J	3.8		10		4.8		2.5	U	2.6	U
Nitrobenzene	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
N-Nitrosodimethylamine	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
N-Nitroso-di-n-propylamine	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
N-Nitrosodiphenylamine	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Pentachlorophenol	5.7	U	6.8	U	5.2	U	35	J	2.9	J	8.6	J	2.8	J	210	U
Phenanthrene	61	J	970		16	J	13		19		4.8		2.5	U	2.6	U
Phenol	240	U	290	U	220	U	230	U	220	U	320	U	210	U	210	U
Pyrene	200		710		55	J	65	J	52		30		8.0		7.3	

Table 1: Split Sampling Sediment Data - Semivolatile Organic Compounds

Sample Code	JBQ23		JBQ31		JBQ36		JBQ40		JBQ45		JBQZ5		JBQZ9		JBR03	
Sample Name	ARK-WB-49-20-22		ARK-WB-56-18-20		ARK-WB-30-10-12		ARK-WB-30-26-28		ARK-WB-30-40-42		ARK-WB-42-20-23		ARK-WB-42-23-26		ARK-WB-42-6-14	
Sample Date	9/9/2009		9/15/2009		9/18/2009		9/18/2009		9/18/2009		9/25/2009		9/25/2009		9/25/2009	
Chemical Name																
Semi-Volatile Organic Compounds (µg/kg)																
1,1'-Biphenyl	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	52	J
1,2,4,5-Tetrachlorobenzene	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
1,2,4-Trichlorobenzene	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
1,2-Diphenylhydrazine	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2,2'-oxybis(1-Chloropropane)	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2,3,5,6-Tetrachlorophenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2,3,4,6-Tetrachlorophenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2,4,5-Trichlorophenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2,4,6-Trichlorophenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2,4-Dichlorophenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2,4-Dimethylphenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2,4-Dinitrophenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2,4-Dinitrotoluene	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2,6-Dinitrotoluene	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2-Chloronaphthalene	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2-Chlorophenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	110	J
2-Methylnaphthalene	2.5	UJ	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	350	
2-Methylphenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2-Nitroaniline	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
2-Nitrophenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
3,3'-Dichlorobenzidine	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
3-Methylphenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
3-Nitroaniline	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
4,6-Dinitro-2-methylphenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
4-Bromophenyl-phenylether	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
4-Chloro-3-methylphenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
4-Chloroaniline	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
4-Chlorophenyl-phenylether	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
4-Methylphenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
4-Nitroaniline	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
4-Nitrophenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Acenaphthene	2.5	UJ	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	140	J
Acenaphthylene	2.5	UJ	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	32	
Acetophenone	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Aniline	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Anthracene	2.5	UJ	2.8	UJ	2.7	UJ	2.8	UJ	2.7	UJ	2.8	U	2.7	U	82	J
Atrazine	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Benzaldehyde	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Benzo(a)anthracene	5.6	J	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	130	J
Benzo(a)pyrene	2.4	J	2.8	U	2.7	U	2.8	U	2.7	U	2.8	UJ	2.7	UJ	65	
Benzo(b)fluoranthene	4.6	J	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	110	J
Benzo(g,h,i)perylene	3.4	J	2.8	U	2.7	U	2.8	U	2.7	U	2.4	J	2.7	U	73	J
Benzo(k)fluoranthene	2.8	J	2.8	U	2.7	U	2.8	U	2.7	U	2.8	UJ	2.7	UJ	92	J
Benzoic acid	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Benzyl alcohol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
bis(2-Chloroethoxy)methane	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
bis(2-Chloroethyl)ether	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U

Table 1: Split Sampling Sediment Data - Semivolatile Organic Compounds

Sample Code	JBQ23		JBQ31		JBQ36		JBQ40		JBQ45		JBQZ5		JBQZ9		JBR03	
Sample Name	ARK-WB-49-20-22		ARK-WB-56-18-20		ARK-WB-30-10-12		ARK-WB-30-26-28		ARK-WB-30-40-42		ARK-WB-42-20-23		ARK-WB-42-23-26		ARK-WB-42-6-14	
Sample Date	9/9/2009		9/15/2009		9/18/2009		9/18/2009		9/18/2009		9/25/2009		9/25/2009		9/25/2009	
Chemical Name																
Semi-Volatile Organic Compounds (µg/kg)																
bis(2-Ethylhexyl)phthalate	200	UJ	51	J	35	J	230	U	220	U	230	U	220	U	250	U
Butylbenzylphthalate	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Caprolactam	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Carbazole	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Chrysene	9.7	J	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	160	J
Dibenz(a,h)anthracene	2.0	J	2.8	U	2.7	U	2.8	U	2.7	U	2.2	J	2.7	U	65	
Dibenzofuran	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	80	J
Diethylphthalate	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Dimethylphthalate	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Di-n-butylphthalate	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Di-n-octylphthalate	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Fluoranthene	6.8	J	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	420	
Fluorene	2.5	UJ	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	83	J
Hexachlorobenzene	200	UJ	0.28	U	220	U	230	U	220	U	230	U	220	U	250	U
Hexachlorobutadiene	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	39	J
Hexachlorocyclopentadiene	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Hexachloroethane	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Indeno(1,2,3-cd)pyrene	2.5	J	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	58	J
Isophorone	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Naphthalene	2.5	UJ	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	880	
Nitrobenzene	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
N-Nitrosodimethylamine	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
N-Nitroso-di-n-propylamine	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
N-Nitrosodiphenylamine	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Pentachlorophenol	2.4	J	230	U	220	U	230	U	220	U	5.6	U	5.4	U	6.1	U
Phenanthrene	4.1	J	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	510	
Phenol	200	UJ	230	U	220	U	230	U	220	U	230	U	220	U	250	U
Pyrene	2.5	UJ	2.8	U	2.7	U	2.8	U	2.7	U	2.8	U	2.7	U	330	

Table 1: Split Sampling Sediment Data - Semivolatile Organic Compounds

Sample Code	JBR07		JBR12		JBR16		JBR20	
Sample Name	ARK-WB-35-10-20		ARK-WB-35-20-23		ARK-WB-35-23-26		ARK-WB-35-32-35	
Sample Date	9/30/2009		9/30/2009		9/30/2009		9/30/2009	
Chemical Name								
Semi-Volatile Organic Compounds (µg/kg)								
1,1'-Biphenyl	82	J	250	U	240	U	220	U
1,2,4,5-Tetrachlorobenzene	280	U	250	U	240	U	220	U
1,2,4-Trichlorobenzene	280	U	250	U	240	U	220	U
1,2-Diphenylhydrazine	280	U	250	U	240	U	220	U
2,2'-oxybis(1-Chloropropane)	280	U	250	U	240	U	220	U
2,3,5,6-Tetrachlorophenol	280	U	250	U	240	U	220	U
2,3,4,6-Tetrachlorophenol	280	U	250	U	240	U	220	U
2,4,5-Trichlorophenol	280	U	250	U	240	U	220	U
2,4,6-Trichlorophenol	280	U	250	U	240	U	220	U
2,4-Dichlorophenol	280	U	250	U	240	U	220	U
2,4-Dimethylphenol	280	U	250	U	240	U	220	U
2,4-Dinitrophenol	280	U	250	U	240	U	220	U
2,4-Dinitrotoluene	280	U	250	U	240	U	220	U
2,6-Dinitrotoluene	280	U	250	U	240	U	220	U
2-Chloronaphthalene	280	U	250	U	240	U	220	U
2-Chlorophenol	280	U	250	U	240	U	220	U
2-Methylnaphthalene	1100		3.1	U	2.9	U	2.7	U
2-Methylphenol	280	U	250	U	240	U	220	U
2-Nitroaniline	280	U	250	U	240	U	220	U
2-Nitrophenol	280	U	250	U	240	U	220	U
3,3'-Dichlorobenzidine	280	U	250	U	240	U	220	U
3-Methylphenol	280	U	250	U	240	U	220	U
3-Nitroaniline	280	U	250	U	240	U	220	U
4,6-Dinitro-2-methylphenol	280	U	250	U	240	U	220	U
4-Bromophenyl-phenylether	280	U	250	U	240	U	220	U
4-Chloro-3-methylphenol	280	U	250	U	240	U	220	U
4-Chloroaniline	280	U	250	U	240	U	220	U
4-Chlorophenyl-phenylether	280	U	250	U	240	U	220	U
4-Methylphenol	280	U	250	U	240	U	220	U
4-Nitroaniline	280	U	250	U	240	U	220	U
4-Nitrophenol	280	U	250	U	240	U	220	U
Acenaphthene	310		3.1	U	2.9	U	2.7	U
Acenaphthylene	63		3.1	U	2.9	U	2.7	U
Acetophenone	280	U	250	U	240	U	220	U
Aniline	280	U	250	U	240	U	220	U
Anthracene	420		3.1	U	2.9	U	2.7	U
Atrazine	280	U	250	U	240	U	220	U
Benzaldehyde	280	U	250	U	240	U	220	U
Benzo(a)anthracene	670		6.9		3.4		2.7	U
Benzo(a)pyrene	350		4.8	J	2.9	UJ	2.7	UJ
Benzo(b)fluoranthene	520		5.8		3.6		2.7	U
Benzo(g,h,i)perylene	250	J	4.5		4.4		2.8	
Benzo(k)fluoranthene	490		3.9	J	2.6	J	2.7	UJ
Benzoic acid	280	U	250	U	240	U	220	U
Benzyl alcohol	280	U	250	U	240	U	220	U
bis(2-Chloroethoxy)methane	280	U	250	U	240	U	220	U
bis(2-Chloroethyl)ether	280	U	250	U	240	U	220	U

