INTERIM ACTION PLAN

Kimberly-Clark Worldwide Site Upland Area
Everett, Washington

Prepared for: Kimberly-Clark Worldwide, Inc.

Project No. 110207-002-04 • September 20, 2012 Draft Final

Exhibit C to Agreed Order No. DE 9476

Aspect CONSULTING

earth + water

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Acronyms and Abbreviations

This list applies for the entire document including appendices.

%R	percent recovery
ARAR	applicable or relevant and appropriate requirements
Aspect	Aspect Consulting, LLC
AST	above-ground storage tank
ASTM	American Society for Testing Materials
bgs	below ground surface
BMP	best management practice
BNSF	BNSF Railway Inc.
BTEX	benzene, toluene, ethylbenzene, xylenes
CAP	Cleanup Action Plan
CFR	Code of Federal Regulations
City	City of Everett, Washington
CLARC	Cleanup Levels and Risk Calculation database
COC	chain of custody
DA	discharge authorization
DAHP	Washington State Department of Archaeology and Historic Preservation
DCAP	Draft Cleanup Action Plan
DQO	data quality objective
Ecology	Washington State Department of Ecology
EIM	Ecology's Environmental Information Management database
EPA	U.S. Environmental Protection Agency
ESA	environmental site assessment
FBI	Friedman and Bruya Inc.
GC-MS	gas chromatograph-mass spectrometry
GPS	global positioning system
HREC	historical recognized environmental condition
IDW	investigation-derived waste

K-C	Kimberly-Clark Worldwide, Inc.
LCS/LCSD	laboratory control samples/laboratory control sample duplicate
LUST	leaking underground storage tank
MC	measured concentration
MDL	method detection limit
mil	millimeter
MLLW	mean lower low water
MS/MSD	matrix spike/matrix spike duplicate
MTCA	Washington State Model Toxics Control Act Cleanup Regulation
NAPL	non-aqueous phase liquid
NAVD88	North American Vertical Datum of 1988
Order	Agreed Order No. DE 9476 between Kimberly-Clark and Ecology
OSHA	Occupational Safety and Health Act
PARCC	precision, accuracy, representativeness, comparability, and completeness
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
PQL	practical quantitation limit
PSCAA	Puget Sound Clean Air Agency
Pyron	Pyron Environmental Inc.
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
REC	recognized environmental condition
RI/FS	Remedial Investigation/Feasibility Study
RL	reporting limit
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SC	spiked concentration
SDG	sample delivery group
SEPA	State Environmental Policy Act

SHSP	Site-Specific Health and Safety Plan
Site	Kimberly-Clark Worldwide Site
SOP	standard operating procedure
SVOC	semivolatile organic compound
SWPPP	Stormwater Pollution Prevention Plan
TCLP	Toxicity Characteristic Leaching Procedure
TSS	total suspended solids
TPH	total petroleum hydrocarbons
U.S.	United States
USC	unspiked sample concentration
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Act
WSDOT	Washington State Department of Transportation

1 Introduction

Aspect Consulting, LLC (Aspect) has prepared this Interim Action Plan, on behalf of Kimberly-Clark Worldwide, Inc. (K-C), to guide opportunistic cleanup activities during facility demolition on the Upland Area of the Kimberly-Clark Worldwide Site (Site). The Site is located at 2600 Federal Avenue in Everett, Washington (herein referred to as the Upland Area) (Figure 1). The Interim Action Plan is prepared as Exhibit C to Agreed Order No. DE 9476 (Order). The Site and the Upland Area of the Site are defined in Section IV of the Order.

A Phase 1 Environmental Site Assessment (ESA) of the K-C Everett Mill property conducted in 2010 by AECOM, Inc. (AECOM, 2011) identified the following recognized environmental conditions (RECs), the locations of which are shown on Figure 1:

- REC 1: ExxonMobil ADC Site;
- REC 2: Former Oil House and Former Gasoline/Bunker C Above Ground Storage Tanks (ASTs);
- REC 3: Heavy Duty Shop Sump;
- REC 4: Railcar Dumper Hydraulic System Building;
- REC 5: Dutch Ovens 1 through 5;
- REC 6: Latex Spill Area; and
- REC 7: East Waterway[1].

The Phase 1 ESA also identified six historical RECs (HRECs), which at the time would have required environmental response "but may or may not be considered a REC currently." These six, located on Figure 1, are as follows:

- HREC 1: Underground Storage Tank (UST) Removals (former UST numbers 29, 67, 68, 68R, 69, 70, 70R, 71, 72, 73);
- HREC 2: Naval Reserve Property;
- HREC 3: Bleaching Tower Area;
- HREC 4: Polychlorinated biphenyl (PCB) Transformers;
- HREC 5: Former Paint Shop; and
- HREC 6: Rail Car Dumper Containment Vault Valve.

[1] The in-water area of the Site is located within the East Waterway. Contamination identified in the in-water area will be addressed under a separate Agreed Order. This interim action plan only applies to the Upland Area of the Site.

The Phase 1 ESA can be viewed for reference purposes on Washington State Department of Ecology's (Ecology) web site using the following web link:

https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=2569.

The Work Plan for Independent Phase 2 ESA of the Upland Area prepared in May 2012 by Aspect (Aspect, 2012) describes the RECs and HRECs, along with proposed environmental characterization for several of them. The Phase 2 ESA Work Plan can be viewed for reference purposes on Ecology's web site using the same web link as provided previously for the Phase 1 ESA.

Based on information gathered during the ongoing Phase 2 ESA, and during mill demolition, the RECs and HRECs may or may not be candidates for opportunistic interim cleanup actions during the demolition program. The locations for the opportunistic interim action will be defined as the environmental assessment proceeds and site demolition proceeds. Based on the understanding of environmental conditions at the time of this Interim Action Plan, Figure 2 identifies locations where opportunistic interim action will likely occur during demolition.

Because locations in which to conduct opportunistic cleanup actions are not yet fully defined, this Interim Action Plan describes the general procedures for conducting the opportunistic cleanups during demolition, wherever they may occur within the Upland Area. The opportunistic cleanup actions will involve excavation and proper off-Site disposal of contaminated soil, with concurrent dewatering to facilitate soil removal and handling. In addition, separate-phase petroleum ("free product") identified in the groundwater during excavation activities will be collected (either by vacuum truck or adsorbent material), characterized, and sent for off-Site disposal. As such, the interim action will involve permanent removal of contaminated soil and/or groundwater from the Upland Area, and will not conflict with or eliminate reasonable alternatives for the final Site cleanup action in accordance with WAC 173-340-430(3)(b). The opportunistic interim actions will be limited solely to the Upland Area (bounded on the west by the mean higher high water elevation), and will not include any work in the in-water area of the Site as defined in Section IV of the Order.

Aspect is the engineering firm responsible for overseeing, monitoring, and reporting the opportunistic interim cleanup activities on behalf of K-C, and is termed the Engineer in this Plan. A construction contractor (Contractor) identified by K-C will be contracted with K-C or the Engineer to conduct the interim cleanup activities.

1.1 Plan Organization

The Interim Action Plan is organized into the following sections:

- **Section 2—Upland Area Subsurface Conditions** presents a brief description of the subsurface conditions at the Upland Area.
- **Section 3—Permits and Other Requirements** describes permitting requirements for conducting the opportunistic interim cleanup activities.
- **Section 4—Generalized Approach for Opportunistic Cleanups** describes the generalized interim cleanup activities including interim action cleanup levels,

erosion and sediment controls, dewatering and water management, soil excavation and handling, and excavation backfilling.

- **Section 5—Compliance Monitoring** presents the procedures for protection and performance monitoring to be conducted during interim cleanup activities.
- **Section 6—Waste Management** identifies preliminary options for off-Site disposal of contaminated soil and groundwater which will be encountered during interim cleanup activities conducted in the Upland Area.
- **Section 7—Reporting** describes the reporting of interim cleanup activities conducted in the Upland Area.
- **Section 8—References** lists the documents cited in this Plan.

A Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP), included as Appendices A and B, respectively, have also been developed in support of the interim cleanup activities in accordance with WAC 173-340-820.

2 Upland Area Subsurface Conditions

This section provides a general description of the Upland Area subsurface conditions that have relevance for conducting the opportunistic interim cleanup activities.

The local topography surrounding the Upland Area slopes westward toward the Waterway. Property ground surface elevations above NAVD88 range from approximately 17 to 19 feet along the eastern boundary to approximately 13 to 17 feet on the western boundary.

A wedge of fill, generally thickening from east to west, comprises the shallow subsurface soils across the Upland Area. The fill was placed on the Waterway tidal flats to create new upland beginning in the early 1900s. Within the west-center portion of the Upland Area, a former log pond was filled in stages between the mid-1950s and early 1980s to create land for wood chip and hog fuel storage. The fill across the Upland Area has variable composition, predominantly including sand and silty sand with shell fragments (probable dredge fill), and localized occurrences of gravel, variable debris, and wood.

A shallow unconfined (water table) water-bearing zone occurs within the fill, overlying siltier native tidal flat deposits. The water table is relatively shallow, generally ranging in depth from 2 to 6 feet below grade in the eastern portion of the Upland Areas to 8 to 15 feet below grade in the western portion. Groundwater in the fill is hydraulically connected to the Waterway. Based on tidal monitoring data collected during the independent Phase 2 ESA, tidally induced water table fluctuations near the Waterway range between about 2 and 7 feet depending on location

3 Permits and Other Requirements

When performing the opportunistic interim actions within the Upland Area under the Order, K-C is exempt from the procedural requirements of Chapters 70.94 (Washington Clean Air Act), 70.95 (Solid Waste Management Act), 70.105 (Hazardous Waste Management Act), 90.48 (Water Pollution Control), and 90.58 (Shoreline Management Act) Revised Code of Washington (RCW), and of laws requiring or authorizing local government permits or approvals; however, K-C must still comply with the substantive requirements of such permits or approvals.

The starting point for Applicable or Relevant and Appropriate Requirements (ARARs) is Ecology's Model Toxics Control Act (MTCA) regulations (Chapter 173-340 WAC) that address implementation of a cleanup and define cleanup standards under the MTCA statute (Chapter 173.105D RCW). Other ARARs include the following:

1. State Water Pollution Control Act (Chapter 90.48 RCW);
2. Water Resources Act (Chapter 90.54 RCW);
3. Applicable surface water quality criteria published in the water quality standards for surface waters of the State of Washington (Chapter 173-201A WAC);
4. Applicable surface water quality criteria published under Section 304 of the Clean Water Act;
5. Applicable surface water quality criteria published under National Toxics Rule (40 C.F.R. Part 131);
6. Washington State Hazardous Waste Management Act (Chapter 70.105 RCW);
7. State Dangerous Waste Regulations (Chapter 173-303 WAC);
8. Solid Waste Management-Reduction and Recycling (Chapter 70.95 RCW);
9. Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 RCW);
10. Washington Clean Air Act (Chapter 70.94 RCW);
11. Puget Sound Clean Air Agency Regulations (http://www.pscleanair.org);
12. Occupational Safety and Health Act (OSHA), 29 CFR Subpart 1910.120;
13. Washington Industrial Safety and Health Act (WISHA);
14. Shoreline Management Act (Chapter 90.58 RCW);
15. Archaeological and Cultural Resources Act (Chapter 43.53 RCW); and
16. State Environmental Policy Act (SEPA; Chapter 43.21C RCW, Chapter 197-11 WAC, and Chapter WAC 173-802)

Section 3.1 describes the substantive permit requirements applicable to conducting the opportunistic interim cleanup activities. No federal permits will be required because the

interim action will be limited to the Upland Area and will not include any in-water work. Section 3.2 describes other requirements for conducting the interim cleanup actions.

3.1 Permitting and Substantive Requirements

3.1.1 State Environmental Policy Act (SEPA)

Compliance with SEPA, Chapter 43.21C RCW, will be achieved by conducting a SEPA review in accordance with applicable regulatory requirements, including WAC 197-11-268, and Ecology guidance as presented in Ecology Policy 130A (Ecology, 2004). SEPA review will be conducted concurrent with public review of the Order. It is planned that public review for the SEPA documentation will be conducted concurrently with public review for the Order.

3.1.2 Stormwater Pollution Prevention Plan

K-C's existing Stormwater Pollution Prevention Plan (SWPPP; David Evans and Associates, 2012) for the mill provides procedures for implementing erosion control and other stormwater pollution prevention measures during both demolition and remediation activities, including the opportunistic interim cleanup activities addressed under this Interim Action Plan. K-C shall adhere to the SWPPP when conducting the demolition phase interim actions described herein. The SWPPP can be viewed for reference purposes on Ecology's web site using the same web link as provided previously for the Phase 1 ESA. Figure 8 in AECOM's (2011) Phase 1 ESA depicts the stormwater drainage basins within the Upland Area (available at same web link as provided above).

3.1.3 City of Everett Discharge Authorization

K-C has obtained a discharge authorization (DA) from the City of Everett (City) industrial pretreatment program to allow discharge of pre-treated dewatering water generated during the interim cleanup action. Groundwater treatment and disposal methods are described in Section 6.2. The DA imposes daily discharge volume limitations and numerical water quality limits for effluent discharged, and it will require sampling and analysis of the discharge water, recording of the volumes discharged, and submittal of the monitoring data at the end of the permit. Treated water not in compliance with the City discharge limits will be re-run through the treatment system until passing discharge limits or containerized, characterized, and sent for off-Site disposal.

3.1.4 City of Everett Grading Permit

Soil excavations exceeding 50 cubic yards are subject to a grading permit from the City. Substantive requirements of the grading permit include erosion control, which is addressed by the SWPPP described in Section 3.1.2.

3.1.5 Shoreline Permit

The substantive requirements of a City of Everett Shoreline Substantial Development Permit will apply for Upland Area interim cleanup activities conducted within 200 feet of the East Waterway shoreline. The substantive requirements would include compliance with the City of Everett Shoreline Management Program, noise ordinance, and critical areas regulations, staging construction work outside the 200-foot shoreline buffer zone,

preventing spills of hazardous materials (e.g., fuel), and use of best management practices (BMPs) substantially equivalent to those included in the SWPPP.

3.2 Other Requirements

This subsection provides a description of additional requirements that will be considered during planning and execution of interim cleanup activities within the Upland Area.

Utilities Protection and Decommissioning

The Upland Area includes subsurface utilities that may be decommissioned as part of the demolition activities and active utilities that will need to be protected during interim cleanup activities (e.g., active stormwater infrastructure). Prior to initiating interim cleanup activities, active subsurface utilities that require protection will be located using any combination of electromagnetic methods, reviewing utilities maps for the mill, manual post hole excavations, and, if warranted, vacuum excavation (e.g., air knife). The Utility Notification Center ("one call") utility locate service will also be contacted, to locate public utilities up to the property boundary. Active utilities will be protected to prevent damage to them, or, potentially, temporarily removed and then restored to their pre-construction condition. Subsurface utilities that will be decommissioned during mill demolition may be decommissioned prior to or during the interim cleanup activities.

Monitoring Well Decommissioning

Groundwater monitoring wells located within the footprints of interim cleanup excavations will be properly decommissioned in accordance with the requirements of Chapter 173-160 WAC. Following completion of the interim cleanup activities, replacement monitoring wells may be installed as warranted, in accordance with procedures described in Appendix A.

Archaeological Resources Monitoring

Ecology is working with landowners/stakeholders including local Indian tribes to clean up contaminated sites and sediments in the vicinity of the Port Gardner Bay area and the Snohomish River Estuary. Port Gardner Bay is identified as a high-priority, "early-action", cleanup area under the Puget Sound Initiative (PSI). The Kimberly-Clark Worldwide Site has been identified as a cleanup site under the PSI. Local tribes that have been actively engaged by Ecology under the PSI at Port Gardner include the Tulalip, Suquamish, Swinomish, and Lummi. Ecology has worked with a tribal liaison to assist in developing contacts and early engagement with cultural and natural resource sections within each of the aforementioned tribes. Engagement with the tribes has consisted of meetings to discuss PSI cleanup sites and cultural resources, providing the Tribes with draft work products for early input, and providing them with updates containing the current status of each PSI site, near-term work products for tribal review, project schedules, and a summary of tribal engagement for the Port Gardner PSI sites.