Table 1: Split Sampling Sediment Data - Semivolatile Organic Compounds

Sample Code	JBR07		JBR12		JBR16		JBR20	
Sample Name	ARK-WB-35-10-20		ARK-WB-35-20-23		ARK-WB-35-23-26		ARK-WB-35-32-35	
Sample Date	9/30/2009		9/30/2009		9/30/2009		9/30/2009	
Chemical Name								
Semi-Volatile Organic Compounds (µg/kg)								
bis(2-Ethylhexyl)phthalate	280	U	250	U	240	U	220	U
Butylbenzylphthalate	280	U	250	U	240	U	220	U
Caprolactam	280	U	250	U	240	U	220	U
Carbazole	280	U	250	U	240	U	220	U
Chrysene	850		16		8.5		3.6	
Dibenz(a,h)anthracene	110	J	4.1		3.7		2.5	J
Dibenzofuran	160	J	250	U	240	U	220	U
Diethylphthalate	280	U	250	U	240	U	220	U
Dimethylphthalate	280	U	250	U	240	U	220	U
Di-n-butylphthalate	280	U	250	U	240	U	220	U
Di-n-octylphthalate	280	U	250	U	240	U	220	U
Fluoranthene	1700		4.2		2.9	U	2.7	U
Fluorene	230	J	3.1	U	2.9	U	2.7	U
Hexachlorobenzene	280	U	250	U	240	U	220	U
Hexachlorobutadiene	280	U	250	U	240	U	220	U
Hexachlorocyclopentadiene	280	U	250	U	240	U	220	U
Hexachloroethane	86	J	250	U	240	U	220	U
Indeno(1,2,3-cd)pyrene	230	J	4.2		3.4		2.5	J
Isophorone	280	U	250	U	240	U	220	U
Naphthalene	1200		3.1	U	2.9	U	2.7	U
Nitrobenzene	280	U	250	U	240	U	220	U
N-Nitrosodimethylamine	280	U	250	U	240	U	220	U
N-Nitroso-di-n-propylamine	280	U	250	U	240	U	220	U
N-Nitrosodiphenylamine	280	U	250	U	240	U	220	U
Pentachlorophenol	6.8	U	6.1	U	5.9	U	5.5	U
Phenanthrene	1700		3.1	U	2.9	U	2.7	U
Phenol	280	U	250	U	240	U	220	U
Pyrene	1200		5.4		2.9	U	2.7	U

Notes:
µg/kg - micrograms per kilogram (parts per billion)
J - The value reported is an estimated value
U - Not detected
R - Rejected

Table 2: Split Sampling Sediment Data - Volatile Organic Compounds

Sample Code	JBPJ4		JBPK1		JBPL0		JBPL4		JBPL8		JBPM6		JBPN2		JBPN4		JBQ09	
Sample Name	ARK-WB-65-8-10		ARK-WB-66-8-10		ARK-WB-63-10-12		ARK-WB-64-10-12		ARK-WB-51-10-12		ARK-WB-40-0-2		ARK-WB-44-2-4		ARK-WB-40-10-12		ARK-WB-34-4-6	
Sample Date	8/18/2009		8/19/2009		8/20/2009		8/25/2009		8/28/2009		9/3/2009		9/2/2009		9/3/2009		9/4/2009	
Chemical Name																		
Volatile Organic Compounds (µg/kg)																		
1,1,1-Trichloroethane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
1,1,2,2-Tetrachloroethane	7.8	U	8.6	U	6.3	U	7.1	R	6.4	U	1300	U	570	U	400	U	660	U
1,1,2-Trichloro-1,2,2-trifluoroethane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
1,1,2-Trichloroethane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
1,1-Dichloroethane	7.8	U	8.6	U	6.3	U	7.1	UJ	6.4	U	1300	U	570	U	400	U	660	U
1,1-Dichloroethene	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
1,2,3-Trichlorobenzene	7.8	U	8.6	UJ	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
1,2,4-Trichlorobenzene	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
1,2-Dibromo-3-chloropropane	7.8	U	8.6	UJ	6.3	U	7.1	R	6.4	U	1300	U	570	U	400	U	660	U
1,2-Dibromoethane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
1,2-Dichlorobenzene	7.8	U	8.6	UJ	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
1,2-Dichloroethane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
1,2-Dichloropropane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
1,3-Dichlorobenzene	7.8	U	8.6	UJ	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
1,4-Dichlorobenzene	7.8	U	8.6	UJ	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
1,4-Dioxane	160	R	170	R	130	R	140	R	130	R	130000	R	11000	R	8100	R	13000	R
2-Butanone	8	J	45		13	U	6.2	J	10	J	2700	U	1100	U	810	U	1300	U
2-Hexanone	16	U	17	U	13	U	14	U	13	U	2700	U	1100	U	810	U	1300	U
4-Methyl-2-pentanone	16	U	17	U	13	U	14	U	13	U	2700	U	1100	U	810	U	1300	U
Acetone	25		140		6.8	J	35		24		2700	U	1100	U	810	U	1300	U
Benzene	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Bromochloromethane	7.8	U	8.6	U	6.3	U	7.1	UJ	6.4	U	1300	U	570	U	400	U	660	U
Bromodichloromethane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Bromoform	7.8	U	8.6	U	6.3	U	7.1	UJ	6.4	U	1300	U	570	U	400	U	660	U
Bromomethane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	UJ
Carbon Disulfide	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Carbon Tetrachloride	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Chlorobenzene	7.8	U	23		6.3	U	7.1	U	6.4	U	140000		10000		10000		2200	
Chloroethane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Chloroform	7.8	U	8.6	U	6.3	U	140	J	6.4	U	1300	U	570	U	400	U	310	J
Chloromethane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
cis-1,2-Dichloroethene	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
cis-1,3-Dichloropropene	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Cyclohexane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Dibromochloromethane	7.8	U	8.6	U	6.3	U	7.1	UJ	6.4	U	1300	U	570	U	400	U	660	U
Dichlorodifluoromethane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Ethylbenzene	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Isopropylbenzene	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
m,p-Xylenes	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Methyl Acetate	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	530	J	140	J	400	U	660	U
Methyl Tert-Butyl Ether	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Metylcyclohexane	7.8	U	8.6	U	6.3	U	3.9	J	6.4	U	1300	U	570	U	400	U	660	U
Methylene Chloride	7.8	U	8.6	U	6.3	U	37		6.4	U	1300	U	570	U	400	U	660	U
o-Xylene	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Styrene	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Tetrachloroethene	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	440		660	U
Toluene	7.8	U	4.4	J	6.3	U	3.3	J	6.4	U	1300	U	570	U	400	U	660	U
trans-1,2-Dichloroethene	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
trans-1,3-Dichloropropene	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Trichloroethene	7.8	U	8.6	U	6.3	U	7.4		6.4	U	1300	U	570	U	140	J	660	U
Trichlorofluoromethane	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U
Vinyl Chloride	7.8	U	8.6	U	6.3	U	7.1	U	6.4	U	1300	U	570	U	400	U	660	U

Table 2: Split Sampling Sediment Data - Volatile Organic Compounds

Sample Code	JBQ14		JBQ19		JBQ26		JBQ29		JBQ34		JBQ39		JBQ44		JBQZ4		JBQZ8	
Sample Name	ARK-WB-49-4-6		ARK-WB-49-14-16		ARK-WB-49-22-23_5		ARK-WB-56-18-20		ARK-WB-30-10-12		ARK-WB-30-26-28		ARK-WB-30-40-42		ARK-WB-42-20-23		ARK-WB-42-23-26	
Sample Date	9/9/2009		9/9/2009		9/9/2009		9/15/2009		9/18/2009		9/18/2009		9/18/2009		9/25/2009		9/25/2009	
Chemical Name																		
Volatile Organic Compounds (µg/kg)																		
1,1,1-Trichloroethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,1,2,2-Tetrachloroethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,1,2-Trichloroethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,1-Dichloroethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,1-Dichloroethene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,2,3-Trichlorobenzene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,2,4-Trichlorobenzene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,2-Dibromo-3-chloropropane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,2-Dibromoethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,2-Dichlorobenzene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,2-Dichloroethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,2-Dichloropropane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,3-Dichlorobenzene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,4-Dichlorobenzene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
1,4-Dioxane	130	U	130	U	130	U	140	U	140	R	130	R	130	R	9000	R	130	R
2-Butanone	7.3	J	13	U	13	U	14	U	14	U	13	U	13	U	900	U	13	U
2-Hexanone	13	U	13	U	13	U	14	U	14	U	13	U	13	U	900	U	13	U
4-Methyl-2-pentanone	13	U	13	U	13	U	14	U	14	U	13	U	13	U	900	U	13	U
Acetone	19		6.3	J	8.5	J	14	U	14	U	12	J	8.6	J	900	U	8.4	J
Benzene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Chlorobromomethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Bromodichloromethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Bromoform	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Bromomethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Carbon Disulfide	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Carbon Tetrachloride	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Chlorobenzene	8.8		6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	640		270	
Chloroethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Chloroform	6.3	U	6.4	U	6.3	U	13		8.7	U	66		76		450	U	6.7	U
Chloromethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
cis-1,2-Dichloroethene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
cis-1,3-Dichloropropene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Cyclohexane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Dibromochloromethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Dichlorodifluoromethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Ethylbenzene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Isopropylbenzene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
m,p-Xylenes	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Methyl Acetate	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Methyl Tert-Butyl Ether	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Metylcyclohexane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Methylene Chloride	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
o-Xylene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Styrene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Tetrachloroethene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	2.7	J
Toluene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
trans-1,2-Dichloroethene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
trans-1,3-Dichloropropene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Trichloroethene	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Trichlorofluoromethane	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U
Vinyl Chloride	6.3	U	6.4	U	6.3	U	6.9	U	6.9	U	6.6	U	6.5	U	450	U	6.7	U

Table 2: Split Sampling Sediment Data - Volatile Organic Compounds

Sample Code	JBR02		JBR06		JBR10		JBR15		JBR19	
Sample Name	ARK-WB-42-6-14		ARK-WB-35-10-20		ARK-WB-35-20-23		ARK-WB-35-23-26		ARK-WB-35-32-35	
Sample Date	9/25/2009		9/30/2009		9/30/2009		9/30/2009		9/30/2009	
Chemical Name										
Volatile Organic Compounds (µg/kg)										
1,1,1-Trichloroethane	2800	UJ	3100	U	460	U	460	U	6.7	U
1,1,2,2-Tetrachloroethane	2800	U	3100	U	460	U	460	U	6.7	U
1,1,2-Trichloro-1,2,2-trifluoroethane	2800	U	3100	U	460	U	460	U	6.7	U
1,1,2-Trichloroethane	2800	U	3100	U	460	U	460	U	6.7	U
1,1-Dichloroethane	2800	UJ	3100	U	460	U	460	U	6.7	U
1,1-Dichloroethene	2800	U	3100	U	460	U	460	U	6.7	U
1,2,3-Trichlorobenzene	2800	U	3100	U	460	U	460	U	6.7	U
1,2,4-Trichlorobenzene	2800	U	3100	U	460	U	460	U	6.7	U
1,2-Dibromo-3-chloropropane	2800	U	3100	U	460	U	460	U	6.7	U
1,2-Dibromoethane	2800	UJ	3100	U	460	U	460	U	6.7	U
1,2-Dichlorobenzene	2800	U	730	J	460	U	460	U	6.7	U
1,2-Dichloroethane	2800	UJ	3100	U	460	U	460	U	6.7	U
1,2-Dichloropropane	2800	U	3100	U	460	U	460	U	6.7	U
1,3-Dichlorobenzene	2800	U	3100	U	460	U	460	U	6.7	U
1,4-Dichlorobenzene	790	J	2000	J	460	U	460	U	6.7	U
1,4-Dioxane	56000	R	62000	R	9200	R	9200	R	130	R
2-Butanone	5600	U	6200	U	920	U	920	U	13	U
2-Hexanone	5600	U	6200	U	920	U	920	U	13	U
4-Methyl-2-pentanone	5600	U	6200	U	920	U	920	U	13	U
Acetone	5600	U	6200	U	920	U	920	U	14	
Benzene	2800	U	3100	U	460	U	460	U	6.7	U
Chlorobromomethane	2800	U	3100	U	460	U	460	U	6.7	U
Bromodichloromethane	2800	U	3100	U	460	U	460	U	6.7	U
Bromoform	2800	U	3100	U	460	U	460	U	6.7	U
Bromomethane	2800	U	3100	U	460	U	460	U	6.7	U
Carbon Disulfide	2800	U	3100	U	460	U	460	U	6.7	U
Carbon Tetrachloride	2800	UJ	3100	U	460	U	460	U	6.7	U
Chlorobenzene	330000		390000		1600		1500		56	
Chloroethane	2800	U	1600	J	460	U	460	U	6.7	U
Chloroform	2800	U	2300	J	460	U	460	U	49	
Chloromethane	2800	U	3100	U	460	U	460	U	6.7	U
cis-1,2-Dichloroethene	2800	U	3100	U	460	U	460	U	6.7	U
cis-1,3-Dichloropropene	2800	U	3100	U	460	U	460	U	6.7	U
Cyclohexane	2800	U	3100	U	460	U	460	U	6.7	U
Dibromochloromethane	2800	U	3100	U	460	U	460	U	6.7	U
Dichlorodifluoromethane	2800	U	3100	U	460	U	460	U	6.7	U
Ethylbenzene	2800	U	3100	U	460	U	460	U	6.7	U
Isopropylbenzene	2800	U	3100	U	460	U	460	U	6.7	U
m,p-Xylenes	2800	U	3100	U	460	U	460	U	6.7	U
Methyl Acetate	2800	UJ	3100	U	460	U	460	U	6.7	U
Methyl Tert-Butyl Ether	2800	UJ	3100	U	460	U	460	U	6.7	U
Metylcyclohexane	2800	U	3100	U	460	U	460	U	6.7	U
Methylene Chloride	2800	UJ	3100	U	460	U	460	U	6.7	U
o-Xylene	2800	U	3100	U	460	U	460	U	6.7	U
Styrene	2800	U	3100	U	460	U	460	U	6.7	U
Tetrachloroethene	19000		610	J	460	U	460	U	6.7	U
Toluene	2800	U	3100	U	460	U	460	U	6.7	U
trans-1,2-Dichloroethene	2800	U	3100	U	460	U	460	U	6.7	U
trans-1,3-Dichloropropene	2800	U	3100	U	460	U	460	U	6.7	U
Trichloroethene	730	J	3100	U	460	U	460	U	6.7	U
Trichlorofluoromethane	2800	UJ	3100	U	460	U	460	U	6.7	U
Vinyl Chloride	2800	U	3100	U	460	U	460	U	6.7	U

Notes:
µg/kg - micrograms per kilogram (parts per billion)
J - The value reported is an estimated value
U - Not detected
R - Rejected