Based on Ecology's discussion with the Tribes and information provided in a 1973 Historical Survey of Everett (Dilgard and Riddle, 1973), people have inhabited the Port Gardner Bay area for thousands of years. For centuries, the northwest point of the peninsula (i.e., Preston Point) was the site of Hebolb, the principal village of the Snohomish Tribe. Its location near the mouth off the Snohomish River and next to Port

Gardner Bay provided both abundant food and transportation. Native tribes used the Everett shoreline in part for subsistence activities such as shellfish collection, hunting, plant gathering and fishing. According to local tribes, native long houses were located up and down the Everett waterfront. Local tribes have communicated to Ecology that the Everett waterfront is a culturally sensitive area. With that in mind, the procedures to be used in the event archaeological resources are encountered during Site activities are presented below.

Prior to initiating the interim action, a professional archaeologist will prepare a cultural resource assessment and an inadvertent discovery plan specific to the Upland Area interim actions. The assessment will map, based on readily available information, estimated probabilities for areas of native soil within the Upland Area to contain significant Native American archaeological materials (low, medium, high probability).

It is currently planned that excavation work associated with the interim actions will occur principally in the non-native fill. The interim action excavations and excavated soils will be observed by a geologist overseeing the interim action activities, with attention paid to looking for evidence of non-soil materials. If a potential archaeological object is discovered during interim action activities, work will be stopped immediately and a professional archaeologist will mobilize to the excavation location to observe and assess the materials encountered. If the professional archaeologist confirms that an archaeological object has been encountered, they will notify Ecology, the Department of Archaeology and Historic Preservation (DAHP), the City of Everett Planning and Community Development Department, and the Tulalip Tribes Cultural Resources Department in a timely manner (current day if possible) and no later than the next business day. Contact information is provided below.

- **Ecology** – Andy Kallus, Site Manager, Toxics Cleanup Program – (360) 407-7259.
- **DAHP** – (360) 586-3065.
- **City of Everett Planning and Community Development Department** – (425) 257-8731
- **Tulalip Tribes Cultural Resources Department** – (360) 716-2600

The professional archeologist will invite the parties to attend an on-site inspection. The archaeologist will document the discovery and provide a professionally documented site form and report. In the event of any discovery of human remains, work will be immediately halted in the discovery area, the remains will be covered and secured against further disturbance, and the Everett Police Department and Snohomish County Medical Examiner will be immediately contacted, along with the DAHP Physical Anthropologist and authorized Tribal representatives. A treatment plan by the professional archaeologist will be developed in consultation with the above-listed parties consistent with Chapter 27.44 RCW (Indian graves and records) and Chapter 27.53 RCW (Archaeological sites and resources) and implemented according to Chapter 25.48 WAC (Archaeological excavation and removal permit). The archaeologist will submit documentation regarding the discovery to DAHP so that they may control access to information regarding potential sensitive-site locations, in accordance with RCW 27.53.070.

4 Generalized Approach for Opportunistic Cleanups

As stated in Section 1, the opportunistic cleanup actions conducted under this Interim Action Plan will involve excavation and proper off-Site disposal of contaminated soil, with concurrent dewatering to facilitate soil removal and handling. In addition, separate-phase petroleum identified in the groundwater during excavation activities will be collected to the extent practicable (either by vacuum truck or adsorbent material), characterized, and sent for off-Site disposal. Separate-phase petroleum can also be recovered from the system used to treat dewatering water (Section 6.2). Specific locations for the opportunistic cleanup actions are not yet defined. While each opportunistic cleanup location will have unique physical conditions to be adapted to, this section describes the generalized procedures/approach to be conducted during the opportunistic interim cleanup actions irrespective of location — including application of interim action cleanup levels guiding the extent of interim cleanup, erosion and sediment controls, dewatering and water management, soil excavation and handling procedures, stockpile management, and excavation backfilling.

4.1 Interim Action Cleanup Levels

The Order requires completion of a Model Toxics Control Act (MTCA) Remedial Investigation/Feasibility Study (RI/FS) and draft Cleanup Action Plan (DCAP) for the Upland Area. Therefore, Ecology has not yet established final soil or groundwater cleanup levels for the Upland Area.

Therefore, the opportunistic interim cleanups addressed under this Plan will, to the extent practicable, remove soil containing contaminant concentrations above soil interim action cleanup levels, which may be less stringent than final soil cleanup levels, in accordance with WAC 173-340-355.

For the purposes of conducting the opportunistic interim cleanups, interim action cleanup levels are established as MTCA soil cleanup levels for unrestricted land use, the more stringent of Method A (see WAC 173-340-740(1); WAC 173-340-900, Table 740-1) or Method B unrestricted values (see WAC 173-340-740(3)). Cleanup levels based on unrestricted land use are protective of residential land use scenarios and natural resources such as groundwater and adjacent surface water.

If, during the course of the interim action, it becomes known that the Upland Area will remain in traditional industrial land use (consistent with WAC 173-340-200 [definitions] and -745) , interim action soil cleanup levels for an industrial land use can be used during the demolition-phase interim action, subject to prior discussion with and approval by Ecology.

4.2 Erosion and Sediment Controls

The construction storm water best management practices (BMPs) described in Section 3 of the SWPPP for demolition and remediation of the K-C Everett Mill (David Evans and Associates, 2012) will be implemented during soil excavation, stockpiling, loading, and transportation on-Site during the interim action. Soil erosion due to precipitation runoff

or run-on to or from soil excavations, stockpiles, or other soil areas exposed or disturbed throughout the interim cleanup activities will be prevented using berms, surface water control, straw bales, plastic covers (minimum 10-mils), or other measures appropriate for the conditions. The Engineer will monitor and maintain the BMPs and apply all available and reasonable methods to control runoff from leaving the immediate area of the soil management activity.

4.3 Dewatering and Water Management

Construction dewatering may be conducted during the interim cleanup activities to dewater saturated contaminated soil in place to facilitate effective soil excavation/handling and performance soil sampling within the excavation (discussed in Section 5.2). Means and methods for dewatering will be determined by the construction contractor specific to each location, and may include:

- Temporary sumps within the open excavation;
- Well points outside the excavation; and/or
- Groundwater cutoff technologies.

Sumps are an effective means of dewatering excavations within lower permeability material where groundwater heads need only be depressed several feet. If sumps are inadequate for dewatering the excavation, closely-spaced vacuum well points may be used outside the excavation footprint. Methods such as temporary shoring, trench boxes, etc. may also be employed to reduce water inflow and/or stabilize the excavations, if needed.

Groundwater pumped during dewatering will be treated on-Site and disposed of as described in Section 6.2.

Separate-phase petroleum identified in the groundwater during excavation activities will be collected to the extent practicable (either by vacuum truck or adsorbent material), characterized, and sent for off-Site disposal. Separate-phase petroleum can also be recovered from the system used to treat dewatering water (Section 6.2).

4.4 Soil Excavation and Handling

Interim cleanup activities in the Upland Area will involve conventional excavation and off-Site disposal of contaminated soils to anticipated depths to 15 feet or more below existing grade. Excavation sidewalls will be sloped or otherwise stabilized as needed to facilitate excavation to the depths required to achieve cleanup goals. Asphalt and concrete removed in the course of interim action excavation will be managed with like materials being removed during the mill demolition. However, visibly contaminated (e.g., petroleum stained) asphalt, concrete, or other debris will be handled and properly disposed off Site.

To the extent practical, contaminated soil that has been drained to an unsaturated condition will be direct loaded into waiting dump trucks or intermodal containers for off-Site transport to a licensed disposal facility, rather than stockpiled temporarily on-Site. If

contaminated soils are temporarily stockpiled on-Site, the stockpiles will be managed as described in Section 4.5.

Some of the soil excavated is expected to be saturated since the depth to the groundwater table varies from 2 to 15 feet below ground surface (bgs). Saturated soil will be drained directly back into the excavated area prior to loading. Care will be taken so that groundwater from the excavation bucket flows back into the excavated region and not to adjacent areas.

During soil removal, the Engineer will initially make a determination of whether or not the soils being excavated are contaminated or not (meet interim action cleanup levels or not), based on information from prior investigations and field screening evidence during excavation. Field screening methods include visual and olfactory observations, use of a photoionization detector (PID) for determining presence/absence of volatile organic compounds, use of a sheen test for presence of petroleum, and/or other methods appropriate to the known contaminant type.

Excavated soils that the Engineer determines to be potentially not contaminated, using the field screening methods described above, are termed “overburden”. The Engineer will also make a determination of whether or not excavated overburden soils are geotechnically suitable to be reused as fill on-Site. Geotechnically suitable soils are defined as having composition, grain size, and moisture characteristics that allow its placement and ability to meet compaction requirements defined in Section 4.6. Conversely, geotechnically unsuitable soils would have undesirable physical soil characteristics and/or an excessive percentage of organic matter or debris, and would not meet compaction requirements. Geotechnically suitable overburden, if confirmed through chemical testing to be not contaminated, can be reused as fill on-Site. Geotechnically unsuitable soils, irrespective of whether contaminated or not, are assumed to have no beneficial use on-Site, and therefore will be disposed of off site. Overburden stockpiles will be managed and sampled/chemically analyzed for the purpose of proper waste designation, as described in Section 4.5.

If the performance monitoring data collected from the excavation extents (Section 5.2) indicate that interim action cleanup levels have not been achieved, the excavation will be expanded to remove additional soil so as to meet interim action cleanup levels, to the extent practicable. Where an excavation sidewall sample exceeds a soil interim action cleanup level, the length of sidewall represented by that sample will be over-excavated approximately 2 feet laterally, followed by collection of a new sidewall verification sample in that location. Where an excavation bottom sample exceeds a soil interim action cleanup level, additional soil from the bottom of the excavation will be over-excavated by a depth of approximately 1 foot, followed by collection of a new bottom verification soil sample at that location.

4.5 Stockpile Management

If soil stockpiling is needed during the interim cleanup excavation activities, the Contractor will stockpile the excavated soils in a location (designated by Aspect) which will not hinder completion of the cleanup activities or nearby demolition activities.

If potentially uncontaminated soils (overburden) require removal to access contaminated soils, separate stockpiles will be designated for contaminated soil versus overburden based on the Engineer's field screening.

To the extent practical, stockpiles will be located away from storm drain catch basins and the waterway shoreline. Areas designated for stockpiling will be cleared of debris or obstructions before stockpiling thereon. Soil will be transported in a way so as to limit spillage of soil between the interim cleanup excavation location and the stockpile location.

The maximum individual size for a stockpile of overburden soil will be 100 cubic yards. The overburden stockpiles can be contiguous, but 100 cubic yard increments must be clearly delineated so that stockpiles of 100 cubic yards or less can be sampled and managed individually based on laboratory analytical results. If contaminated soils are stockpiled, they need not be further sampled, unless needed for waste profiling, and can be of any size.

Each stockpile, irrespective of soil type, will be underlain by plastic sheeting with a minimum thickness of 10-mils, with adjacent sheeting sections continuously overlapped by a minimum of 3 feet. The ground surface on which the sheeting will be placed will be free of rocks greater than 1-inch in diameter and other objects that could damage the sheeting. Alternatively, a layer of geotextile or plywood may be placed beneath the sheeting to protect it in locations containing rocks or debris greater than 1-inch in diameter on the ground surface, or in areas through which vehicular traffic will travel. The stockpile area will be surrounded by straw bales or equivalent to limit transport of sediment potentially generated from the stockpiles.

The soil stockpiles will be covered by plastic sheeting of minimum 10-mil thickness to prevent precipitation from entering the stockpiled soil. Each stockpile cover will be anchored (e.g., using sand bags) sufficiently to prevent it from being removed by wind. Soil stockpiles will be covered when not in use and as needed during periods of rain and wind to prevent transport of soil. The stockpile management measures will be inspected regularly and maintained as needed as long as the stockpile remains at the Site.

4.5.1 Sampling and Disposition of Stockpiled Soil

The Engineer will conduct soil sampling and analysis of each stockpile of overburden soil to characterize it for appropriate disposition. Stockpiles of soil known/suspected to be contaminated based on the Engineer's judgment will not be sampled, unless needed for disposal profiling (assumed to already have been profiled for disposal based on prior data).

For each overburden stockpile being sampled (100 cubic yards or less in size), three (3) grab samples of soil will be collected, in accordance with stockpile sampling requirements provided in Ecology (2011). Stockpile soil sampling procedures are described in Appendix A, and analytical quality assurance procedures are outlined in Appendix B. Once the laboratory chemical testing data are available, each stockpile of overburden soil will be characterized according to the highest level of contamination detected in any one sample.

Based on the analytical results, each stockpile of geotechnically suitable overburden soil will be managed as follows:

- If chemical testing data confirm contaminant concentrations above interim action cleanup levels, it will be designated as contaminated soil, and will be transported and disposed of at an appropriately permitted off-Site disposal facility (disposal facility options described in Section 6.1).
- If chemical testing data confirm contaminant concentrations below interim action cleanup levels, it will be designated as non-contaminated and can be reused as fill on-Site.

Based on the analytical results, each stockpile of geotechnically unsuitable overburden soil will be managed as follows:

- If chemical testing data confirm contaminant concentrations above interim action cleanup levels, it will be designated as contaminated soil, and will be transported and disposed of at an appropriately permitted off-Site disposal facility (see Section 6.1).
- If chemical testing data confirm contaminant concentrations below interim action cleanup levels, it will be designated as non-contaminated soil. However, because it cannot be reused on-Site, the non-contaminated stockpiled soil will be loaded and transported to an off-Site facility permitted to accept it (see Section 6.1).

4.6 Excavation Backfill and Compaction

Each interim cleanup action excavation will be backfilled to surrounding grade using a combination of crushed concrete (less than 4 inch) recycled from demolition of former mill structures, (stockpiled) geotechnically suitable overburden confirmed to be uncontaminated, and/or granular materials (sand/gravel or crushed rock) imported from a known source of uncontaminated fill (e.g., Washington State Department of Transportation [WSDOT]-approved borrow pit).

Visibly contaminated concrete will be properly disposed of off Site as contaminated material (Section 4.4), so will not be used for backfill. Only concrete from locations where hazardous materials were not handled, and which has no visual or olfactory evidence of contamination and no surface coatings (e.g., paint) would be a candidate for use as backfill for the interim action excavations. Stockpile(s) of crushed concrete that are candidate for use as backfill will be chemically tested to demonstrate they are not contaminated, prior to use as excavation backfill.

For imported backfill, the Contractor must provide to the Engineer documentation of the fill source area land use and operational history, as well as representative analytical testing data for the fill material, to demonstrate it is not contaminated.

Representative sampling and chemical analyses for the imported fill soil and crushed concrete proposed for backfill will include the following: 5 samples for up to 1,000 cubic yards of material, and 1 additional sample for every additional 1,000 cubic yards of material, with each sample analyzed for gasoline-range petroleum hydrocarbons

(NWTPH-Gx method), diesel-/oil-range petroleum hydrocarbons (NWTPH-Dx method), volatile organic compounds (EPA Method 8260), semivolatile organic compounds (EPA Method 8270), priority pollutant metals (EPA Methods 6000/7000), and PCBs (EPA Method 8082).

Depending on the condition of the excavation bottom prior to backfill, a layer of quarry spalls may be required as a base for the granular backfill materials. Where crushed concrete is used as backfill, it will be capped with no less than 1 foot of clean granular material or organic soils.

The excavation backfill will be placed in lifts not to exceed 12 inches in thickness, and will be compacted to minimum 95 percent of maximum dry density as determined by ASTM D-1557 and measured by the Engineer. It is expected that the interim action excavations will not be repaved.

4.7 Control of Dust and Spreading of Contaminated Soil

During the interim action, the Contractor will use the following methods as needed to minimize off-Site migration, as airborne dust, track out, or stormwater runoff, of any contaminated soils identified based on visual observation or measurements:

- Apply water to dry soils as necessary to suppress airborne dust;
- Use BMPs identified in the SWPPP to prevent contaminated soils at the Site from entering the stormwater drainage systems;
- Use pipe plugs to fit internal lines in catch basins in the event of a release;
- Use other erosion control devices to prevent contaminated soils suspended in stormwater from migrating off-Site (e.g., soil piles will be covered in plastic and placed on plastic within berms);
- Maintain excavation equipment in good working order. The contractor must immediately clean up any contaminated soil resulting from spilled hydraulic oils or other hazardous materials from equipment;
- Minimize equipment traffic through the exclusion zone to prevent contaminated soils from being transported via track-off to other parts of the Site, or off of the Site;
- Establish specific truck haul routes before beginning off-Site transport of contaminated soil. Use on-Site truck routes that minimize or prevent traffic over contaminated areas;
- Locate loading areas for contaminated soil in, or at the edge of, the exclusion zone;
- Load only soils without free liquid in trucks (wet soils with free water will not be loaded into trucks);
- Load trucks in a manner that prevents the spilling, tracking, or dispersal of contaminated soils. Cover all loads prior to exiting the Site;

- Remove soil from the exterior of vehicles before they leave soil-loading areas or exit the Site. Place any soil collected in the loading area back into the truck; and
- Verify that loaded truck weights are within acceptable limits.

5 Compliance Monitoring

In accordance with WAC 173-340-410, compliance monitoring for a cleanup action includes the following elements:

- **Protection monitoring** confirms that human health and the environment are adequately protected during the cleanup action;
- **Performance monitoring** confirms that the cleanup action has attained interim action cleanup levels and/or other performance standards; and
- **Confirmation monitoring** confirms the long-term effectiveness of the cleanup action once interim action cleanup levels and/or other performance standards have been attained.

Protection and performance monitoring will be conducted for the opportunistic interim cleanups conducted in the Upland Area. Confirmation monitoring will be conducted as part of the final cleanup remedy established in the final Cleanup Action Plan, not as part of the interim action. However, based on approval from Ecology, K-C may initiate groundwater monitoring following completion of the interim soil cleanups to expedite data collection supporting confirmation monitoring.

The protection and performance monitoring requirements for the opportunistic interim cleanup actions are briefly described below.

5.1 Protection Monitoring

Protection monitoring will be conducted pursuant to WAC 173-340-410(1)(a) to confirm that human health and the environment are adequately protected during implementation of the interim action. On-Site workers conducting the interim action are required to be appropriately trained in hazardous waste operations in accordance with WAC 296-843-200, and follow an applicable site-specific health and safety plan (SHSP) that they develop as required by WAC 173-340-810. Activities performed under the SHSP will comply with the applicable section of 29 CFR 1910.120. In general, protection monitoring will include air monitoring within the exclusion zone (worker breathing zone) using PID to measure volatile organic compound concentrations and, if warranted based on PID information, using instruments (e.g., Draeger tubes) for measuring airborne concentrations of contaminants specific to the interim action location. Visual monitoring of fugitive dust will also be conducted, with dust control BMPs (Section 4.7) conducted as needed to minimize visible dust emissions in accordance with Puget Sound Clean Air Agency (PSCAA) rules (Section 9.15 of PSCAA Regulation I). If visible dust is generated, either work will stop until the visible dust is eliminated, or dust levels will be

measured to assure that they meet appropriate action levels protective of human health. If measured volatile organic compounds or dust levels exceed action levels established for the interim action, measures will be implemented to reduce the emissions to below action levels. Some of the measures may include those discussed previously in Section 4.7, covering exposed soils with plastic, reducing the areal extent of soil disturbance, or use of a vapor barrier. By achieving occupational health standards within the exclusion zone and dust control during the short-term interim action excavations, the off-Site public will also be protected. Protection monitoring data collected by the Engineer during cleanup will be made available to other on-Site workers and Ecology, if requested.

Nothing in this Plan precludes other on-Site contractors/consultants from choosing to conduct additional protection monitoring. All contractors, subcontractors, and other persons on-Site are solely responsible for the safety of their employees, including training and preparation and execution of their own site-specific health and safety plan.

5.2 Performance Monitoring

During the interim cleanup actions, the Engineer will conduct performance monitoring consisting of collecting and analyzing soil samples from the limits of cleanup excavations to determine if interim action cleanup levels are achieved. The Engineer will collect the performance soil samples when field screening indicates that sufficient soil has been removed to meet interim action cleanup levels for that portion of an excavation.

Performance samples will be collected from both bottom and sidewalls of the interim cleanup action excavations to document that the vertical and lateral extents of soil exceeding interim action cleanup levels have been removed. Excavation bottom verification samples will be collected using the excavator bucket on a systematic 15-foot grid (i.e., one sample per 15-foot by 15-foot square), with a minimum of three samples from the bottom of each excavation. Excavation sidewall verification samples will be collected at a horizontal spacing of approximately 15-feet and at 3-feet depth intervals (e.g., 0 to 3 feet, 3 to 6 feet, 6 to 9 feet, etc.) across the full depth of excavation. A minimum of two verification samples will be collected from each sidewall at each depth interval within each excavation.

Chemical analyses for the excavation verification soil samples in each interim cleanup area will be determined based on the existing data (contaminants of concern) that identified the area for interim cleanup and/or other information regarding historical operations in that location. The Engineer will determine the specific chemical analyses for the verification soil samples based on contaminants of concern, as determined by sufficient prior characterization sampling and analysis, for each interim action excavation area. For example, verification soil samples collected from areas with diesel or oil (e.g., Bunker C) fuel contamination will be analyzed for diesel-/oil-range TPH (with silica gel cleanup) and PAHs. Verification soil samples collected from areas with gasoline contamination will be analyzed for gasoline-range TPH, volatile organic compounds (VOCs) which include fuel oxygenates, and lead. Verification soil samples collected from areas with xylene contamination will be analyzed for gasoline-range TPH and VOCs. Verification soil samples collected from the latex spill area will be analyzed for VOCs including vinyl acetate and 1,4-dioxane. The Engineer will expand the list of

analytes if an interim action excavation area expands into an area with different contaminants.

The procedures for excavation verification soil sample collection and analysis are presented in detail in the SAP and QAPP (Appendices A and B).

6 Waste Management

This section describes management and disposal of soil and groundwater generated during the Upland Area opportunistic interim cleanup activities.

6.1 Soil Disposal

K-C will dispose of contaminated and geotechnically unsuitable overburden soils generated during the interim cleanups at an appropriate off-Site facility permitted to accept the waste. Trucks transporting contaminated soil from the site will comply with applicable state and federal regulations and local ordinances, and will be covered from the time they are loaded on-Site until they off-load at the designated off-Site disposal facility.

Final disposal facilities for contaminated soil generated during the interim cleanup activities will be determined based on the soil's chemical characteristics relative to disposal facilities' permit requirements. Potential disposal facilities for contaminated soil include:

- **Soil contaminated by only petroleum:** CEMEX USA, Everett, Washington.
    - Restrictions: Cannot accept soil containing concentrations of metals or chlorinated compounds above MTCA unrestricted soil cleanup levels.
    - Contact: Larry Baker, (425) 210-8429, lbaker@cemexusa.com.
- **Non-hazardous contaminated soil (special waste):** Republic Services Inc.'s Roosevelt Regional Subtitle D Landfill in Roosevelt, Washington.
    - Restrictions: Cannot accept hazardous waste.
    - Contact: Leslie Whiteman, (206) 332-7711, LWhiteman@republicservices.com.
- **Non-hazardous contaminated soil (special waste):** Waste Management Inc.'s Subtitle D landfills, including one in Wenatchee, Washington, and three in Oregon (Columbia Ridge, Riverbend, and Hillsboro).
    - Restrictions: Cannot accept hazardous waste.
    - Contact: Michael McQuarrie, (360) 913-4781, mmcquarr@wm.com.

- **Hazardous contaminated soil (dangerous waste):** Waste Management Inc.'s Chemical Waste Management Subtitle C Landfill in Arlington, Oregon.
    - Restrictions: Waste must meet universal treatment standards prior to disposal. Note that Waste Management has technical capabilities at their Arlington facility for treating soils to achieve treatment standards prior to land disposal.
    - Contact: Michael McQuarrie, (360) 913-4781, mmcquarr@wm.com.

Prior data from the environmental assessments and/or interim action performance monitoring will be used to profile the contaminated soil for off-Site disposal. Additional testing of soil may be required during the interim cleanups, if requested by the disposal facility.

Geotechnically unsuitable overburden (not contaminated) will be retained on site for use in final site grading and/or landscaping.

Irrespective of the type of soil disposed of off site, the Engineer will obtain and retain copies of the certificates of disposal and other disposal records for it; this documentation will be included in the Interim Action Report (Section 7).

6.1.1 On-Site Treatment Option

K-C retains the option to treat waste on-Site to remove a hazardous waste characteristic prior to off-Site disposal (e.g., stabilize soil on-Site to reduce Toxicity Characteristic Leaching Procedure [TCLP]-leachable concentrations to below federal characteristic criteria). For example, chemical stabilization for metals-contaminated soil could include mixing the soil with reagents including cement, phosphate minerals, etc. to reduce leachability under the TCLP test Bench-scale testing of specific reagent mixes with Site soil would likely be conducted prior to full-scale stabilization. If on-Site treatment successfully removes the hazardous characteristic, the waste can be disposed of as solid waste in a Subtitle D landfill. Likewise, on-Site treatment can be used to achieve universal treatment standards and thereby allow land disposal of hazardous waste in a Subtitle C landfill. If hazardous waste is treated on-Site, its excavation, treatment, and loading for off-Site disposal would be completed within 90 days.

6.2 Groundwater Treatment and Disposal

Groundwater pumped during dewatering will be pre-treated on-Site using a temporary treatment system, and then discharged to City of Everett's wastewater treatment plant via their sanitary sewer, in accordance with a discharge authorization (DA) obtained by K-C (Section 3.1.3). The temporary water pre-treatment system will consist of a 3-chamber weir tank(s), bag filters, and granular activated carbon vessels. The weir tank will provide removal of settleable solids and, if present, floating separate-phase petroleum. Weir tank effluent will be pumped through bag filters (mesh sizing to be determined) for removal of suspended solids, and then through vessels of granular activated carbon (sized for flow rate and expected concentrations) for removal of dissolved-phase organics. The treated water will then be discharged into K-C's on-Site wastewater treatment facility, from which it will be discharged to City sanitary sewer. Treated water not in compliance with

the City discharge limits will be re-run through the treatment system until passing discharge limits, or will be containerized, characterized, and sent for off-Site disposal. Rates of treated water discharge to sewer will comply with the DA. Additional storage tanks may be used to provide additional on-Site storage if necessary.

Separate-phase petroleum (free product) identified in the groundwater during excavation activities will be collected to the extent practicable (either by vacuum truck or adsorbent material), characterized, and sent for off-Site disposal consistent with the following:

- Petroleum free product collected by vacuum truck may be drummed, characterized, and sent for off-Site disposal.
- Petroleum free product collected on adsorbent materials will be characterized and disposed of along with the adsorbents together with contaminated soils from the excavation or dewatering.

Prior to demobilization of the temporary water treatment system, the Contractor will clean the weir tank(s), including removing and stockpiling the settled solids from within the tank(s).The Engineer will chemically test the stockpiled solids for waste profiling in accordance with the sampling procedures described in Appendix A and chemical analyses outlined in Appendix B. The settled solids stockpile will be designated for disposal according to the highest level of contamination detected in any one sample, and will then be loaded, transported, and disposed of at a licensed off-Site disposal facility.

7 Reporting

As specified in the Order, K-C shall provide Ecology with quarterly written updates on interim actions that have taken place in the Upland Area. In addition, once active cleanup has begun, Ecology and K-C shall have meetings or teleconferences on a monthly basis to discuss the status of Site activities including upland interim actions. Within 90 days of completing an opportunistic interim cleanup action, an Interim Action Report, describing the methods and outcome of the interim cleanup activities, will be prepared and submitted to Ecology in accordance with the Order. Information provided in the Interim Action Report will include a description of how the contaminated media was managed, the lateral and vertical limits of any excavations, the volume of contaminated soil or groundwater removed from each excavation, and all sampling results including pre-excavation characterization of site media, post-excavation compliance monitoring, and characterization of environmental media for waste disposal purposes. All interim actions at the Site will subsequently be fully described and documented in the Upland Area RI/FS report and the draft Cleanup Action Plan (CAP) for the Site.

The results of the interim cleanup activities will subsequently be incorporated into the draft RI/FS for the Upland Area. The data collected during the interim action will also be uploaded to Ecology's EIM database (within 60 days after it has been validated) along with the other RI/FS data, in accordance with the Order.

8 References

AECOM, 2011, Phase I Environmental Site Assessment, Everett Pulp and Paper Mill, Everett Washington, April 2011.

Aspect Consulting, 2012, Work Plan for Independent Phase 2 Environmental Site Assessment, Kimberly-Clark Mill Upland, Everett, Washington, May 21, 2012.

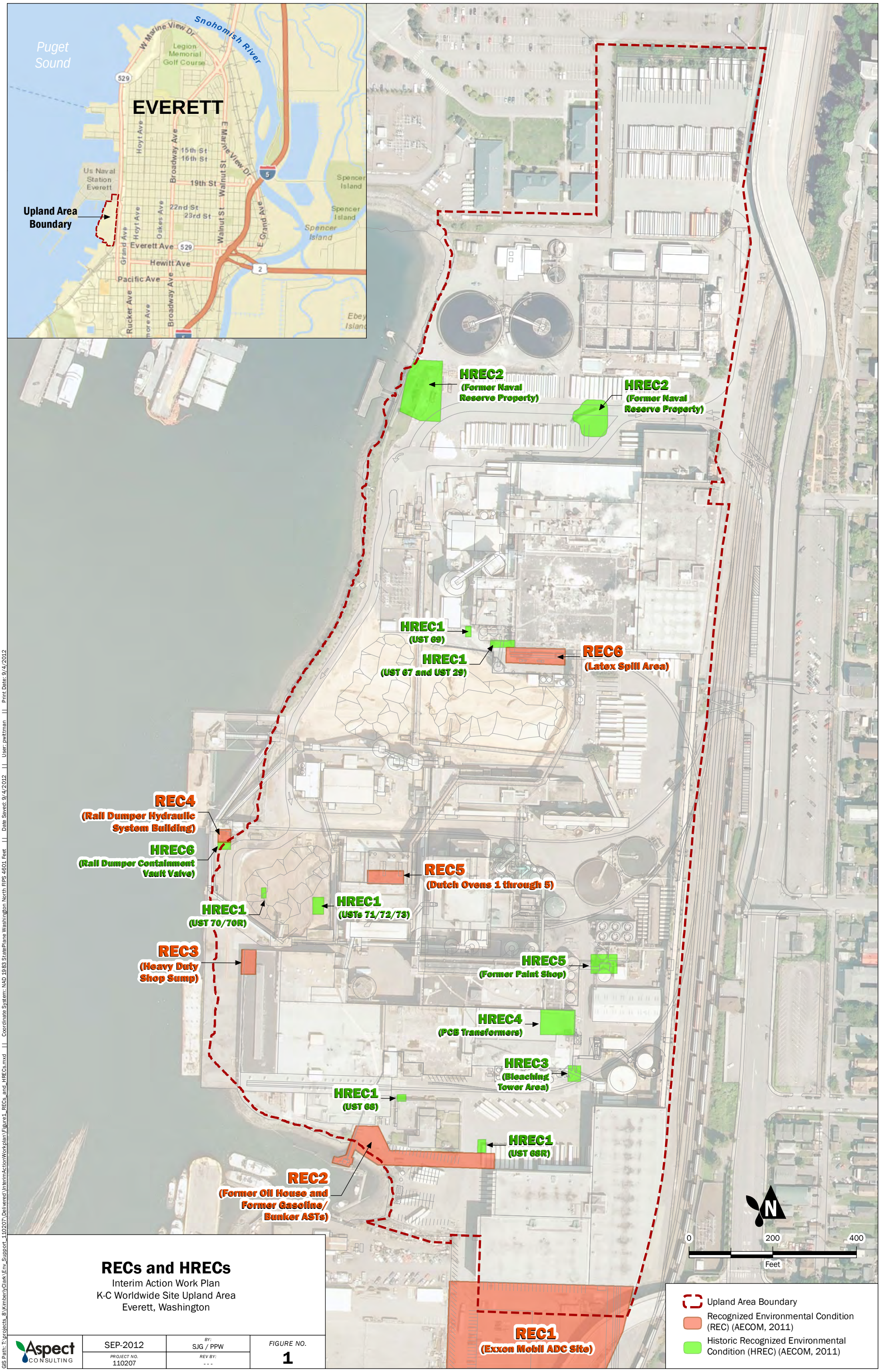
David Evans and Associates, 2012, Storm Water Pollution Prevention Plan for Kimberly Clark Everett Pulp and Paper Mill Demolition and Remediation, March 1, 2012.