Table 3: Split Sampling Sediment Data - Pesticide Compounds

Chemical Name	JBPJ3 ARK-WB-65-6-8 8/18/2009		JBPJ6 ARK-WB-65-8-10 8/18/2009		JBPJ9 ARK-WB-66-4-6 8/19/2009		JBPK0 ARK-WB-66-6-8 8/19/2009		JBPK3 ARK-WB-66-8-10 8/19/2009		JBPK8 ARK-WB-63-4-6 8/20/2009		JBPK9 ARK-WB-63-6-8 8/20/2009		JBPL1 ARK-WB-63-10-12 8/20/2009	
Pesticides (µg/kg)																
2,4'-DDD	33	UR	27	UR	35	UR	33	UR	33	UR	35	UR	38	R	25	UR
2,4'-DDE	33	UR	27	UR	35	UR	110	R	32	R	35	UR	67	R	25	UR
2,4'-DDT	10000	R	27	UR	35	UR	1200	R	7300	R	260	R	480	R	130	R
4,4'-DDD	33	UR	27	UR	35	UR	33	UR	33	UR	35	UR	240	R	25	UR
4,4'-DDE	17	UR	13	UR	17	UR	130	R	190	R	17	UR	180	R	13	UR
4,4'-DDT	21000	R	14	R	33	R	5000	R	16000	R	90	R	2900	R	360	R
Aldrin	17	UR	13	UR	17	UR	16	UR	17	UR	17	UR	16	UR	13	UR
alpha-BHC	17	UR	13	UR	17	UR	16	UR	17	UR	17	UR	16	UR	13	UR
alpha-Chlordane	17	UR	13	UR	17	UR	16	UR	17	UR	17	UR	16	UR	13	UR
beta-BHC	17	UR	13	UR	17	UR	16	UR	17	UR	130	R	13	R	13	UR
cis-Nonachlor	33	UR	27	UR	35	UR	33	UR	33	UR	35	UR	32	UR	25	UR
delta-BHC	17	UR	13	UR	17	UR	16	UR	23	R	17	UR	16	UR	13	UR
Dieldrin	17	UR	13	UR	17	UR	16	UR	17	UR	17	UR	16	UR	13	UR
Endosulfan I	17	UR	13	UR	17	UR	16	UR	17	UR	17	UR	16	UR	13	UR
Endosulfan II	33	UR	27	UR	35	UR	33	UR	33	UR	35	UR	32	UR	25	UR
Endosulfan sulfate	33	UR	27	UR	35	UR	33	UR	33	UR	35	UR	32	UR	25	UR
Endrin	33	UR	27	UR	35	UR	33	UR	33	UR	35	UR	220	R	25	UR
Endrin aldehyde	33	UR	27	UR	35	UR	33	UR	33	UR	35	UR	32	UR	25	UR
Endrin ketone	33	UR	27	UR	35	UR	33	UR	33	UR	35	UR	32	UR	25	UR
gamma-BHC (Lindane)	17	UR	13	UR	17	UR	16	UR	17	UR	17	UR	16	UR	13	UR
gamma-Chlordane	17	UR	13	UR	23	R	16	UR	17	UR	17	UR	16	UR	13	UR
Heptachlor	17	UR	13	UR	17	UR	16	UR	17	UR	17	UR	16	UR	13	UR
Heptachlor epoxide	17	UR	13	UR	17	UR	16	UR	17	UR	17	UR	16	UR	13	UR
Hexachlorobutadiene	33	UR	27	UR	11	R	11	R	11	R	28	R	12	R	5.6	R
Hexachlorobenzene	33	UR	27	UR	35	UR	33	UR	33	UR	35	UR	32	UR	25	UR
Methoxychlor	170	UR	130	UR	33	R	160	UR	170	UR	170	UR	160	UR	130	UR
Oxychlordane	33	UR	27	UR	35	UR	33	UR	33	UR	35	UR	32	UR	25	UR
Octachlorostyrene	33	UR	27	UR	8.6	UR	33	UR	33	UR	35	UR	32	UR	25	UR
Toxaphene	1700	UR	1300	UR	1700	UR	1600	UR	1700	UR	1700	UR	1600	UR	1300	UR
trans-Nonachlor	33	UR	27	UR	35	UR	33	UR	33	UR	35	UR	32	UR	25	UR
Aroclor-1016	--		1.4	U	--		--		1.7	U	--		--		1.3	UJ
Aroclor-1221	--		1.4	U	--		--		1.7	U	--		--		1.3	UJ
Aroclor-1232	--		1.4	U	--		--		1.7	U	--		--		1.3	UJ
Aroclor-1242	--		1.4	U	--		--		1.7	U	--		--		1.3	UJ
Aroclor-1248	--		1.4	U	--		--		1.7	U	--		--		1.3	UJ
Aroclor-1254	--		1.4	U	--		--		1.7	U	--		--		1.3	UJ
Aroclor-1260	--		1.4	U	--		--		1.7	U	--		--		1.3	UJ
Aroclor-1262	--		1.4	U	--		--		1.7	U	--		--		1.3	UJ
Aroclor-1268	--		1.4	U	--		--		1.7	U	--		--		1.3	UJ

Table 3: Split Sampling Sediment Data - Pesticide Compounds

Chemical Name	JBPL5 ARK-WB-51-4-6 8/28/2009		JBPL7 ARK-WB-51-6-8 8/28/2009		JBPM0 ARK-WB-51-10-12 8/28/2009		JBPM4 ARK-WB-60-2-3-7 9/1/2009		JBPM5 ARK-WB-40-0-2 9/3/2009		JBPM7 ARK-WB-40-2-4 9/3/2009		JBPM9 ARK-WB-40-6-8 9/3/2009		JBPN5 ARK-WB-40-4-6 9/3/2009	
Pesticides (µg/kg)																
2,4'-DDD	24	UR	81	R	26	UR	3.1	R	0.81	R	0.32	UR	0.27	UR	0.28	UR
2,4'-DDE	24	UR	27	UR	26	UR	0.44	R	0.34	UR	0.32	UR	0.27	UR	0.28	UR
2,4'-DDT	24	UR	130	R	120	R	4.7	R	0.34	UR	0.43	R	0.27	UR	0.28	UR
4,4'-DDD	200	R	250	R	26	UR	6.1	R	1.1	R	0.32	UR	0.27	UR	0.28	UR
4,4'-DDE	120	R	13	UR	13	UR	0.68	UR	0.17	UR	0.16	UR	0.13	UR	0.14	UR
4,4'-DDT	1400	R	1500	R	370	R	14	R	0.43	UR	1.4	R	0.27	UR	0.28	UR
Aldrin	12	UR	13	UR	13	UR	0.2	UR	0.17	UR	0.16	UR	0.13	UR	0.14	UR
alpha-BHC	12	UR	13	UR	13	UR	0.2	UR	0.17	UR	0.16	UR	0.13	UR	0.14	UR
alpha-Chlordane	12	UR	13	UR	13	UR	0.2	UR	0.17	UR	0.16	UR	0.13	UR	0.14	UR
beta-BHC	12	UR	13	UR	13	UR	0.2	UR	0.17	UR	0.16	UR	0.13	UR	0.14	UR
cis-Nonachlor	24	UR	37	UR	26	UR	57	UR	9.7	UR	0.7	UR	0.27	UR	0.46	UR
delta-BHC	12	UR	13	UR	13	UR	0.2	UR	0.17	UR	0.16	UR	0.13	UR	0.14	UR
Dieldrin	12	UR	13	UR	13	UR	0.2	UR	0.17	UR	0.16	UR	0.13	UR	0.14	UR
Endosulfan I	12	UR	13	UR	13	UR	0.2	UR	0.17	UR	0.16	UR	0.13	UR	0.14	UR
Endosulfan II	24	UR	27	UR	26	UR	0.4	UR	0.34	UR	0.32	UR	0.27	UR	0.28	UR
Endosulfan sulfate	24	UR	27	UR	26	UR	0.4	UR	0.34	UR	0.32	UR	0.27	UR	0.28	UR
Endrin	24	UR	27	UR	26	UR	0.4	UR	0.34	UR	0.32	UR	0.27	UR	0.28	UR
Endrin aldehyde	24	UR	27	UR	26	UR	0.4	UR	0.34	UR	0.32	UR	0.27	UR	0.28	UR
Endrin ketone	24	UR	27	UR	26	UR	0.4	UR	0.34	UR	0.32	UR	0.27	UR	0.28	UR
gamma-BHC (Lindane)	12	UR	13	UR	13	UR	0.2	UR	0.17	UR	0.16	UR	0.4	R	0.17	R
gamma-Chlordane	12	UR	13	UR	13	UR	0.2	UR	0.17	UR	0.16	UR	0.13	UR	0.14	UR
Heptachlor	12	UR	13	UR	13	UR	0.2	UR	0.17	UR	0.16	UR	0.13	UR	0.14	UR
Heptachlor epoxide	12	UR	13	UR	13	UR	0.2	UR	0.17	UR	0.16	UR	0.13	UR	0.14	UR
Hexachlorobutadiene	21	R	7.3	R	11	R	0.4	UR	4.1	R	3.7	R	15		5.7	
Hexachlorobenzene	24	UR	37	UR	26	UR	0.4	UR	0.34	UR	0.32	UR	6.5		0.28	UR
Methoxychlor	120	UR	130	UR	130	UR	2	UR	1.7	UR	1.6	UR	1.3	UR	1.4	UR
Oxychlordane	24	UR	37	UR	26	UR	0.4	UR	0.34	UR	0.32	UR	0.27	UR	0.28	UR
Octachlorostyrene	24	UR	37	UR	26	UR	0.4	UR	0.34	UR	0.32	UR	0.27	UR	0.28	UR
Toxaphene	1200	UR	1300	UR	1300	UR	20	UR	17	UR	16	UR	13	UR	14	UR
trans-Nonachlor	24	UR	37	UR	26	UR	0.4	UR	0.34	UR	0.32	UR	0.27	UR	0.28	UR
Aroclor-1016	--		--		1.4	U	--		--		--		1.3	U	--	
Aroclor-1221	--		--		1.4	U	--		--		--		1.3	U	--	
Aroclor-1232	--		--		1.4	U	--		--		--		1.3	U	--	
Aroclor-1242	--		--		1.4	U	--		--		--		1.3	U	--	
Aroclor-1248	--		--		1.4	U	--		--		--		1.3	U	--	
Aroclor-1254	--		--		1.4	U	--		--		--		1.3	U	--	
Aroclor-1260	--		--		1.4	U	--		--		--		1.3	U	--	
Aroclor-1262	--		--		1.4	U	--		--		--		1.3	U	--	
Aroclor-1268	--		--		1.4	U	--		--		--		1.3	U	--	