Dilgard and Riddle, 1973. Shoreline Historical Survey Report, Shoreline Master Plan Committee for City of Everett. 1973.

Ecology, 2004, Toxics Cleanup Program Policy 130A, Coordination of SEPA and MTCA, Revised July 28, 2004.

Ecology, 2011, Guidance for Remediation of Petroleum Contaminated Sites, Washington State Department of Ecology Toxics Cleanup Program, September 2011.

Landau Associates, 1991, Soil and Groundwater Investigation, Former Underground Petroleum Storage Tanks, Everett Pulp and Paper Mill, Everett, Washington,



RECs and HRECs

Interim Action Work Plan
K-C Worldwide Site Upland Area
Everett, Washington

Aspect CONSULTING			
	SEP-2012	BY: SJG / PPW	FIGURE NO. 1
	PROJECT NO. 110207	REV BY: ---	

GIS Path: T:\projects_8\KimberlyClark\Env_Support_110207\Delivered\InterimActionWorkplan\Figure1_RECs_and_HRECs.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 9/4/2012 || User: pwittman || Print Date: 9/4/2012

Xylene UST 29/Latex Spill

Rail Car Dumper Hydraulic System Building

Diesel UST 70

Bunker C USTs 71/72/73

Heavy Duty Shop Sump

Bunker C ASTs

N

0 200 400

Feet

Upland Area Boundary

Current Probable Area for Interim Action During Demolition (areas are schematic)

Current Probable Areas for Interim Action During Demolition

Interim Action Work Plan
K-C Worldwide Site Upland Area
Everett, Washington

Aspect CONSULTING	SEP-2012	BY: SJG / PPW	FIGURE NO. 2
	PROJECT NO. 110207	REV BY: ---	

GIS Path: T:\projects_8\KimberlyClark\Env_Support_110207\Delivered\InterimActionWorkplan\Figure2_CurrentProbable_IA_Areas.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 9/4/2012 || User: pwittman || Print Date: 9/4/2012

APPENDIX A

Sampling and Analysis Plan

Appendix A Contents

A1 Introduction

This Sampling and Analysis Plan (SAP) describes field sampling and quality control (QC) procedures to be followed during interim cleanup activities conducted in the Upland Area of the Kimberly-Clark Worldwide Site located at 2600 Federal Avenue in Everett, Washington (herein referred to as the Upland Area). Additional information on laboratory analytical methods and QC are provided in the Quality Assurance Project Plan (QAPP), included as Appendix B of the Interim Action Plan. It is the responsibility of the project personnel performing or overseeing the sampling and analysis activities to adhere to the requirements of the SAP and QAPP.

A1.1 Purpose of SAP

The purpose of this SAP is to ensure that field sample collection, handling, and analysis conducted during interim cleanup activities in the Uplands Area will generate data to meet project-specific data quality objectives (DQOs) in accordance with MTCA requirements (WAC 173-340-350). The SAP includes requirements for sampling activities such as sampling frequency and location, analytical testing, documentation, and quality assurance/quality control (QA/QC) for performance monitoring and waste characterization.

A2 Excavation Verification Soil Sampling Procedures

Soil sampling will be collected from the bottoms and sidewalls of the interim cleanup excavations to determine if interim action cleanup levels are achieved, as described in Section 5 of the Interim Action Plan. The Engineer will collect the verification soil samples when field screening indicates that soils within a segment of the excavation may be clean (i.e., below interim action cleanup levels). The Engineer's field screening will include visual and olfactory observations of the soil, and using a photionization detector (PID) to monitor for the presence of volatile organic compounds (VOCs). In using the PID, bagged soil will be sealed, briefly shaken, and then allowed to equilibrate to allow vaporous head accumulations to become representative. Field personnel will then measure the potential presence of volatiles in the air of the head space in a manner sufficient to not allow vaporous head concentration to escape. In areas of known or suspected petroleum contamination, soil samples will also be field screened for the presence of petroleum using a sheen test: placing a small aliquot of soil into a plastic cup containing water, gently shaking, adding a hydrophobic dye such as Sudan IV, and watching for presence of petroleum sheen. Care will be taken to differentiate sheen created by petroleum (iridescent swirl of colors, does coalesce after being disturbed)

versus other organic matter (angular “waxy sheets”, do not coalesce after being disturbed), and recording the information appropriately.

The excavation verification soil samples will be collected using the excavator bucket, unless an excavation is shallow enough and appropriately sloped/shored to allow safe entry and egress of the Engineer. Soil samples will be obtained directly from the center of excavator bucket, avoiding contact with the bucket itself.

All soil samples to be submitted for VOC and gasoline-range petroleum analyses will be collected in accordance with EPA Method 5035A. The soil aliquot for VOC analysis will be collected from the undisturbed soil sample core using a laboratory-supplied modified disposable plastic syringe as required by the 5035A method, and placed in pre-weighed laboratory supplied vials.

For all other analyses, the soil samples will be collected using a stainless steel spoon and placed in a stainless steel bowl for homogenization with the stainless steel spoon. Gravel-sized material greater than approximately 0.5 inch will be removed from the sample during mixing. A representative aliquot of the homogenized soil will be placed into certified-clean jars supplied by the analytical laboratory.

QC soil samples (e.g., field duplicates, rinsate blanks, and trip blanks) will be collected at the respective frequencies prescribed in Section 8.1 of the QAPP (Appendix C).

Each excavation verification soil sample collected for chemical analysis will be assigned a unique sample identification number including a prefix designating the interim action cleanup area, a designation for bottom sample (B) or sidewall sample (S) with sequential numbers for each, the sample depth below surrounding grade, and the date the sample was collected. Recording sample date helps track progress of the excavation, particularly when sample locations need to be subsequently over-excavated to meet interim action cleanup levels. For example, within an excavation at hypothetical underground storage tank (UST) 10, the fourth excavation sidewall verification soil sample, collected from a depth of 7 feet, on October 31, 2012, would be identified as UST10-S4-7-103112. The location of each verification soil sample will be recorded using a global position system (GPS) instrument or other measurement techniques (tape measure) based on its accessibility.

A3 Stockpile Sampling and Analysis Procedures

The Engineer will conduct sampling and analysis of each stockpile of overburden soil, and the stockpile of settled solids removed from the water treatment system, to characterize it for appropriate disposition. For each soil stockpile (100 cubic yards or less in size), three (3) grab samples of soil will be collected, in accordance with stockpile sampling requirements provided in Ecology (2011). Each soil sample will be collected from a minimum of 6 inches below the exposed surface of the stockpile, with decontamination of sampling utensils, or replacement of disposal utensils, between each sample location. The location of each of the grab samples will be where field instrument

readings indicate contamination is most likely to be present. If field instruments do not indicate contamination, the pile will be divided into sections and each section sampled.

The soil samples will be submitted under chain of custody to an analytical laboratory, accredited by Ecology, for the following chemical analyses:

- Gasoline-range petroleum hydrocarbons (Method NWTPH-Gx);
- Diesel- and oil-range petroleum hydrocarbons (Method NWTPH-Dx with silica gel cleanup);
- Priority pollutant metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, zinc) (EPA Methods 6010/mercury by 7471). At Engineer's discretion to designate waste for off-Site disposal, RCRA 8 TCLP metals analysis (EPA Methods 1311 and 6010/mercury by 7470) may also be conducted, or can be conducted contingent upon results from the total metals analysis;
- Semivolatile organic compounds including PAHs (SVOCs; EPA Method 8270);
- Volatile organic compounds (VOCs; EPA Method 8260); and
- Polychlorinated biphenyls (PCBs; EPA Method 8082).

The Engineer may adjust this analyte list based on knowledge of contamination in a specific area (e.g., during soil remediation), and/or analytical data requirements of the intended disposal facility. Depending on the time available for disposition of the soil stockpiles, the Engineer can coordinate with the laboratory to provide expedited analysis (rush turnaround of results) at additional cost.

A4 Monitoring Well Installation and Development

Groundwater monitoring wells located within the footprints of the interim cleanup action excavations will be properly decommissioned in accordance with the requirements of Chapter 173-160 WAC.

Following completion of the interim cleanup activities, replacement monitoring wells may be installed as necessary to initiate post-construction groundwater monitoring. This section presents the procedures for installation of replacement monitoring wells, if needed.

A4.1 Monitoring Well Installation

Monitoring wells will be constructed by a state-licensed resource protection well driller and in accordance with Chapter 173-160 WAC. An Aspect field geologist will oversee and document installation of each monitoring well, including completion of an As-Built Well Completion Diagram.

New monitoring wells will be constructed with 1-inch or 2-inch-diameter, threaded Schedule 40 PVC slotted screen and blank casing. Well screens will be 0.010-inch (10 slot) or 0.020-inch slot (20-slot) slotted screen either 5 feet of 10 feet in length, depending on field conditions; however, where there is potential for light non-aqueous phase liquid petroleum, a 10-foot screen will be placed to straddle the water table observed at time of drilling and spanning the expected depth range of water table fluctuation (expected less than 3 feet at shoreline wells, and less than 0.5 feet more than 200 feet or so inland of the shoreline). An artificial filter pack consisting of 10/20 silica sand will be placed around the well screen, and an annular seal consisting of bentonite chips will be placed above the filter pack. A concrete surface seal will be set at grade for each new monitoring well. The finished monitoring wells will be protected with a steel flush-mount monument, or steel above-ground monument, embedded in the concrete surface seal.

A4.2 Monitoring Well Development

Following installation, each new monitoring well will be developed to remove fine-grained material from inside the well casing and filter pack to the extent practical, and to improve hydraulic communication between the well screen and the surrounding water-bearing formation. The new 1-inch-diameter wells will be developed using a peristaltic pump and downhole 1/4-inch tubing surged gently along the length of the well screen; a downhole submersible well development pump can be used for new 2-inch diameter wells. Each well will be developed until visual turbidity is reduced to minimal levels or until a maximum of 15 casing volumes of water has been removed.

A5 Sample Custody and Field Documentation

A5.1 Sample Custody

Upon collection, samples will be placed upright in a cooler. Ice or blue ice will be placed in each cooler to meet sample preservation requirements. Inert cushioning material will be placed in the remaining space of the cooler as needed to limit movement of the sample containers. If the sample coolers are being shipped, not hand carried, to the laboratory, the chain of custody (COC) form will be placed in waterproof bag taped to the inside lid of the cooler for shipment.

After collection, samples will be maintained in Aspect's custody until formally transferred to the analytical laboratory. For purposes of this work, custody of the samples will be defined as follows.

- In plain view of the field representatives;
- Inside a cooler that is in plain view of the field representative; or
- Inside any locked space such as a cooler, locker, car, or truck to which the field representative has the only immediately available key(s).

A COC record provided by the laboratory will be initiated at the time of sampling for all samples collected. The record will be signed by the field representative and others who subsequently take custody of the sample. Couriers or other professional shipping representatives are not required to sign the COC form; however, shipping receipts will be collected and maintained as a part of custody documentation in project files. A copy of the COC form with appropriate signatures will be kept by Aspect's project manager.

Upon sample receipt, the laboratory will fill out a cooler receipt form to document sample delivery conditions. A designated sample custodian will accept custody of the shipped samples and will verify that the chain of custody form matches the samples received. The laboratory will notify as soon as possible the Aspect project manager of any issues noted with the sample shipment or custody.

A5.2 Field Documentation

While conducting field work, the field representative will document pertinent observations and events on field forms specific to each activity (e.g., boring log form, as-built well completion form, well development form, groundwater sampling form, etc.) and/or in a field notebook, and, when warranted, provide photographic documentation of specific sampling efforts. Field notes will include a description of the field activity, sample descriptions, and associated details such as the date, time, and field conditions.

A6 Exploration Surveying

The final as-built perimeter of each interim action excavation will be recorded using hand-held GPS with real-time differential correction. Horizontal coordinates for each soil sampling location will also be recorded with GPS However, the verification soil sample locations within excavations will be taken within a grid (see Section 5.2 in the main body of this Plan), which will be recorded by GPS. The horizontal coordinates and elevations of monitoring wells included in the assessment will be surveyed by a licensed surveyor relative to a common horizontal and vertical datum. The NAVD88 vertical datum will be used as the reference elevation datum. Monitoring well top-of-casing elevations will be surveyed to the nearest 0.01 foot, and horizontal coordinates to the nearest 0.1 foot, or better. Each well will be surveyed at the marked spot on the top of the PVC well casing from which depth-to-water measurements are collected.

A7 Decontamination and Investigative-Derived Waste Management

All non-disposable sampling equipment (stainless steel spoons and bowls) will be decontaminated before collection of each sample. The decontamination sequence consists

of a scrub with a non-phosphate (Alconox) solution, followed by tap water (potable) rinse, and finished with thorough spraying with deionized or distilled water.

Investigation-derived waste (IDW) water generated during equipment decontamination and monitoring well development and sampling will be conveyed to the dewatering pre-treatment system for pre-treatment and discharge to City sanitary sewer under the DA, as described in Section 6.2. If the treatment plant is not operating, and/or the water cannot be conveyed to City sewer under DA, the IDW water may be placed in labeled DOT-approved drums and disposed of appropriately at a permitted off-Site disposal facility.

Soil cuttings from borings and disposable personal protective equipment (PPE) will be placed in labeled DOT-approved drums pending the analytical results to determine appropriate disposal. The drums will be temporarily consolidated on-Site, profiled based on available analytical data, and disposed of appropriately at a permitted off-Site disposal facility.

Documentation for off-Site disposal of IDW will be maintained in the project file.

APPENDIX B

Quality Assurance Project Plan

Appendix B Contents

Table

Attachment

B1 Introduction

This Quality Assurance Project Plan (QAPP) identifies quality control (QC) procedures and criteria required to ensure that data collected during the opportunistic interim actions are of known quality and acceptable to achieve project objectives. Specific protocols and criteria are also set forth in this QAPP for data quality evaluation, upon the completion of data collection, to determine the level of completeness and usability of the data. It is the responsibility of the project personnel performing or overseeing the sampling and analysis activities to adhere to the requirements of the Sampling and Analysis Plan (SAP; Appendix A) and this QAPP.

B1.1 Purpose of the QAPP

As stated in Ecology's Guidelines for Preparation of Quality Assurance Project Plans for Environmental Studies (Ecology Publication No. 04-03-030, July 2004), specific goals of this QAPP is to:

- Focus project manager and project team to factors affecting data quality during the planning stage of the project;
- Facilitate communication among field, laboratory, and management staff as the project progresses;
- Document the planning, implementation, and assessment procedures for QA/QC activities for the investigation;
- Ensure that the data quality objectives (DQOs) are achieved; and
- Provide a record of the project to facilitate final report preparation.

DQOs dictate sampling and analysis designs and sample collection procedures are presented in the Interim Action Plan and SAP. The DQOs for the project include both qualitative and quantitative objectives, which define the appropriate type of data, and specify the tolerable levels of potential decision errors that will be used as a basis for establishing the quality and quantity of data needed to support the environmental assessment. To ensure that the DQOs are achieved, this QAPP details aspects of data collection including analytical methods, QA/QC procedures, and data quality reviews. This QAPP describes both quantitative and qualitative measures of data to ensure that the DQOs are achieved. DQOs dictate data collection rationale, sampling and analysis designs that are presented in the Interim Action Plan, and sample collection procedures that are presented in the SAP.

B2 Project Organization and Responsibilities

The project consultant team involved with data generation includes representatives from Aspect Consulting, LLC (Aspect), Pyron Environmental, Inc. (Pyron), and Friedman and Bruya Inc. (FBI), which is an accredited laboratory with the Washington State Department of Ecology (Ecology). Key individuals and their roles on this project are as follows:

Aspect Project Manager – Steve Germiat, Aspect Consulting. The project manager is responsible for the successful completion of all aspects of this project, including day-to-day management, production of reports, liaison with Kimberly-Clark (K-C) and regulatory agencies, and coordination with the project team members. The Aspect project manager is also responsible for resolution of non-conformance issues, is the lead author on project plans and reports, and will provide regular, up-to-date progress reports and other requested project information to Kimberly-Clark and Ecology.

Field Manager – Brett Carp or Bob Hanford, Aspect Consulting. The Field Manager is responsible for overseeing the monitoring program outlined in this plan, including collecting representative samples and ensuring that they are handled properly prior to transfer of custody to the project laboratory. The field manager will manage procurement of necessary field supplies, assure that monitoring equipment is operational and calibrated in accordance with the specifications provided herein, and act as the Site Health and Safety Officer.

Data Quality Manager – Mingta Lin, Pyron Environmental. The Data Quality Manager is responsible for developing data quality objectives, selecting analytical methods, coordinating with the analytical laboratory, overseeing laboratory performance, and approving quality assurance/quality control (QA/QC) procedures. The data quality manager is also responsible for conducting QA validation of the analytical data reports received from the project laboratory.

Laboratory Project Manager – Mike Erdahl, Friedman and Bruya. The laboratory project manager is responsible for ensuring that all laboratory analytical work for soil and water media complies with project requirements, and acting as a liaison with the project manager, field manager, and data quality manager to fulfill project needs on the analytical laboratory work.

B3 Analytical Methods and Reporting Limits

Analytical methodologies applied to the analyses of samples collected during the opportunistic interim action are in accordance with the following documents:

- USEPA SW Methods - USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, December 1996.

- USEPA Method 1631, Revision E: Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry, Office of Water, U.S. Environmental Protection Agency, August 2002, EPA-821-R-02-019.
- USEPA Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983 and updates.
- Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 20th Edition, 1995.
- Ecology (Washington State Department of). 1997. *Analytical Methods for Petroleum Hydrocarbons*. Publication No. ECY 97-602. June 1997.

Table B-1 lists the laboratory analytical methods for soil and groundwater analyses to be performed during the interim action, along with samples containers, preservation, and analytical holding times for each analysis.

The analytical method detection limit (MDL) is the minimum concentration of a compound that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero; MDLs are established by the laboratory using prepared samples, not samples of environmental media. The analytical reporting limit (RL) is defined as the lowest concentration at which a chemical can be accurately and reproducibly quantified, within specified limits of precision and accuracy, for a given environmental sample. The RL can vary from sample to sample depending on sample size, sample dilution, matrix interferences, moisture content, and other sample-specific conditions. Operationally, it is equivalent to the concentration of the lowest calibration standard (at a minimum) in the initial calibration curve. In accordance with MTCA, the RL is equivalent to a practical quantitation limit (PQL) which cannot be greater than 10 times the MDL. The laboratories analytical RLs and MDLs for the individual constituents identified above are summarized in Attachment B-1.

B3.1 Sample Preparation for Brackish Groundwater Samples

Saline groundwater may create analytical interferences for trace metals analyses. Additional sample preparation/analysis techniques, including reductive precipitation, hydrided atomic absorption spectrometry, and/or direct dilution, may be applied in cases of brackish water samples, as indicated by elevated specific electrical conductance of the samples. To assist the laboratory in identifying saline groundwater samples, the field-measured specific conductance for each groundwater sample will be recorded on the corresponding chain-of-custody document.

B4 Data Quality Objectives

Data quality objectives (DQOs), including indicators for precision, accuracy, representativeness, comparability, and completeness (PARCC parameters), and data RLs

are dictated by the data quality objectives, project requirements, and intended uses of the data. For this project, the analytical data must be of sufficient technical quality to determine whether contaminants are present and, if present, whether their concentrations are above or below applicable screening criteria based on protection of human health and the environment.

An assessment of data quality is based upon quantitative (precision, accuracy, and completeness) and qualitative (representativeness and comparability) data quality indicators. Definitions of these parameters and the applicable QC procedures are presented below.

B4.1 Precision

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements compared with their average values. Analytical precision is measured through matrix spike/matrix spike duplicate (MS/MSD) samples and laboratory control samples/laboratory control sample duplicate (LCS/LCSD) for organic analysis and through laboratory duplicate samples for inorganic analyses.

Analytical precision is quantitatively expressed as the relative percent difference (RPD) between the LCS/LCSD, MS/MSD, or lab duplicate pairs and is calculated with the following formula:

$$RPD\ (\%) = 100 \times \frac{|S - D|}{(S + D)/2}$$

where:
S = analyte concentration in sample
D = analyte concentration in duplicate sample

Analytical precision measurements will be carried out at a minimum frequency of 1 per 20 samples for each matrix sampled, or one per laboratory analysis group. Laboratory precision will be evaluated against laboratory quantitative RPD performance criteria provided with the lab's analytical data report. If the control criteria are not met, the laboratory will supply a justification of why the limits were exceeded and implement the appropriate corrective actions. The RPD will be evaluated during data review and validation. The data reviewer will note deviations from the specified limits and will comment on the effect of the deviations on reported data.

B4.2 Accuracy

Accuracy measures the closeness of the measured value to the true value. The accuracy of chemical test results is assessed by "spiking" samples with known standards (surrogates, blank spikes, or matrix spikes) and establishing the average recovery. Accuracy is quantified as the percent recovery (%R). The closer the %R is to 100%, the more accurate the data.

Surrogate recovery will be calculated as follows:

$$\text{Recovery (\%)} = \frac{MC}{SC} \times 100$$

where:

SC = spiked concentration
MC = measured concentration

MS percent recovery will be calculated as follows:

$$\text{Recovery (\%)} = \frac{MC - USC}{SC} \times 100$$

where:

SC = spiked concentration
MC = measured concentration
USC = unspiked sample concentration

Accuracy measurements on MS samples will be carried out at a minimum frequency of one in 20 samples per matrix analyzed. Blank spikes will also be analyzed at a minimum frequency of one in 20 samples per matrix analyzed. Surrogate recoveries for organic compounds will be determined for each sample analyzed for respective compounds. Laboratory accuracy will be evaluated against the lab's quantitative matrix spike and surrogate spike recovery performance criteria as provided with the lab's analytical data report. If the control criteria are not met, the laboratory will supply a justification of why the limits were exceeded and implement the appropriate corrective actions. Percent recoveries will be evaluated during data review and validation, and the data reviewer will comment on the effect of the deviations on the reported data.

B4.3 Representativeness

Representativeness measures how closely the measured results reflect the actual concentration or distribution of the chemical compounds in the matrix sampled. The Interim Action Plan sampling plan design, sampling techniques, and sample handling protocols (e.g., homogenizing, storage, preservation, and use of duplicates and blanks) have been developed to ensure representative samples. Sampling locations for interim action activities are described in the main body of the Interim Action Plan. The field sampling procedures are described in the SAP included as Appendix A of the Interim Action Plan.

B4.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. This goal will be achieved through the use of standard techniques to collect samples, USEPA-approved standard methods to analyze samples, and consistent units to report analytical results. Data comparability also depends on data quality. Data of unknown quality cannot be compared.

B4.5 Completeness

Completeness is defined as the percentage of measurements made that are judged to be valid. Results will be considered valid if the precision, accuracy, and representativeness objectives are met and if RLs are sufficient for the intended uses of the data. Completeness is calculated as follows:

$$Completeness\ (\%) = \frac{V}{P} \times 100$$

where:

V = number of valid measurements
P = number of measurements taken

Valid and invalid data (i.e., data qualified with the R flag [rejected]) will be identified during data validation. The target completeness goal for this project is 95 percent.

B5 Quality Control Procedures

Field and laboratory QC procedures are outlined below.

B5.1 Field Quality Control

Beyond use of standard sampling protocols defined in the SAP, field QC procedures include maintaining the field instrumentation used. Field instruments (e.g., PID for evaluating presence of VOCs in soil samples, and the YSI meter for measuring field parameters during groundwater sampling) are maintained and calibrated regularly in accordance with manufacturer recommendations prior to use.

In addition, field QC is accomplished through the analysis of controlled samples that are introduced to the laboratory from the field. Field duplicates and trip blanks will be collected and submitted for analysis as described below.

Field Duplicates

Field duplicate samples are used to check for sampling and analysis reproducibility; however, the field duplicate sample results included variability introduced during both field sampling and laboratory preparation and analysis, and EPA data validation guidance provides no RPD control limits for field duplicate samples. Duplicates for all media will be submitted "blind" to the laboratory as discrete samples (i.e., given unique sample identifiers to keep the duplicate identity unknown to the laboratory), but will be clearly identified in the field log. Field duplicate samples will be collected at a frequency of 5 percent (1 per 20 samples – not including QA samples) of the field samples for each matrix and analytical method, but not less than one duplicate per sampling event per matrix.

Trip Blank

Trip blank samples will be used to monitor possible VOC cross contamination occurring during sample transport. Trip blank samples are prepared and supplied by the laboratory using organic-free reagent-grade water into a VOC vial prior to the collection of field samples. The trip blank sample vials are placed with and accompany the VOC and petroleum gasoline samples through the entire transporting process. Trip blank samples will be prepared and analyzed for the full suite of VOCs and petroleum gasoline (if required). **One trip blank will be collected for each soil sampling round and each groundwater sampling round where VOC analysis is conducted.**

Equipment Rinsate Blank

Equipment rinsate blanks are collected to determine the potential of cross-contamination introduced by soil sampling equipment that is used between samples. Groundwater sampling is conducted using dedicated equipment, so rinsate blanks are not needed for groundwater sampling QC. The deionized water used for soil sampling equipment decontamination is rinsed through the decontaminated sampling equipment and collected into adequate sample containers for analysis of VOCs, low-level polycyclic aromatic hydrocarbons (PAHs), and priority pollutant metals. The blank is then processed, analyzed, and reported as a regular field sample. **One rinsate blank will be conducted for each round of soil sampling.** The rinsate blank sampled will be labeled with a "RB-" prefix and the date it is collected (e.g., RB-5-29-12).

B5.2 Laboratory Quality Control

The laboratories' analytical procedures must meet requirements specified in the respective analytical methods or approved laboratory standard operating procedures (SOPs), e.g., instrument performance check, initial calibration, calibration check, blanks, surrogate spikes, internal standards, and/or labeled compound spikes. The laboratory QC procedures used for this project will consist of the following at a minimum:

- Instrument calibration and standards as defined in the laboratory standard operating procedures (SOPs);
- Laboratory method blank measurements at a minimum frequency of 5% or one per 20 samples; and
- Accuracy and precision measurements as defined above, at a minimum frequency of 5% or one per 20 samples per matrix.

The laboratory's QA officers are responsible for ensuring that the laboratory implements the internal QC and QA procedures detailed in Friedman and Bruya's Quality Assurance Manual.

B6 Corrective Actions

If routine QC audits by the laboratory result in detection of unacceptable conditions or data, actions specified in the laboratory standard operating procedures (SOPs) will be taken. Specific corrective actions are outlined in each SOP used and can include the following:

- Identifying the source of the violation;
- Reanalyzing samples if holding time criteria permit;
- Resampling and analyzing;
- Evaluating and amending sampling and analytical procedures; and/or
- Accepting but qualifying data to indicate the level of uncertainty.

If unacceptable conditions occur, the laboratory will contact Aspect's project manager to discuss the issues and determine the appropriate corrective action. Corrective actions taken by the laboratory during analysis of samples for this project will be documented by the laboratory in the case narrative associated with the affected samples.

In addition, the project data quality manager will review the laboratory data generated for this investigation to ensure that project DQOs are met. If the review indicates that non-conformances in the data have resulted from field sampling or documentation procedures or laboratory analytical or documentation procedures, the impact of those non-conformances on the overall project data usability will be assessed. Appropriate actions, including re-sampling and/or re-analysis of samples may be recommended to the project manager to achieve project objectives.

B7 Data Reduction, Quality Review, and Reporting

All data will undergo a QA/QC evaluation at the laboratory which will then be reviewed by the Aspect database manager. Initial data reduction, evaluation, and reporting at the laboratory will be carried out as described in the appropriate analytical protocols. Quality control data resulting from methods and procedures described in this document will also be reported.

B7.1 Minimum Data Reporting Requirements

The following sections describe the minimum data reporting requirements necessary to allow proper data quality review (as described in Section 7.2) and analytical data documentation.

Sample Receipt. Cooler receipt forms will be filled out for all sample shipments to document problems in sample packaging, chain of custody, and sample preservation.

Reporting. For each analytical method run, analytes for each sample will be reported as a detected concentration or as less than the specific RL. Solid data will be reported on a dry weight basis except that from gas chromatograph-mass spectrometry (GC-MS) methods (EPA Method 8260 and EPA Method 8270). The laboratories will report dilution factors for each sample as well as date of extraction (if applicable), date of analysis, extraction method, any cleanup methods performed, and confirmation results where required. The laboratory will also report any corrective actions taken if unacceptable conditions or data are detected.

Internal Quality Control Reporting. Internal quality control samples will be analyzed at the rates specified in the applicable analytical method.

- **Laboratory Method Blanks.** Analytes will be reported for each laboratory blank. Non-blank sample results shall be designated as corresponding to a particular laboratory blank in terms of analytical batch processing.
- **Surrogate Spike Samples.** Surrogate spike recoveries will be reported with organic reports where appropriate. The report shall also specify the control limits for surrogate spike results as well as the spiking concentration. Spike recoveries outside of specified control limits (as defined in the laboratory SOP) will result in the sample being rerun.
- **Laboratory Duplicate and/or Matrix Spike Duplicate Pairs.** Relative percent differences will be reported for duplicate pairs relative to analyte/matrix-specific control limits defined in the laboratory SOP.
- **Laboratory Control Samples (LCS).** LCS recoveries will be reported for organic analyses. LCS results and control limits will be reported with the corresponding sample data.

B7.2 Data Quality Verification and Validation

Reported analytical results will be qualified by the laboratory to identify QC concerns in accordance with the specifications of the analytical methods. Additional laboratory data qualifiers may be defined and reported by the laboratory to more completely explain QC concerns regarding a particular sample result. All data qualifiers will be defined in the laboratory's narrative reports associated with each case.