Table 3: Split Sampling Sediment Data - Pesticide Compounds

Chemical Name	JBPN6 ARK-WB-34-0-2 9/4/2009		JBQ07 ARK-WB-34-2-4 9/4/2009		JBQ11 ARK-WB-34-4-6 9/4/2009		JBQ16 ARK-WB-49-6-8 9/9/2009		JBQ20 ARK-WB-49-14-16 9/9/2009		JBQ23 ARK-WB-49-20-22 9/9/2009		JBQ27 ARK-WB-56-10-11 9/15/2009		JBQ28 ARK-WB-56-14-16 9/15/2009	
Pesticides (µg/kg)																
2,4'-DDD	0.47	R	0.28	R	4.4	UR	2.9	UR	0.16	R	0.25	UR	0.26	UR	0.28	UR
2,4'-DDE	0.45	UR	0.41	UR	4.4	UR	2.9	UR	0.26	UR	0.25	UR	0.26	UR	0.28	UR
2,4'-DDT	0.45	UR	0.41	UR	18	R	7.7	R	0.076	R	0.25	UR	0.26	UR	0.28	UR
4,4'-DDD	0.75	R	0.23	R	3.2	R	0.83	R	0.5	R	0.25	UR	0.26	UR	0.28	UR
4,4'-DDE	0.24	R	0.22	R	2.2	UR	1.5	UR	0.13	UR	0.12	UR	0.13	UR	0.14	UR
4,4'-DDT	1.1	R	0.17	UR	73	R	20	R	2.4	R	0.25	UR	0.26	UR	0.16	R
Aldrin	0.23	UR	0.2	UR	2.2	UR	1.5	UR	0.13	UR	0.12	UR	0.13	UR	0.14	UR
alpha-BHC	0.13	R	0.2	UR	2.2	UR	1.5	UR	0.13	UR	0.12	UR	0.13	UR	0.14	UR
alpha-Chlordane	0.23	UR	0.2	UR	2.2	UR	1.5	UR	0.13	UR	0.12	UR	0.13	UR	0.14	UR
beta-BHC	0.23	UR	0.2	UR	2.2	UR	1.5	UR	0.13	UR	0.12	UR	0.13	UR	0.14	UR
cis-Nonachlor	6.5	UR	1.9	UR	4.4	UR	2.9	UR	4.4	UR	0.24	UR	0.26	UR	0.28	UR
delta-BHC	0.23	UR	0.2	UR	2.2	UR	1.5	UR	0.13	UR	0.12	UR	0.13	UR	0.14	UR
Dieldrin	0.23	UR	0.2	UR	2.2	UR	1.5	UR	1.5	UR	0.12	UR	0.13	UR	0.14	UR
Endosulfan I	0.23	UR	0.2	UR	2.2	UR	1.5	UR	0.13	UR	0.12	UR	0.13	UR	0.14	UR
Endosulfan II	0.45	UR	0.41	UR	4.4	UR	2.9	UR	0.26	UR	0.25	UR	0.26	UR	0.28	UR
Endosulfan sulfate	0.45	UR	0.41	UR	4.4	UR	2.9	UR	0.26	UR	0.25	UR	0.26	UR	0.28	UR
Endrin	0.45	UR	0.41	UR	4.4	UR	2.9	UR	0.26	UR	0.25	UR	0.26	UR	0.28	UR
Endrin aldehyde	0.45	UR	0.41	UR	4.4	UR	2.9	UR	0.26	UR	0.25	UR	0.26	UR	0.28	UR
Endrin ketone	0.45	UR	0.41	UR	4.4	UR	2.9	UR	0.26	UR	0.25	UR	0.26	UR	0.28	UR
gamma-BHC (Lindane)	0.23	UR	0.2	UR	2.2	UR	1.5	UR	0.13	UR	0.12	UR	0.13	UR	0.14	UR
gamma-Chlordane	0.23	UR	0.2	UR	2.2	UR	1.5	UR	0.13	UR	0.12	UR	0.13	UR	0.14	UR
Heptachlor	0.23	UR	0.2	UR	2.2	UR	1.5	UR	0.13	UR	0.12	UR	0.13	UR	0.14	UR
Heptachlor epoxide	0.23	UR	0.2	UR	2.2	UR	1.5	UR	0.13	UR	0.12	UR	0.13	UR	0.14	UR
Hexachlorobutadiene	0.45	UR	0.41	UR	4.4	UR	2.9	UR	0.26	UR	0.25	UR	0.26	UR	0.28	UR
Hexachlorobenzene	0.45	UR	0.41	UR	4.4	UR	2.9	UR	0.26	UR	0.25	UR	0.26	UR	0.28	UR
Methoxychlor	2.3	UR	2	UR	22	UR	15	UR	1.3	UR	1.2	UR	1.3	UR	1.4	UR
Oxychlordane	0.45	UR	0.41	UR	4.4	UR	2.9	UR	0.26	UR	0.25	UR	0.26	UR	0.28	UR
Octachlorostyrene	0.45	UR	0.41	UR	4.4	UR	2.9	UR	0.26	UR	0.25	UR	0.26	UR	0.28	UR
Toxaphene	23	UR	20	UR	220	UR	150	UR	13	UR	12	UR	13	UR	14	UR
trans-Nonachlor	0.45	UR	0.41	UR	4.4	UR	2.9	UR	0.26	UR	0.25	UR	0.26	UR	0.28	UR
Aroclor-1016	--		--		1.9	U	1.2	U	1.3	U	1.2	UJ	--		--	
Aroclor-1221	--		--		1.9	U	1.2	U	1.3	U	1.2	UJ	--		--	
Aroclor-1232	--		--		1.9	U	1.2	U	1.3	U	1.2	UJ	--		--	
Aroclor-1242	--		--		1.9	U	1.2	U	1.3	U	1.2	UJ	--		--	
Aroclor-1248	--		--		1.9	U	1.2	U	1.3	U	1.2	UJ	--		--	
Aroclor-1254	--		--		1.9	U	1.2	U	1.3	U	1.2	UJ	--		--	
Aroclor-1260	--		--		1.9	U	1.2	U	1.3	U	1.2	UJ	--		--	
Aroclor-1262	--		--		1.9	U	1.2	U	1.3	U	1.2	UJ	--		--	
Aroclor-1268	--		--		1.9	U	1.2	U	1.3	U	1.2	UJ	--		--	