The project data quality manager will conduct an independent Stage III data verification and validation for all chemical data submitted by the analytical laboratories during the independent environmental assessment, following the guidance below:

- USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review, Office of Superfund Remediation and Technical Innovation, U.S. Environmental Protection Agency, September 2011, USEPA 540/R-11/016
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, Office of Superfund Remediation and

Technical Innovation, U.S. Environmental Protection Agency, January 2010, USEPA 540/R-10/011

- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, Office of Superfund Remediation and Technical Innovation, U.S. Environmental Protection Agency, June 2008, USEPA-540-R-08-01.
- USEPA Region 10 Standard Operating Procedure for the Validation of Polychlorinated Dibenzo-p-Dioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data, January 1996.

The data validation will examine and verify the following parameters against the method requirements and laboratory control limits:

- Sample management and holding times;
- Instrument performance check, calibration, and calibration verification;
- Laboratory and field blank results;
- Detection and reporting limits;
- Laboratory replicate results;
- MS/MSD results;
- LCS and/or standard reference material results;
- Field duplicate results;
- Surrogate spike recovery (organic analyses only);
- Internal standard recovery (internal calibration methods only);
- Inter-element interference check (ICP analyses only);
- Serial dilution (metals only);
- Labeled compound recovery (isotope dilution methods only); and
- Ion ratios for detected compounds (high resolution GC/MS methods only).

Data qualifiers will be assigned based on outcome of the data validation. Data qualifiers are limited to and defined as follows:

- U - The analyte was analyzed for but was determined to be non-detect above the reported sample quantitation limit, or the quantitation limit was raised to the concentration found in the sample due to blank contamination.
- J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

- UJ - The analyte was not detected above the reported quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified.
- DNR - Do not report from this analysis; the result for this analyte is to be reported from an alternative analysis.

In cases of multiple analyses (such as an un-diluted and a diluted analysis) performed on one sample, the optimal result will be determined and only the determined result will be reported for the sample.

The scope and findings of the data validation will be documented and discussed in the Data Validation Report. The Data Validation Report will be appended to the project report.

B8 Preventative Maintenance Procedures and Schedules

Preventative maintenance in the laboratory will be the responsibility of the laboratory personnel and analysts. This maintenance includes routine care and cleaning of instruments and inspection and monitoring of carrier gases, solvents, and glassware used in analyses. Details of the maintenance procedures are addressed in the respective laboratory SOPs.

Precision and accuracy data are examined for trends and excursions beyond control limits to determine evidence of instrument malfunction. Maintenance will be performed when an instrument begins to change as indicated by the degradation of peak resolution, shift in calibration curves, decrease in sensitivity, or failure to meet one or another of the method-specific QC criteria.

Maintenance and calibration of instruments used in the field for sampling (e.g., PID for evaluating presence of VOCs in soil samples, and the YSI meter for measuring field parameters during groundwater sampling) will be conducted regularly in accordance with manufacturer recommendations prior to use.

B9 Performance and System Audits

The Aspect project manager has responsibility for reviewing the performance of the laboratory QA program. This will be achieved through regular contact with the analytical laboratory's project manager. To ensure comparable data, all samples of a given matrix to be analyzed by each specified analytical method will be processed consistently by the same analytical laboratory.

B10 Data and Records Management

Records will be maintained documenting all activities and data related to field sampling and chemical analyses.

B10.1 Field Documentation

The Aspect project manager will ensure that the field team receives the final approved version of this QAPP, the site health and safety plan, and the SAP prior to the initiation of field activities. Field records are discussed in Appendix A, Sampling and Analysis Plan, of this Plan, and include:

- Daily Report forms.
- Boring and well completion logs.
- Field data and sample collection information forms.
- Sample tracking/chain of custody forms.
- Photo documentation (as necessary).

Field documents will be maintained in the project file.

B10.2 Analytical Data Management

Raw data received from the analytical laboratory will be reviewed, entered into a computerized database, and verified for consistency and correctness. The database will be updated based on data review and independent validation if necessary.

The following field data will be included in the database:

- Sample location coordinates.
- Sample type (i.e., groundwater or soil).
- Soil or groundwater sampling depth interval.
- Sampler's name.

Information regarding whether concentrations represent total phase (unfiltered samples) or dissolved phase (filtered samples) will be compiled and stored in the database. Data may be submitted to Ecology's Environmental Information Management (EIM) database once all data have been reviewed and validated.

B11 References for Appendix B

USEPA, 1996, USEPA Region 10 Standard Operating Procedure for the Validation of Polychlorinated Dibenzo-p-Dioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data, January 1996.

USEPA, 2008, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, Office of Superfund Remediation and Technical Innovation, U.S. Environmental Protection Agency, June 2008, USEPA-540-R-08-01.

USEPA, 2010, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, Office of Superfund Remediation and Technical Innovation, U.S. Environmental Protection Agency, January 2010, USEPA 540/R-10/011.

USEPA, 2011, Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review, Office of Superfund Remediation and Technical Innovation, U.S. Environmental Protection Agency, September 2011, USEPA 540/R-11/016.

Table B-1 - Analytical Methods, Sample Containers, Preservation, and Holding Times

Sample Matrix	Analytical Parameter	Analytical Method	Sample Container	No. Containers	Preservation Requirements	Holding Time
Soil	Gasoline Range TPH	NWTPH-Gx	Method 5035A, 40-ml vials	4	4°C ±2°C, Freeze within 48 hours to <-7°C	14 days
	Diesel & Motor Oil Range TPH	NWTPH-Dx/SW846 Method 3630 (Silica Gel Cleanup)	4 ounce jar	1	4°C ±2°C	14 days for extraction; 40 days for analysis
	VOCs	Method 8260C	Method 5035A, 40-ml vials	4	4°C ±2°C, Freeze within 48 hours to <-7°C	14 days
	Low-level PAHs	Method 8270D-SIM	4 ounce jar	1	4°C ±2°C	14 days for extraction; 40 days for analysis
	Total Metals other than Hg	Method 200.8	4 ounce jar	1	4°C ±2°C	6 months
	Total Mercury	Method 1631E	4 ounce jar	1	4°C ±2°C	28 days
	SVOCs	Method 8270D	4 ounce jar	1	4°C ±2°C	14 days for extraction; 40 days for analysis
	PCBs	Method 8082A	4 ounce jar	1	4°C ±2°C	NA
	Total Organic Carbon	ASTM D4129-05 Single Replicate	4 ounce jar	1	4°C ±2°C	14 days
	pH	Method 9045C	4 ounce jar	1	4°C ±2°C	28 days
	Dioxins/Furans	Method 8290	4 ounce jar	1	4°C ±2°C, Freeze within 14 days to <-7°C	1 year for extraction, 40 days for analysis
Ground water	Gasoline Range TPH	Method NWTPH-Gx	40-mL VOA Vials	3	4°C ±2°C, HCl pH < 2	14 days
	Diesel & Motor Oil Range TPH	NWTPH-Dx/SW846 Method 3630 (Silica Gel Cleanup)	500-mL Amber Glass	1	4°C ±2°C	7 days for extraction, 40 days for analysis
	VOCs	Method 8260C	40-mL VOA Vials	4	4°C ±2°C, 2 with HCl pH < 2, 2 without HCl	14 days for analysis
	Low-level PAHs	Method 8270D-SIM	1-L Amber Glass	1	4°C ±2°C	7 days for extraction, 40 days for analysis
	SVOCs	Method 8270D	1-L Amber Glass	1	4°C ±2°C	7 days for extraction, 40 days for analysis
	Dissolved Metals other than Hg	Method 200.8 (non-brackish),	500-mL HDPE	5 (for potential brackish water)	4°C ±2°C, HNO3 pH < 2 (after filtration)	180 days
	Dissolved Mercury	Method 1631 (non-brackish)	500-mL HDPE	5 (for potential brackish water)	4°C ±2°C, HNO3 pH < 2 (after filtration)	28 days
	Total Metals other than Hg	Method 200.8 (non-brackish)	500-mL HDPE	5 (for potential brackish water)	4°C ±2°C, HNO3 pH < 2	180 days
	Total Mercury	Method 1631 (non-brackish)	500-mL HDPE	5 (for potential brackish water)	4°C ±2°C, HNO3 pH < 2	28 days
	Dissolved Metals other than Hg (Brackish)	200.7/ 7742 (Se)	500-mL HDPE	4	4°C ±2°C, HNO3 pH < 2 (after filtration)	180 days
	Dissolved Mercury (Brackish)	7740A	500-mL HDPE	4	4°C ±2°C, HNO3 pH < 2 (after filtration)	28 days
	Total Metals other than Hg (Brackish)	200.7/ 7742 (Se)	500-mL HDPE	4	4°C ±2°C, HNO3 pH < 2	180 days
	Total Mercury (Brackish)	7740A	500-mL HDPE	4	4°C ±2°C, HNO3 pH < 2	28 days
	Ammonia	Method 350.1	500-mL HDPE	1	4°C ±2°C, H2SO4 pH < 2	28 days
	Dissolved Sulfide	Method 376.2	500-mL HDPE	1	4°C ±2°C, Zinc Acetate and NaOH pH > 9 (after filtration)	7 days
	Formaldehyde	Method 8315A	1 Liter Amber	1	4°C ±2°C	3 days
	TSS	SM2540D	500-mL HDPE	1	4°C ±2°	7 days
	TDS	SM2540C	500-mL HDPE	1	4°C ±2°	7 days

Attachment B-1

Analytical Method Detection Limits and Reporting Limits

NWTPH-Dx Analysis

MDL Results GC1 SUMMARY

SOIL mg/kg

2 grams of soil extracted into 10 mL solvent no concentration

Analyte	(StdDev*3.14) MDL	(2*MDL) PQL	(5*MDL) PQL	Std Dev	Mean	Spike Level	% Rec.	Date Calculated	Reporting Limit
Diesel	4.13	8.3	20.6	1.31	12.7	25	51	01/27/12	50
Diesel extended	5.47	10.9	27.4	1.74	15.1	25	60	01/27/12	50
Motor Oil	13.0	26.1	65.2	4.15	125.3	125	100	02/02/12	250
Heavy Oil	12.0	24.0	60.0	3.82	123.6	125	99	02/02/12	250
Stoddard solvent	1.42	2.8	7.1	0.45	16.9	25	68	02/02/12	50

WATER ug/L

Analyte	(StdDev*3.14) MDL	(2*MDL) PQL	(5*MDL) PQL	Std Dev	Mean	Spike Level	% Rec.	Date Calculated	Reporting Limit
Diesel	8.80	17.59	43.98	2.80	14.53	25.0	58	01/27/12	50
Diesel extended	9.77	19.54	48.86	3.11	18.5	25.0	74	01/27/12	250
Motor Oil	22.82	45.64	114.09	7.27	112.9	100.0	113	02/02/12	250
Heavy Oil	20.00	40.00	100.00	6.37	108.7	100	109	02/02/12	250
Stoddard solvent	1.975	3.950	9.876	0.6291	18.029	25.0	72	02/02/12	50

NWTPH-Gx/8021 Analysis
MDL Data and Calculations

SOIL **mg/kg**

Analyte	MDL	(2*MDL) PQL	(5*MDL) PQL	Std Dev	Mean	Spike Level	% Rec.
Benzene	0.00094	0.00189	0.00472	0.00030	0.007	0.01	68
Toluene	0.00044	0.00089	0.00222	0.00014	0.011	0.01	105
Ethylbenzene	0.00041	0.00082	0.00206	0.00013	0.010	0.01	97
Total Xylenes	0.00139	0.00278	0.00695	0.00044	0.031	0.03	102
MTBE	0.00372	0.00743	0.01858	0.00118	0.006	0.01	65
NW Gas	0.24168	0.48336	1.20840	0.07697	0.617	0.5	123
8015 Gas	0.22350	0.44699	1.11749	0.07118	0.588	0.5	118

WATER **ug/L**

Analyte	MDL	(2*MDL) PQL	(5*MDL) PQL	Std Dev	Mean	Spike Level	% Rec.
Benzene	0.0258	0.0516	0.1290	0.0082	0.527	0.5	105
Toluene	0.0153	0.0305	0.0763	0.0049	0.532	0.5	106
Ethylbenzene	0.0113	0.0226	0.0566	0.0036	0.505	0.5	101
Total Xylenes	0.0650	0.1300	0.3249	0.0207	1.553	1.5	104
MTBE	0.0979	0.1958	0.4896	0.0312	0.812	0.5	162
NW Gas	11.1189	22.2378	55.5945	3.5411	52.929	50.0	106
8015 Gas	8.6406	17.2813	43.2032	2.7518	52.329	50.0	105

EPA Method 8260
MDL Data and Calculations

Analysis:	8260	Standard(s) spiked:	1 ppm 8260 cal std 34-194b; 50 ppm 8260 cal std 34-194a
Matrix:	**Water**	Volume spiked:	21.5 uL (above); 43 uL (above); 4.3 uL (above)
Instrument ID:	GCMS #4	Date(s) Extracted:	4/27/2011, 05/03/11(0.5)
Reporting Units:	ug/L	Date(s) Analyzed:	4/27/2011, 05/03/11 (0.5)
		Date Calculated:	5/2/2011, 05/05/11
		Calculation Analyst:	YA

	(StdDev*3.14)	(2*MDL)	(5*MDL)	Std		Spike	%
Analyte	**MDL**	**PQL**	**PQL**	**Dev**	**Mean**	**Level**	**Rec.**
Ethanol	62.4	125	312	19.9	292.456	250.0	117
Dichlorodifluoromethane	0.385	0.770	1.924	0.1225	1.363	1.0	136
Chloromethane	0.157	0.313	0.783	0.0499	1.041	1.0	104
Vinyl chloride	0.071	0.143	0.356	0.0227	0.453	0.5	91
Bromomethane	0.851	1.702	4.254	0.2710	1.339	1.0	134
Chloroethane	0.222	0.444	1.109	0.0706	1.100	1.0	110
Trichlorofluoromethane	0.186	0.372	0.930	0.0592	0.993	1.0	99
2-Propanol	2.1	4.2	10.5	0.67	26.073	25.0	104
Acetone	1.096	2.192	5.480	0.349	6.737	5.0	135
1,1-Dichloroethene	0.183	0.366	0.916	0.0583	1.161	1.0	116
Hexane	0.194	0.388	0.970	0.0618	1.150	1.0	115
Methylene chloride	0.945	1.89	4.73	0.301	2.680	5.0	54
t-Butyl alcohol (TBA)	2.90	5.81	14.5	0.92	51.193	50.0	102
Methyl t-butyl ether (MTBE	0.244	0.487	1.219	0.0776	1.101	1.0	110
trans-1,2-Dichloroethene	0.402	0.804	2.009	0.1280	1.156	1.0	116
Diisopropyl ether (DIPE)	0.262	0.525	1.312	0.0836	1.128	1.0	113
1,1-Dichloroethane	0.123	0.246	0.616	0.0392	1.051	1.0	105
Ethyl t-butyl ether (ETBE)	0.151	0.302	0.755	0.0481	1.079	1.0	108
2,2-Dichloropropane	0.471	0.943	2.357	0.1502	1.178	1.0	118
cis-1,2-Dichloroethene	0.190	0.379	0.949	0.0604	1.115	1.0	112
Chloroform	0.084	0.167	0.418	0.0266	1.086	1.0	109
2-Butanone (MEK)	1.171	2.342	5.856	0.3730	5.100	5.0	102
t-Amyl methyl ether (TAME)	0.110	0.219	0.548	0.0349	1.073	1.0	107
1,2-Dichloroethane (EDC)	0.108	0.215	0.538	0.0343	1.119	1.0	112
1,1,1-Trichloroethane	0.116	0.232	0.580	0.0370	1.039	1.0	104
1,1-Dichloropropene	0.080	0.159	0.398	0.0253	1.143	1.0	114
Carbon Tetrachloride	0.148	0.296	0.741	0.0472	1.114	1.0	111
Benzene	0.080	0.160	0.401	0.0256	0.510	0.5	102
Trichloroethene	0.116	0.232	0.580	0.0369	1.097	1.0	110
1,2-Dichloropropane	0.130	0.260	0.65	0.0415	1.132	1.0	113
Bromodichloromethane	0.096	0.192	0.48	0.0305	1.027	1.0	103

EPA Method 8260

MDL Data and Calculations

Analyte	(StdDev*3.14) MDL	(2*MDL) PQL	(5*MDL) PQL	Std Dev	Mean	Spike Level	% Rec.
Dibromomethane	0.155	0.310	0.775	0.0494	0.941	1.0	94
4-Methyl-2-pentanone	0.293	0.586	1.46	0.0933	5.144	5.0	103
cis-1,3-Dichloropropene	0.133	0.267	0.666	0.0424	1.034	1.0	103
Toluene	0.070	0.141	0.351	0.0224	1.120	1.0	112
trans-1,3-Dichloropropene	0.114	0.228	0.57	0.0363	1.014	1.0	101
1,1,2-Trichloroethane	0.113	0.226	0.57	0.0360	1.129	1.0	113
2-Hexanone	0.332	0.664	1.66	0.1057	5.026	5.0	101
1,3-Dichloropropane	0.060	0.120	0.30	0.0192	1.101	1.0	110
Tetrachloroethene	0.115	0.231	0.577	0.0367	1.110	1.0	111
Dibromochloromethane	0.058	0.115	0.29	0.0183	1.084	1.0	108
1,2-Dibromoethane (EDB)	0.156	0.311	0.78	0.0496	1.101	1.0	110
Chlorobenzene	0.054	0.107	0.27	0.0171	1.108	1.0	111
Ethylbenzene	0.039	0.078	0.196	0.0125	1.129	1.0	113
1,1,1,2-Tetrachloroethane	0.128	0.255	0.64	0.0406	1.082	1.0	108
m,p-Xylene	0.127	0.253	0.63	0.0403	2.217	2.0	111
o-Xylene	0.067	0.134	0.34	0.0214	1.102	1.0	110
Styrene	0.063	0.127	0.32	0.0202	1.090	1.0	109
Isopropylbenzene	0.042	0.085	0.21	0.0135	1.098	1.0	110
Bromoform	0.091	0.182	0.45	0.0289	1.016	1.0	102
n-Propylbenzene	0.066	0.132	0.329	0.0210	1.164	1.0	116
Bromobenzene	0.041	0.082	0.20	0.0130	1.158	1.0	116
1,3,5-Trimethylbenzene	0.094	0.188	0.47	0.0299	1.084	1.0	108
1,1,2,2-Tetrachloroethane	0.114	0.228	0.57	0.0363	1.078	1.0	108
1,2,3-Trichloropropane	0.131	0.262	0.66	0.0418	1.112	1.0	111
2-Chlorotoluene	0.082	0.165	0.41	0.0262	1.132	1.0	113
4-Chlorotoluene	0.065	0.130	0.32	0.0206	1.108	1.0	111
tert-Butylbenzene	0.097	0.195	0.49	0.0310	1.110	1.0	111
1,2,4-Trimethylbenzene	0.081	0.162	0.40	0.0257	1.073	1.0	107
sec-Butylbenzene	0.052	0.104	0.26	0.0165	1.096	1.0	110
p-Isopropyltoluene	0.048	0.095	0.24	0.0152	1.090	1.0	109
1,3-Dichlorobenzene	0.102	0.204	0.51	0.0325	1.109	1.0	111
1,4-Dichlorobenzene	0.091	0.182	0.46	0.0290	1.121	1.0	112
1,2-Dichlorobenzene	0.078	0.156	0.39	0.0249	1.097	1.0	110
1,2-Dibromo-3-chloropropane	0.549	1.097	2.74	0.1747	1.089	1.0	109
1,2,4-Trichlorobenzene	0.180	0.360	0.899	0.0573	0.896	1.0	90
Hexachlorobutadiene	0.181	0.362	0.90	0.0576	1.142	1.0	114
Naphthalene	0.196	0.392	0.98	0.0625	0.910	1.0	91
1,2,3-Trichlorobenzene	0.251	0.502	1.25	0.0799	0.972	1.0	97
2-Chloroethyl vinyl ether	0.069	0.137	0.34	0.0219	1.117	1.0	112

EPA Method 8260
MDL Data and Calculations

MDL Data and Calculations

Analyst fill in all below (attach extraction worksheet(s))

Analysis:	8260	Standard(s) spiked:	50/250/2500 ug/mL 8260 Cal std 35-133a
Matrix:	**Soil**	Volume spiked:	8.6uL (above); 43uL (above)
Instrument ID:	GCMS #4	Date(s) Extracted:	05/17/11, 05/18/11
Reporting Units:	mg/kg	Date(s) Analyzed:	05/17/11, 05/18/11
		Date Calculated:	05/17/11, 05/18/11
		Calculation Analyst:	JS

	(StdDev*3.14)	(2*MDL)	(5*MDL)	Std		Spike	%
Analyte	**MDL**	**PQL**	**PQL**	**Dev**	**Mean**	**Level**	**Rec.**
Ethanol	3.343872	6.687744	16.71936	1.064927	12.58541	12.5	100.6833
Dichlorodifluoromethane	0.009416	0.018833	0.047082	0.002999	0.029764	0.05	59.52857
Chloromethane	0.00615	0.012301	0.030752	0.001959	0.043779	0.05	87.55714
Vinyl chloride	0.006422	0.012843	0.032108	0.002045	0.020829	0.025	83.31429
Bromomethane	0.023008	0.046016	0.11504	0.007327	0.053807	0.05	107.6143
Chloroethane	0.012675	0.025351	0.063377	0.004037	0.030607	0.05	61.21429
Trichlorofluoromethane	0.004604	0.009208	0.023021	0.001466	0.02225	0.05	44.5
Acetone	0.067854	0.135709	0.339272	0.02161	0.27435	0.25	109.74
1,1-Dichloroethene	0.012881	0.025762	0.064406	0.004102	0.054764	0.05	109.5286
Hexane	0.012795	0.025591	0.063977	0.004075	0.056164	0.05	112.3286
Methylene chloride	0.052764	0.105528	0.26382	0.016804	0.264571	0.25	105.8286
t-Butyl alcohol (TBA)	0.182336	0.364672	0.91168	0.058069	2.315929	2.5	92.63714
Methyl t-butyl ether (MTBE	0.002824	0.005647	0.014119	0.000899	0.025107	0.025	100.4286
trans-1,2-Dichloroethene	0.005015	0.010029	0.025073	0.001597	0.026657	0.025	106.6286
Diisopropyl ether (DIPE)	0.005611	0.011223	0.028057	0.001787	0.024043	0.025	96.17143
1,1-Dichloroethane	0.011745	0.02349	0.058725	0.00374	0.0445	0.05	89
Ethyl t-butyl ether (ETBE)	0.003813	0.007626	0.019065	0.001214	0.024107	0.025	96.42857
2,2-Dichloropropane	0.013395	0.026789	0.066973	0.004266	0.053057	0.05	106.1143
cis-1,2-Dichloroethene	0.006004	0.012008	0.03002	0.001912	0.045643	0.05	91.28571
Chloroform	0.003685	0.007369	0.018423	0.001173	0.045693	0.05	91.38571
2-Butanone (MEK)	0.039347	0.078694	0.196735	0.012531	0.236086	0.25	94.43429
t-Amyl methyl ether (TAME)	0.004828	0.009656	0.024139	0.001538	0.023264	0.025	93.05714
1,2-Dichloroethane (EDC)	0.004872	0.009743	0.024358	0.001551	0.023543	0.025	94.17143
1,1,1-Trichloroethane	0.005103	0.010206	0.025515	0.001625	0.022607	0.025	90.42857
1,1-Dichloropropene	0.001791	0.003582	0.008955	0.00057	0.023543	0.025	94.17143
Carbon Tetrachloride	0.005076	0.010153	0.025382	0.001617	0.022707	0.025	90.82857
Benzene	0.001097	0.002194	0.005484	0.000349	0.023307	0.025	93.22857
Trichloroethene	0.006286	0.012573	0.031432	0.002002	0.024564	0.025	98.25714
1,2-Dichloropropane	0.005515	0.01103	0.027575	0.001756	0.023314	0.025	93.25714

EPA Method 8260

MDL Data and Calculations

Analyte	(StdDev*3.14) MDL	(2*MDL) PQL	(5*MDL) PQL	Std Dev	Mean	Spike Level	% Rec.
Bromodichloromethane	0.003593	0.007185	0.017963	0.001144	0.021971	0.025	87.88571
Dibromomethane	0.004	0.008001	0.020002	0.001274	0.023836	0.025	95.34286
4-Methyl-2-pentanone	0.022774	0.045548	0.113869	0.007253	0.236221	0.25	94.48857
cis-1,3-Dichloropropene	0.001796	0.003591	0.008978	0.000572	0.022457	0.025	89.82857
Toluene	0.00209	0.004181	0.010452	0.000666	0.026179	0.025	104.7143
trans-1,3-Dichloropropene	0.001931	0.003862	0.009655	0.000615	0.021829	0.025	87.31429
1,1,2-Trichloroethane	0.003102	0.006205	0.015512	0.000988	0.023757	0.025	95.02857
2-Hexanone	0.012187	0.024374	0.060935	0.003881	0.220686	0.25	88.27429
1,3-Dichloropropane	0.002087	0.004174	0.010434	0.000665	0.0229	0.025	91.6
Tetrachloroethene	0.00433	0.00866	0.02165	0.001379	0.024479	0.025	97.91429
Dibromochloromethane	0.003655	0.00731	0.018274	0.001164	0.020836	0.025	83.34286
1,2-Dibromoethane (EDB)	0.002497	0.004994	0.012485	0.000795	0.023429	0.025	93.71429
Chlorobenzene	0.002856	0.005713	0.014282	0.00091	0.0239	0.025	95.6
Ethylbenzene	0.003116	0.006232	0.015581	0.000992	0.023621	0.025	94.48571
1,1,1,2-Tetrachloroethane	0.003226	0.006453	0.016131	0.001027	0.022279	0.025	89.11429
m,p-Xylene	0.004449	0.008899	0.022247	0.001417	0.047943	0.05	95.88571
o-Xylene	0.002326	0.004653	0.011632	0.000741	0.023764	0.025	95.05714
Styrene	0.001811	0.003621	0.009053	0.000577	0.02285	0.025	91.4
Isopropylbenzene	0.001802	0.003605	0.009012	0.000574	0.024093	0.025	96.37143
Bromoform	0.004043	0.008085	0.020213	0.001287	0.02085	0.025	83.4
n-Propylbenzene	0.003459	0.006917	0.017293	0.001101	0.023429	0.025	93.71429
Bromobenzene	0.005618	0.011237	0.028092	0.001789	0.02365	0.025	94.6
1,3,5-Trimethylbenzene	0.00388	0.007759	0.019399	0.001236	0.02365	0.025	94.6
1,1,2,2-Tetrachloroethane	0.003177	0.006354	0.015885	0.001012	0.022007	0.025	88.02857
1,2,3-Trichloropropane	0.002674	0.005349	0.013371	0.000852	0.022357	0.025	89.42857
2-Chlorotoluene	0.003529	0.007058	0.017645	0.001124	0.023614	0.025	94.45714
4-Chlorotoluene	0.003502	0.007005	0.017511	0.001115	0.023621	0.025	94.48571
tert-Butylbenzene	0.00278	0.00556	0.013901	0.000885	0.024286	0.025	97.14286
1,2,4-Trimethylbenzene	0.001918	0.003836	0.00959	0.000611	0.024464	0.025	97.85714
sec-Butylbenzene	0.003348	0.006695	0.016738	0.001066	0.024621	0.025	98.48571
p-Isopropyltoluene	0.002512	0.005024	0.012559	0.0008	0.024779	0.025	99.11429
1,3-Dichlorobenzene	0.00502	0.01004	0.025099	0.001599	0.024729	0.025	98.91429
1,4-Dichlorobenzene	0.005105	0.01021	0.025525	0.001626	0.025271	0.025	101.0857
1,2-Dichlorobenzene	0.003215	0.00643	0.016074	0.001024	0.023671	0.025	94.68571
1,2-Dibromo-3-chloropropane	0.01213	0.024261	0.060652	0.003863	0.022171	0.025	88.68571
1,2,4-Trichlorobenzene	0.005535	0.01107	0.027676	0.001763	0.02345	0.025	93.8
Hexachlorobutadiene	0.009489	0.018979	0.047446	0.003022	0.025093	0.025	100.3714
Naphthalene	0.004059	0.008118	0.020296	0.001293	0.020757	0.025	83.02857
1,2,3-Trichlorobenzene	0.008228	0.016456	0.04114	0.00262	0.022021	0.025	88.08571

EPA Method 8270
MDL Data and Calculations

Analysis:	8270 BNAs	Standard(s) spiked:	20/100/200 ug/ml BNA mdl stock 34-172; 2000 ug/ml Benzoic Acid stock 31-169
Matrix:	**Water**	Volume spiked:	50 uL (above); 40 uL (above)
Instrument ID:	GCMS #8	Date(s) Extracted:	04/12/11
Reporting Units:	ug/L	Date(s) Analyzed:	04/12/11
		Date Calculated:	04/22/11
		Calculation Analyst:	YA

	(StdDev*3.14)	(2*MDL)	(5*MDL)	**Std**		**Spike**	**%**
Analyte	**MDL**	**PQL**	**PQL**	**Dev**	**Mean**	**Level**	**Rec.**
N-Nitrosodimethylamine	0.135	0.271	0.677	0.0431	0.613	1.0	61
Phenol	0.420	0.841	2.102	0.1339	2.137	5.0	43
Bis(2-chloroethyl) ether	0.198	0.397	0.992	0.0632	1.017	1.0	102
2-Chlorophenol	0.941	1.882	4.704	0.2996	4.819	5.0	96
1,3-Dichlorobenzene	0.182	0.364	0.910	0.0580	1.054	1.0	105
1,4-Dichlorobenzene	0.170	0.341	0.852	0.0543	1.059	1.0	106
1,2-Dichlorobenzene	0.217	0.435	1.087	0.0692	1.063	1.0	106
Benzyl alcohol	0.249	0.498	1.246	0.0793	0.704	1.0	70
Bis(2-chloroisopropyl) ether	0.257	0.514	1.284	0.0818	1.063	1.0	106
2-Methylphenol	0.787	1.574	3.936	0.2507	4.171	5.0	83
Hexachloroethane	0.217	0.433	1.083	0.0690	0.957	1.0	96
N-Nitroso-di-n-propylamine	0.296	0.591	1.478	0.0941	0.927	1.0	93
3-Methylphenol +4 -Methylphenol	1.603	3.205	8.013	0.5104	7.154	10.0	72
Nitrobenzene	0.225	0.450	1.124	0.0716	1.206	1.0	121
Isophorone	0.253	0.507	1.267	0.0807	0.959	1.0	96
2-Nitrophenol	1.223	2.446	6.114	0.3894	4.926	5.0	99
2,4-Dimethylphenol	0.560	1.120	2.800	0.1783	4.114	5.0	82
Benzoic acid	18.908	37.816	94.539	6.0216	25.164	90.0	28
Bis(2-chloroethoxy)methane	0.246	0.493	1.232	0.0785	1.074	1.0	107
2,4-Dichlorophenol	1.151	2.302	5.754	0.3665	4.903	5.0	98
1,2,4-Trichlorobenzene	0.183	0.366	0.915	0.0583	1.014	1.0	101
Naphthalene	0.168	0.336	0.841	0.0535	1.080	1.0	108
Hexachlorobutadiene	0.198	0.396	0.991	0.0631	1.079	1.0	108
4-Chloroaniline	0.092	0.185	0.462	0.0294	0.620	1.0	62
4-Chloro-3-methylphenol	1.229	2.458	6.146	0.3915	4.477	5.0	90
2-Methylnaphthalene	0.195	0.390	0.975	0.0621	0.997	1.0	100
Hexachlorocyclopentadiene	0.166	0.331	0.828	0.0527	0.599	1.0	60
2,4,6-Trichlorophenol	1.237	2.473	6.183	0.3938	4.734	5.0	95
2,4,5-Trichlorophenol	1.232	2.464	6.160	0.3924	4.474	5.0	89
2-Nitroaniline	0.354	0.707	1.768	0.1126	0.759	1.0	76