Table 3: Split Sampling Sediment Data - Pesticide Compounds

Chemical Name	JBQ31 ARK-WB-56-18-20 9/15/2009		JBQ36 ARK-WB-30-10-12 9/18/2009		JBQ40 ARK-WB-30-26-28 9/18/2009		JBQ45 ARK-WB-30-40-42 9/18/2009		JBQZ5 ARK-WB-42-20-23 9/25/2009		JBQZ9 ARK-WB-42-23-26 9/25/2009		JBR03 ARK-WB-42-6-14 9/25/2009	
Pesticides (µg/kg)														
2,4'-DDD	0.28	UR	0.27	UR	0.78	R	0.27	UR	4.1	R	0.13	R	29000	R
2,4'-DDE	0.28	UR	0.27	UR	0.28	UR	0.27	UR	0.28	UR	0.27	UR	400	R
2,4'-DDT	0.28	UR	0.27	UR	0.88	R	0.27	UR	4.7	R	0.076	R	11000	R
4,4'-DDD	0.28	UR	0.27	UR	2.1	R	0.27	UR	12	R	0.26	R	37000	R
4,4'-DDE	0.14	UR	0.14	UR	0.14	UR	0.13	UR	0.19	R	0.14	UR	1300	R
4,4'-DDT	0.28	UR	0.27	UR	2.7	R	0.27	UR	39	R	0.34	R	93000	R
Aldrin	0.14	UR	0.14	UR	0.14	UR	0.27	UR	0.14	UR	0.14	UR	15	UR
alpha-BHC	0.14	UR	0.14	UR	0.14	UR	0.13	UR	0.14	UR	0.14	UR	15	UR
alpha-Chlordane	0.14	UR	0.14	UR	0.14	UR	0.13	UR	0.14	UR	0.14	UR	15	UR
beta-BHC	0.14	UR	0.14	UR	0.14	UR	0.13	UR	0.14	UR	0.14	UR	15	UR
cis-Nonachlor	0.28	UR	0.27	UR	13	UR	0.27	UR	86	UR	1.6	UR	140000	UR
delta-BHC	0.14	UR	0.14	UR	0.14	UR	0.13	UR	0.34	R	0.14	UR	15	UR
Dieldrin	0.14	UR	0.14	UR	0.14	UR	0.13	UR	0.14	UR	0.14	UR	15	UR
Endosulfan I	0.14	UR	0.14	UR	0.14	UR	0.13	UR	0.14	UR	0.14	UR	15	UR
Endosulfan II	0.28	UR	0.27	UR	0.28	UR	0.27	UR	0.28	UR	0.27	UR	30	UR
Endosulfan sulfate	0.28	UR	0.27	UR	0.28	UR	0.27	UR	0.28	UR	0.27	UR	30	UR
Endrin	0.28	UR	0.27	UR	0.28	UR	0.27	UR	6.2	UR	0.27	UR	30	R
Endrin aldehyde	0.28	UR	0.27	UR	0.28	UR	0.27	UR	0.28	UR	0.27	UR	30	UR
Endrin ketone	0.28	UR	0.27	UR	0.28	UR	0.27	UR	0.28	UR	0.27	UR	30	UR
gamma-BHC (Lindane)	0.14	UR	0.14	UR	0.14	UR	0.13	UR	0.32	R	0.14	UR	15	UR
gamma-Chlordane	0.14	UR	0.14	UR	0.14	UR	0.13	UR	0.14	UR	0.14	UR	330	R
Heptachlor	0.14	UR	0.14	UR	0.14	UR	0.13	UR	0.11	R	0.14	UR	15	UR
Heptachlor epoxide	0.14	UR	0.14	UR	0.14	UR	0.13	UR	0.14	UR	0.14	UR	15	UR
Hexachlorobutadiene	0.28	UR	0.27	UR	0.28	UR	0.27	UR	0.28	UR	0.27	UR	39	R
Hexachlorobenzene	0.28	UR	0.27	UR	0.28	UR	0.27	UR	17	R	0.27	UR	22	R
Methoxychlor	1.4	UR	1.4	UR	1.4	UR	1.3	UR	1.4	UR	1.4	UR	150	UR
Oxychlordane	0.28	UR	0.27	UR	0.28	UR	0.27	UR	0.28	UR	0.27	UR	30	UR
Octachlorostyrene	0.28	UR	0.27	UR	0.28	UR	0.27	UR	0.28	UR	0.27	UR	30	R
Toxaphene	14	UR	14	UR	14	UR	13	UR	14	UR	14	UR	1500	UR
trans-Nonachlor	0.28	UR	0.27	UR	0.27	UR	0.27	UR	0.28	UR	0.27	UR	30	UR
Aroclor-1016	1.4	U	1.4	U	1.4	U	1.3	U	1.4	UJ	1.3	UJ	1.5	UJ
Aroclor-1221	1.4	U	1.4	U	1.4	U	1.3	U	1.4	U	1.3	U	1.5	U
Aroclor-1232	1.4	U	1.4	U	1.4	U	1.3	U	1.4	U	1.3	U	1.5	U
Aroclor-1242	1.4	U	1.4	U	1.4	U	1.3	U	1.4	U	1.3	U	1.5	U
Aroclor-1248	1.4	U	1.4	U	1.4	U	1.3	U	1.4	U	1.3	U	1.5	U
Aroclor-1254	1.4	U	1.4	U	1.4	U	1.3	U	1.4	U	1.3	U	1.5	U
Aroclor-1260	1.4	U	1.4	U	1.4	U	1.3	U	1.4	UJ	1.3	UJ	1.5	UJ
Aroclor-1262	1.4	U	1.4	U	1.4	U	1.3	U	1.4	U	1.3	U	1.5	U
Aroclor-1268	1.4	U	1.4	U	1.4	U	1.3	U	1.4	U	1.3	U	1.5	U

Table 3: Split Sampling Sediment Data - Pesticide Compounds

Chemical Name	JBR07 ARK-WB-35-10-20 9/30/2009		JBR12 ARK-WB-35-20-23 9/30/2009		JBR16 ARK-WB-35-23-26 9/30/2009		JBR20 ARK-WB-35-32-35 9/30/2009	
Pesticides (µg/kg)								
2,4'-DDD	23000	R	7.5	R	5.4	R	0.063	R
2,4'-DDE	33	UR	0.31	UR	0.29	UR	0.27	UR
2,4'-DDT	6000	R	2.6	R	1.6	R	0.27	UR
4,4'-DDD	62000	R	17	R	12	R	0.12	R
4,4'-DDE	3000	R	0.15	UR	0.15	UR	0.14	UR
4,4'-DDT	87000	R	25	R	14	R	0.13	R
Aldrin	17	UR	0.15	UR	0.15	UR	0.14	UR
alpha-BHC	17	UR	0.15	UR	0.15	UR	0.14	UR
alpha-Chlordane	17	UR	0.15	UR	0.15	UR	0.14	UR
beta-BHC	17	UR	0.15	UR	0.15	UR	0.14	UR
cis-Nonachlor	7100	UR	120	R	110	R	0.72	UR
delta-BHC	17	UR	0.15	UR	0.15	UR	0.14	UR
Dieldrin	17	UR	0.15	UR	0.15	UR	0.14	UR
Endosulfan I	17	UR	0.38	R	0.15	UR	0.14	UR
Endosulfan II	33	UR	0.31	UR	0.29	UR	0.27	UR
Endosulfan sulfate	33	UR	0.31	UR	0.29	UR	0.27	UR
Endrin	33	UR	0.31	UR	0.29	UR	0.27	UR
Endrin aldehyde	33	UR	0.31	UR	0.29	UR	0.27	UR
Endrin ketone	33	UR	0.31	UR	0.29	UR	0.27	UR
gamma-BHC (Lindane)	17	UR	0.15	UR	0.15	UR	0.14	UR
gamma-Chlordane	17	UR	0.15	UR	0.15	UR	0.14	UR
Heptachlor	17	UR	0.15	UR	0.15	UR	0.14	UR
Heptachlor epoxide	17	UR	0.15	UR	0.15	UR	0.14	UR
Hexachlorobutadiene	110	R	0.31	UR	0.29	UR	0.27	UR
Hexachlorobenzene	380	R	0.31	UR	0.29	UR	0.27	UR
Methoxychlor	170	UR	1.5	UR	1.5	UR	1.4	UR
Oxychlordane	33	UR	0.31	UR	0.29	UR	0.27	UR
Octachlorostyrene	33	UR	0.31	UR	0.29	UR	0.27	UR
Toxaphene	1700	UR	15	UR	15	UR	14	UR
trans-Nonachlor	33	UR	0.31	UR	0.29	UR	0.27	UR
Aroclor-1016	1.7	UJ	1.5	UJ	1.5	UJ	1.4	UJ
Aroclor-1221	1.7	U	1.5	U	1.5	U	1.4	U
Aroclor-1232	1.7	U	1.5	U	1.5	U	1.4	U
Aroclor-1242	1.7	U	1.5	U	1.5	U	1.4	U
Aroclor-1248	1.7	U	1.5	U	1.5	U	1.4	U
Aroclor-1254	1.7	U	1.5	U	1.5	U	1.4	U
Aroclor-1260	1.7	UJ	1.5	UJ	1.5	UJ	1.4	UJ
Aroclor-1262	1.7	U	1.5	U	1.5	U	1.4	U
Aroclor-1268	1.7	U	1.5	U	1.5	U	1.4	U

Notes:
-- Not analyzed
µg/kg - micrograms per kilogram (parts per billion)
J - The value reported is an estimated value
U - Not detected
R - Rejected

Table 4: Split Sampling Sediment Data - Dioxins and Furans

Sample Code	JBPJ7		JBPK4		JBPL2		JBPM1		JBPN0		JBQ12		JBQ17	
Sample Name	ARK-WB-65-8-10		ARK-WB-66-8-10		ARK-WB-63-10-12		ARK-WB-51-10-12		ARK-WB-40-6-8		ARK-WB-34-4-6		ARK-WB-49-6-8	
Sample Date	8/18/2009		8/19/2009		8/20/2009		8/28/2009		9/3/2009		9/4/2009		9/9/2009	
Chemical Name														
Dioxins (ng/kg)														
2,3,7,8-TCDD	0.21	J	1.44		0.107	UJ	0.0989	J	0.0473	UJ	0.91	J	0.11	UJ
1,2,3,7,8-PeCDD	0.585	J	2.17	J	0.069	U	0.165	J	0.0981	J	1.92		0.151	U
1,2,3,6,7,8-HxCDD	2.03		16.3		0.208	U	1.27	U	0.157	J	10.1		0.518	J
1,2,3,4,7,8-HxCDD	1.27	U	2.87	J	0.247	U	0.586	U	0.143	U	2.01		0.232	U
1,2,3,7,8,9-HxCDD	1.24	J	7.49	U	0.188	U	0.417	U	0.134	U	5.41		0.4	J
1,2,3,4,6,7,8-HpCDD	40.1		392		2.65		12.9		0.62	J	211		11.4	
OCDD	532		4220		31.8		139		4.71		3150		116	
2,3,7,8-TCDF	151		1770	J	18.1	J	139	J	0.119	J	306	J	83.7	
1,2,3,7,8-PeCDF	252		1470		32.3		235		0.198	U	495		125	
2,3,4,7,8-PeCDF	157		1470		18.3		135		0.177	J	230		60.7	
1,2,3,6,7,8-HxCDF	122		940		6.59		94.5		0.197	J	429		74.6	
1,2,3,7,8,9-HxCDF	50.4		526		5.24		50.9		0.148	J	156		24.6	
1,2,3,4,7,8-HxCDF	252		3050		37.4		431		0.338	U	1290	J	241	
2,3,4,6,7,8-HxCDF	27.8		175		2.69		32		0.116	J	64.3		15.3	
1,2,3,4,6,7,8-HpCDF	186		1560		10.5		222		0.596	U	720		102	
1,2,3,4,7,8,9-HpCDF	77.2		597		4.47		129		0.162	J	299		41.1	
OCDF	394		2410		20.3		717		0.781	U	1390		189	
Total TCDD	2.95	J	42.3	J	86.3	J	13		0.581	U	4.62	J	1.44	U
Total PeCDD	5.34	J	30.4	J	1.63	J	1.79		1.75	U	13.9	J	0.581	U
Total HxCDD	17.3	J	132	J	2.6	J	6.31		2.54	U	72.9	J	4.82	U
Total HpCDD	87.8		893		6.12		25.4		1.33		388		23.4	
Total TCDF	449		5460	J	56.8	J	388		2.01	U	836	J	249	J
Total-PeCDF	815	J	5870		93.1	J	682		1.81	U	1510	J	309	
Total HxCDF	708		5130		61.2	J	708		1.54	U	2680	J	404	
Total HpCDF	364	J	2390		21.2		479		1.17	U	1590	J	185	
Total TEQ ND=0	139.7		1291		13.6		111.3		0.27		391.6	J	67.6	J
Total TEQ ND=0.5	139.7		1291		13.8		111.4		0.31		391.6	J	67.7	J
Total TEQ ND=1.0	139.7		1291		13.9		111.4		0.34		391.6	J	67.8	J

Table 4: Split Sampling Sediment Data - Dioxins and Furans

Sample Code	JBQ21		JBQ24		JBQ32		JBQ37		JBQ42		JBQ46	
Sample Name	ARK-WB-49-14-16		ARK-WB-49-20-22		ARK-WB-56-18-20		ARK-WB-30-10-12		ARK-WB-30-26-28		ARK-WB-30-40-42	
Sample Date	9/9/2009		9/9/2009		9/15/2009		9/18/2009		9/18/2009		9/18/2009	
Chemical Name												
Dioxins (ng/kg)												
2,3,7,8-TCDD	0.0297	J	0.0129	UJ	0.0147	UJ	0.0124	U	0.0141	U	0.0197	U
1,2,3,7,8-PeCDD	0.0184	U	0.0173	J	0.0127	U	0.0261	J	0.0274	J	0.0339	J
1,2,3,6,7,8-HxCDD	0.0566	J	0.0393	U	0.0259	J	0.075	J	0.0619	J	0.0561	U
1,2,3,4,7,8-HxCDD	0.0218	J	0.0285	U	0.0179	U	0.0514	U	0.0337	U	0.0329	J
1,2,3,7,8,9-HxCDD	0.049	U	0.0367	J	0.0566	J	0.149	J	0.0973	J	0.0885	J
1,2,3,4,6,7,8-HpCDD	0.976	U	0.387	U	0.62	U	1.72	U	1.16	U	0.969	U
OCDD	11.6		3.68	U	5.06	U	16		21.3		10.2	
2,3,7,8-TCDF	3.22	J	0.374	UJ	0.134	UJ	0.151	U	0.272	U	0.121	U
1,2,3,7,8-PeCDF	5.51		0.371	J	0.0127	U	0.0449	J	0.0758	J	0.0194	U
2,3,4,7,8-PeCDF	2.6		0.167	J	0.0104	U	0.0271	J	0.0485	J	0.0142	J
1,2,3,6,7,8-HxCDF	2.95		0.176	J	0.0102	U	0.0264	U	0.0248	J	0.0113	J
1,2,3,7,8,9-HxCDF	1.14	J	0.0669	J	0.0138	U	0.00943	U	0.0208	U	0.0139	U
1,2,3,4,7,8-HxCDF	9.74		0.683	J	0.00896	U	0.0892	J	0.0846	J	0.0192	U
2,3,4,6,7,8-HxCDF	0.659	J	0.0531	J	0.00825	U	0.0126	U	0.0134	U	0.0655	U
1,2,3,4,6,7,8-HpCDF	3.98		0.319	J	0.0322	U	0.0708	J	0.0636	J	0.0273	U
1,2,3,4,7,8,9-HpCDF	1.77		0.157	J	0.0237	U	0.024	U	0.0298	U	0.0387	U
OCDF	9.34		0.909	U	0.168	U	0.233	U	0.207	U	0.202	U
Total TCDD	0.185		0.0287		0.0605	U	0.125	U	0.13		0.372	U
Total PeCDD	0.244	U	0.0605	U	0.0757	U	0.187	U	0.23	U	0.395	U
Total HxCDD	0.814	U	0.366	U	0.562	U	1.62		1.22	U	1.31	
Total HpCDD	2.57		0.966	U	1.44	U	4.33		2.72		2.68	
Total TCDF	8.09		0.864	U	0.273	U	0.303	U	0.622	U	0.265	U
Total-PeCDF	13		0.803		0.0104	U	0.0923		0.226	U	0.0517	
Total HxCDF	16.2		1.16		0.0394	U	0.199	U	0.192	U	0.0735	
Total HpCDF	7.19		0.694		0.0963	U	0.178		0.18	U	0.13	
Total TEQ ND=0	2.83	J	0.227	J	0.03	J	0.0724		0.0922		0.0545	
Total TEQ ND=0.5	2.84	J	0.237	J	0.05	J	0.1142		0.1417		0.0928	
Total TEQ ND=1.0	2.84	J	0.247	J	0.07	J	0.1235		0.1523		0.1092	

Table 4: Split Sampling Sediment Data - Dioxins and Furans

Sample Code	JBQZ6		JBR00		JBR04		JBR08		JBR13	
Sample Name	ARK-WB-42-20-23		ARK-WB-42-23-26		ARK-WB-42-6-14		ARK-WB-35-10-20		ARK-WB-35-20-23	
Sample Date	9/25/2009		9/25/2009		9/25/2009		9/30/2009		9/30/2009	
Chemical Name										
Dioxins (ng/kg)										
2,3,7,8-TCDD	0.0191	UJ	0.0141	UJ	3.23	J	3.84	J	0.0137	UJ
1,2,3,7,8-PeCDD	0.0286	U	0.0217	U	5.55	J	8.9		0.0208	J
1,2,3,6,7,8-HxCDD	0.0491	J	0.0442	U	12.6		12.7		0.058	U
1,2,3,4,7,8-HxCDD	0.036	J	0.0255	U	5.21		9.96		0.0343	U
1,2,3,7,8,9-HxCDD	0.0946	J	0.0727	J	5.54		5.88		0.0929	J
1,2,3,4,6,7,8-HpCDD	1.15		0.652	U	235		234		1.04	U
OCDD	12.4		5.35		2790		3090		9.61	
2,3,7,8-TCDF	0.197	J	0.424	UJ	12300	J	21400	J	5.03	J
1,2,3,7,8-PeCDF	0.0343	J	0.471	J	18800		46800		6.39	
2,3,4,7,8-PeCDF	0.0325	U	0.249	J	10300		24100		3.83	
1,2,3,6,7,8-HxCDF	0.0225	J	0.207	J	7810		18200		2.28	
1,2,3,7,8,9-HxCDF	0.0246	U	0.116	J	3660		9480		1.18	
1,2,3,4,7,8-HxCDF	0.0561	U	0.762		29400		69600	J	9.19	
2,3,4,6,7,8-HxCDF	0.0151	U	0.0491	J	2110		5580		0.578	J
1,2,3,4,6,7,8-HpCDF	0.109	U	0.265	U	7560		14500		2.72	
1,2,3,4,7,8,9-HpCDF	0.0371	U	0.0765	U	3520		7410		0.998	
OCDF	0.386	U	0.424	U	9010		21200		3.68	
Total TCDD	0.108	UJ	0.063	U	31.1		25.9	J	0.0846	
Total PeCDD	0.21	U	0.117	U	25.3		35.8	J	0.148	J
Total HxCDD	1.16	U	0.798	U	89.8		84.6	J	0.97	J
Total HpCDD	2.86		1.64		477		500		2.45	
Total TCDF	0.416	U	1.01	J	32300	J	50500	J	13.4	J
Total-PeCDF	0.113	U	1.21		49500		121000	J	17.2	
Total HxCDF	0.15	U	1.29	J	47100		113000	J	14.8	
Total HpCDF	0.294	U	0.521	U	14100		28400		4.84	
Total TEQ ND=0	0.056	J	0.211	J	9300	J	21300		3.24	
Total TEQ ND=0.5	0.08	J	0.281	J	9300	J	21300		3.26	
Total TEQ ND=1.0	0.104	J	0.299	J	9300	J	21300		3.27	

Table 4: Split Sampling Sediment Data - Dioxins and Furans

Sample Code	JBR17		JBR21	
Sample Name	ARK-WB-35-23-26		ARK-WB-35-32-35	
Sample Date	9/30/2009		9/30/2009	
Chemical Name				
Dioxins (ng/kg)				
2,3,7,8-TCDD	0.0217	J	0.0131	UJ
1,2,3,7,8-PeCDD	0.0331	J	0.0265	U
1,2,3,6,7,8-HxCDD	0.0958	J	0.0891	J
1,2,3,4,7,8-HxCDD	0.0513	U	0.0428	U
1,2,3,7,8,9-HxCDD	0.151	U	0.13	J
1,2,3,4,6,7,8-HpCDD	1.7		1.4	
OCDD	16.4		11	
2,3,7,8-TCDF	1.48	J	0.407	J
1,2,3,7,8-PeCDF	2.48		0.444	J
2,3,4,7,8-PeCDF	1.42		0.215	J
1,2,3,6,7,8-HxCDF	0.931		0.202	J
1,2,3,7,8,9-HxCDF	0.574	J	0.0992	J
1,2,3,4,7,8-HxCDF	3.18		0.752	
2,3,4,6,7,8-HxCDF	0.245	J	0.0575	J
1,2,3,4,6,7,8-HpCDF	1.2		0.247	U
1,2,3,4,7,8,9-HpCDF	0.458	J	0.0817	J
OCDF	1.6		0.46	U
Total TCDD	0.185		0.139	U
Total PeCDD	0.259	J	0.252	
Total HxCDD	1.9	J	1.73	
Total HpCDD	4.55		3.58	
Total TCDF	3.65	J	0.9	U
Total-PeCDF	6.45		1.04	J
Total HxCDF	5.66	J	1.26	J
Total HpCDF	2.31		0.494	U
Total TEQ ND=0	1.245		0.2722	
Total TEQ ND=0.5	1.247		0.2864	
Total TEQ ND=1.0	1.248		0.3005	

Notes:

TCDD - Tetrachlorodibenzo-p-dioxin
PeCDD - Pentachlorodibenzo-p-dioxin
HxCDD - Hexachlorodibenzo-p-dioxin
HpCDD - Heptachlorodibenzo-p-dioxin
OCDD - Octachlorodibenzo-p-dioxin
TCDF - Tetrachlorodibenzofuran
PeCDF - Pentachlorodibenzofuran
HxCDF - Hexachlorodibenzofuran
HpCDF - Heptachlorodibenzofuran
OCDF - Octachlorodibenzofuran

ng/kg - nanograms per kilogram (parts per trillion)
J - The value reported is an estimated value
U - Not detected
TEQ - Toxic equivalency
ND - Non-detect

Table 5: Split Sampling Sediment Data - Tributyltin and Asbestos

Sample Code	JBPJ8		JBPK5		JBPL3		JBPM2		JBPN3		JBQ13		JBQ18	
Sample Name	ARK-WB-65-8-10		ARK-WB-66-8-10		ARK-WB-63-10-12		ARK-WB-51-10-12		ARK-WB-40-6-8		ARK-WB-34-4-6		ARK-WB-49-6-8	
Sample Date	8/18/2009		8/19/2009		8/20/2009		8/28/2009		9/3/2009		9/4/2009		9/9/2009	
Chemical Name														
Tributyltin (µg/kg)														
Dibutyl Tin	14	U	17	U	13	U	14	U	13	U	20	U	13	U
Monobutyl Tin	14	UJ	17	UJ	13	UJ	14	U	13	UJ	20	UJ	13	UJ
Tetrabutyl Tin	14	U	17	U	13	U	14	U	13	U	20	U	13	U
Tributyl Tin	14	U	17	U	13	U	14	U	13	U	20	U	13	U

Sample Name	ARK-WB-42-0-6		ARK-WB-42-6-14		ARK-WB-35-0-10		ARK-WB-35-10-20	
Sample Date	9/25/2009		9/25/2009		9/30/2009		9/30/2009	
Chemical Name								
Asbestos (%)								
Chrysotile	T		T		4.5		2.8	
Amosite	T		ND		ND		ND	

Table 5: Split Sampling Sediment Data - Tributyltin and Asbestos

Sample Code	JBQ22		JBQ25		JBQ33		JBQ38		JBQ43		JBQZ2		JBR09	
Sample Name	ARK-WB-49-14-16		ARK-WB-49-20-22		ARK-WB-56-18-20		ARK-WB-30-10-12		ARK-WB-30-26-28		ARK-WB-30-40-42		ARK-WB-35-10-20	
Sample Date	9/9/2009		9/9/2009		9/15/2009		9/18/2009		9/18/2009		9/18/2009		9/30/2009	
Chemical Name														
Tributyltin (µg/kg)														
Dibutyl Tin	13	U	14	U	16	U	14	U	16	U	15	U	17	U
Monobutyl Tin	13	UJ	14	UJ	16	UJ	14	UJ	16	UJ	15	UJ	17	UJ
Tetrabutyl Tin	13	U	14	U	16	U	14	U	16	U	15	U	17	U
Tributyl Tin	13	U	14	U	16	U	14	U	16	U	15	U	17	U

Table 5: Split Sampling Sediment Data - Tributyltin and Asbestos

Sample Code	JBR14		JBR18		JBR22		JBR05		JBQZ4		JBR01	
Sample Name	ARK-WB-35-20-23		ARK-WB-35-23-26		ARK-WB-35-32-35		ARK-WB-42-6-14		ARK-WB-42-20-23		ARK-WB-42-23-26	
Sample Date	9/30/2009		9/30/2009		9/30/2009		9/25/2009		9/25/2009		9/25/2009	
Chemical Name												
Tributyltin (µg/kg)												
Dibutyl Tin	14	U	14	U	13	UJ	16	UJ	14	U	14	UJ
Monobutyl Tin	14	U	14	UJ	13	UJ	16	UJ	14	UJ	14	UJ
Tetrabutyl Tin	14	U	14	U	13	UJ	16	UJ	14	U	14	UJ
Tributyl Tin	14	U	14	U	13	UJ	16	UJ	14	U	14	UJ

Notes:
µg/kg - micrograms per kilogram (parts per billion)
J - The value reported is an estimated value
U - Not detected
R - Rejected
% - Percent
T - Trace
ND - Not detected