EPA Method 8270

MDL Data and Calculations

	(StdDev*3.14)	(2*MDL)	(5*MDL)	Std		Spike	%
Analyte	**MDL**	**PQL**	**PQL**	**Dev**	**Mean**	**Level**	**Rec.**
Dimethyl phthalate	0.265	0.530	1.325	0.0844	1.077	1.0	108
Acenaphthylene	0.259	0.517	1.293	0.0823	1.111	1.0	111
2,6-Dinitrotoluene	0.321	0.643	1.607	0.1024	0.821	1.0	82
3-Nitroaniline	0.192	0.385	0.962	0.0613	0.473	1.0	47
Acenaphthene	0.213	0.426	1.064	0.0678	1.114	1.0	111
2,4-Dinitrophenol	1.867	3.733	9.333	0.5944	1.892	5.0	38
Dibenzofuran	0.230	0.460	1.150	0.0732	1.106	1.0	111
2,4-Dinitrotoluene	0.365	0.731	1.826	0.1163	0.960	1.0	96
4-Nitrophenol	0.536	1.071	2.678	0.1706	0.955	5.0	19
Diethyl phthalate	0.270	0.540	1.350	0.0860	1.137	1.0	114
Fluorene	0.246	0.491	1.228	0.0782	1.141	1.0	114
4-Chlorophenyl phenyl ether	0.218	0.437	1.091	0.0695	1.150	1.0	115
1,2-Diphenylhydrazine	0.247	0.494	1.234	0.0786	0.959	1.0	96
2-Chloronaphthalene	0.183	0.367	0.917	0.0584	1.101	1.0	110
N-Nitrosodiphenylamine	0.181	0.362	0.906	0.0577	0.874	1.0	87
4-Nitroaniline	0.364	0.727	1.818	0.1158	0.604	1.0	60
4,6-Dinitro-2-methylphenol	1.704	3.408	8.519	0.5426	3.523	5.0	70
4-Bromophenyl phenyl ether	0.240	0.480	1.201	0.0765	1.069	1.0	107
Hexachlorobenzene	0.167	0.334	0.834	0.0531	1.093	1.0	109
Pentachlorophenol	1.301	2.603	6.507	0.4145	3.987	5.0	80
Phenanthrene	0.156	0.312	0.780	0.0497	1.160	1.0	116
Anthracene	0.192	0.384	0.961	0.0612	1.111	1.0	111
Carbazole	0.240	0.480	1.201	0.0765	0.991	1.0	99
Di-n-butyl phthalate	0.322	0.644	1.611	0.1026	1.024	1.0	102
Fluoranthene	0.276	0.553	1.382	0.0880	1.021	1.0	102
Benzidine	0.711	1.422	3.555	0.2264	0.560	10.0	6
Pyrene	0.154	0.307	0.768	0.0489	1.006	1.0	101
Benzyl butyl phthalate	0.272	0.543	1.358	0.0865	0.769	1.0	77
Benz(a)anthracene	0.165	0.330	0.824	0.0525	0.953	1.0	95
3,3'-Dichlorobenzidine	0.785	1.570	3.925	0.2500	7.416	10.0	74
Chrysene	0.158	0.317	0.792	0.0505	0.981	1.0	98
Bis(2-ethylhexyl) phthalate	0.287	0.574	1.435	0.0914	0.974	1.0	97
Di-n-octyl phthalate	0.265	0.530	1.324	0.0843	0.589	1.0	59
Benzo(a)pyrene	0.204	0.409	1.022	0.0651	0.690	1.0	69
Benzo(b)fluoranthene	0.182	0.364	0.910	0.0580	0.836	1.0	84
Benzo(k)fluoranthene	0.099	0.199	0.496	0.0316	0.900	1.0	90
Indeno(1,2,3-cd)pyrene	0.246	0.491	1.229	0.0783	0.727	1.0	73
Dibenzo(a,h)anthracene	0.325	0.650	1.626	0.1036	0.704	1.0	70
Benzo(g,h,i)perylene	0.267	0.535	1.337	0.0852	0.853	1.0	85

EPA Method 8270
MDL Data and Calculations

MDL Data and Calculations

Analyst fill in all below
(attach extraction worksheet(s))

Analysis:	8270 BNA	Standard(s) spiked:	20/100/200 ug/ml BNA mdl stock 34-172; 2,000 ug/ml 4-chloroaniline, m and p-nitroaniline
Matrix:	**Soil**	Volume spiked:	50 uL (above); 100 uL (above)
Instrument ID:	GCMS #6	Date(s) Extracted:	40589
Reporting Units:	mg/kg	Date(s) Analyzed:	02/22/11, 02/23/11, 02/28/11, 03/08/11
		Date Calculated:	40645
		Calculation Analyst:	YA

Analyte	(StdDev*3. MDL	(2*MDL) PQL	(5*MDL) PQL	Std Dev	Mean	Spike Level	% Rec.
N-Nitrosodimethylamine	0.020324	0.040648	0.10162	0.006473	0.034917	0.033	105.8104
Phenol	0.026984	0.053969	0.134921	0.008594	0.153846	0.167	92.12335
Bis(2-chloroethyl) ether	0.011728	0.023456	0.058641	0.003735	0.036345	0.033	110.1351
2-Chlorophenol	0.023294	0.046588	0.116469	0.007418	0.149327	0.167	89.41719
1,3-Dichlorobenzene	0.009803	0.019607	0.049017	0.003122	0.032396	0.033	98.17013
1,4-Dichlorobenzene	0.012778	0.025555	0.063888	0.004069	0.038628	0.033	117.0545
1,2-Dichlorobenzene	0.007911	0.015821	0.039554	0.002519	0.043195	0.033	130.8935
Benzyl alcohol	0.016129	0.032259	0.080647	0.005137	0.021455	0.033	65.01429
Bis(2-chloroisopropyl) ether	0.009583	0.019167	0.047916	0.003052	0.037629	0.033	114.0273
2-Methylphenol	0.044369	0.088738	0.221845	0.01413	0.1616	0.167	96.76655
Hexachloroethane	0.010739	0.021477	0.053693	0.00342	0.033585	0.033	101.774
N-Nitroso-di-n-propylamine	0.009933	0.019865	0.049664	0.003163	0.034061	0.033	103.2156
3-Methylphenol +4 -Methylphenol	0.086255	0.17251	0.431276	0.02747	0.326768	0.334	97.83477
Nitrobenzene	0.01409	0.028179	0.070448	0.004487	0.043528	0.033	131.9026
Isophorone	0.006303	0.012605	0.031513	0.002007	0.032967	0.033	99.9
2-Nitrophenol	0.033804	0.067607	0.169018	0.010765	0.139908	0.167	83.77699
2,4-Dimethylphenol	0.020093	0.040187	0.100467	0.006399	0.127729	0.167	76.4846
Benzoic acid	0.326987	0.653974	1.634936	0.104136	0.255221	0.333	76.64286
Bis(2-chloroethoxy)methane	0.007741	0.015482	0.038705	0.002465	0.033585	0.033	101.774
2,4-Dichlorophenol	0.034664	0.069327	0.173318	0.011039	0.150516	0.167	90.12934
1,2,4-Trichlorobenzene	0.005117	0.010235	0.025587	0.00163	0.034489	0.033	104.513
Naphthalene	0.00816	0.01632	0.040801	0.002599	0.036868	0.033	111.7208
Hexachlorobutadiene	0.006494	0.012988	0.03247	0.002068	0.034394	0.033	104.2247
4-Chloroaniline	1.044026	2.088052	5.22013	0.332492	3.064694	6.7	45.7417
4-Chloro-3-methylphenol	0.043242	0.086484	0.216211	0.013771	0.143999	0.167	86.22678
2-Methylnaphthalene	0.006356	0.012712	0.031781	0.002024	0.031778	0.033	96.2961
Hexachlorocyclopentadiene	0.014487	0.028973	0.072434	0.004614	0.02312	0.033	70.05974
2,4,6-Trichlorophenol	0.027111	0.054223	0.135557	0.008634	0.146663	0.167	87.82198
2,4,5-Trichlorophenol	0.029299	0.058597	0.146493	0.009331	0.1518	0.167	90.89846
2-Nitroaniline	0.015218	0.030435	0.076088	0.004846	0.02802	0.033	84.90779
Dimethyl phthalate	0.004471	0.008943	0.022356	0.001424	0.030826	0.033	93.41299

EPA Method 8270

MDL Data and Calculations

Acenaphthylene	0.006002	0.012005	0.030011	0.001912	0.033157	0.033	100.4766
2,6-Dinitrotoluene	0.008616	0.017233	0.043082	0.002744	0.022739	0.033	68.90649
3-Nitroaniline	1.024383	2.048765	5.121913	0.326237	4.135337	6.7	61.72144
Acenaphthene	0.005223	0.010446	0.026116	0.001663	0.033776	0.033	102.3506
2,4-Dinitrophenol	0.131486	0.262972	0.65743	0.041875	0.06202	0.167	37.13772
Dibenzofuran	0.006841	0.013683	0.034207	0.002179	0.034347	0.333	10.31429
2,4-Dinitrotoluene	0.010181	0.020362	0.050906	0.003242	0.030588	0.033	92.69221
4-Nitrophenol	0.438203	0.876406	2.191016	0.139555	0.388992	0.033	1178.762
Diethyl phthalate	0.005366	0.010731	0.026829	0.001709	0.033966	0.333	10.2
Fluorene	0.006286	0.012572	0.031431	0.002002	0.032253	0.033	97.73766
4-Chlorophenyl phenyl ether	0.006127	0.012254	0.030634	0.001951	0.033966	0.033	102.9273
1,2-Diphenylhydrazine	0.010978	0.021957	0.054892	0.003496	0.029542	0.033	89.52078
2-Chloronaphthalene	0.006178	0.012355	0.030888	0.001967	0.034061	0.033	103.2156
N-Nitrosodiphenylamine	0.004213	0.008427	0.021067	0.001342	0.025879	0.033	78.42078
4-Nitroaniline	0.738269	1.476538	3.691344	0.235117	6.285232	6.7	93.80944
4,6-Dinitro-2-methylphenol	0.082177	0.164354	0.410884	0.026171	0.096173	0.167	57.58845
4-Bromophenyl phenyl ether	0.005772	0.011545	0.028862	0.001838	0.030018	0.033	90.96234
Hexachlorobenzene	0.007007	0.014014	0.035034	0.002231	0.031397	0.033	95.14286
Pentachlorophenol	0.145384	0.290767	0.726918	0.046301	0.135674	0.167	81.24175
Phenanthrene	0.006028	0.012057	0.030141	0.00192	0.033728	0.033	102.2065
Anthracene	0.007011	0.014021	0.035053	0.002233	0.031445	0.033	95.28701
Carbazole	0.008093	0.016186	0.040465	0.002577	0.030065	0.033	91.10649
Di-n-butyl phthalate	0.007033	0.014066	0.035164	0.00224	0.032206	0.033	97.59351
Fluoranthene	0.007478	0.014955	0.037388	0.002381	0.031254	0.033	94.71039
Benzidine	ND	ND	ND	ND	ND	0.333	ND
Pyrene	0.003852	0.007704	0.01926	0.001227	0.029066	0.033	88.07922
Benzyl butyl phthalate	0.007516	0.015032	0.037579	0.002394	0.025308	0.033	76.69091
Benz(a)anthracene	0.00477	0.00954	0.023849	0.001519	0.030255	0.333	9.085714
3,3'-Dichlorobenzidine	0.099194	0.198388	0.495969	0.03159	0.137291	0.333	41.22857
Chrysene	0.005691	0.011381	0.028453	0.001812	0.030779	0.033	93.26883
Bis(2-ethylhexyl) phthalate	0.01265	0.0253	0.063251	0.004029	0.031115	0.033	94.28701
Di-n-octyl phthalate	0.010765	0.021531	0.053827	0.003428	0.025974	0.033	78.70909
Benzo(a)pyrene	0.007904	0.015808	0.039521	0.002517	0.023595	0.033	71.5013
Benzo(b)fluoranthene	0.006413	0.012826	0.032066	0.002042	0.027116	0.033	82.16883
Benzo(k)fluoranthene	0.012456	0.024912	0.062279	0.003967	0.034394	0.033	104.2247
Indeno(1,2,3-cd)pyrene	0.010133	0.020265	0.050663	0.003227	0.026545	0.033	80.43896
Dibenzo(a,h)anthracene	0.009951	0.019902	0.049755	0.003169	0.02821	0.033	85.48442
Benzo(g,h,i)perylene	0.011452	0.022904	0.05726	0.003647	0.028781	0.033	87.21429

EPA Method 8270-SIM
MDL Data and Calculations

WATER ug/L

	(StdDev*3.14)	(2*MDL)	(5*MDL)	Std		Spike	%
Analyte	**MDL**	**PQL**	**PQL**	**Dev**	**Mean**	**Level**	**Rec.**
Naphthalene	0.00222	0.00444	0.01110	0.000707	0.03139	0.030	105
2-Methylnaphthalene	0.00184	0.00368	0.00921	0.000587	0.02695	0.030	90
1-Methylnaphthalene	0.00336	0.00673	0.01681	0.001071	0.02674	0.030	89
Acenaphthylene	0.00639	0.01278	0.03194	0.002035	0.02368	0.030	79
Acenaphthene	0.00307	0.00615	0.01537	0.000979	0.02783	0.030	93
Fluorene	0.01485	0.02970	0.07424	0.004729	0.02754	0.030	92
Phenanthrene	0.00283	0.00565	0.01414	0.000900	0.02874	0.030	96
Anthracene	0.00594	0.01188	0.02971	0.001893	0.02611	0.030	87
Fluoranthene	0.00339	0.00679	0.01696	0.001081	0.02318	0.030	77
Pyrene	0.00363	0.00727	0.01817	0.001157	0.02271	0.030	76
Benz(a)anthracene	0.00379	0.00758	0.01894	0.001207	0.03256	0.030	109
Chrysene	0.00244	0.00489	0.01221	0.000778	0.02479	0.030	83
Benzo(b)fluoranthene	0.00379	0.00759	0.01896	0.001208	0.01850	0.030	62
Benzo(k)fluoranthene	0.00515	0.01029	0.02573	0.001639	0.01991	0.030	66
Benzo(a)pyrene	0.00404	0.00808	0.02021	0.001287	0.01584	0.030	53
Indeno(1,2,3-cd)pyrene	0.00625	0.01250	0.03125	0.001990	0.01485	0.030	50
Dibenz(a,h)anthracene	0.00720	0.01440	0.03600	0.002293	0.01686	0.030	56
Benzo(g,h,i)perylene	0.00733	0.01467	0.03667	0.002335	0.02136	0.030	71

SOIL mg/kg

	(StdDev*3.14)	**(2*MDL)**	**(5*MDL)**	**Std**		**Spike**	**%**
Analyte	**MDL**	**PQL**	**PQL**	**Dev**	**Mean**	**Level**	**Rec.**
Naphthalene	0.00021	0.000419	0.001048	6.68E-05	0.000963	0.001	96.25603
2-Methylnaphthalene	0.000433	0.000866	0.002165	0.000138	0.00094	0.001	93.98687
1-Methylnaphthalene	0.000244	0.000487	0.001218	7.76E-05	0.000863	0.001	86.3469
Acenaphthylene	0.000501	0.001003	0.002507	0.00016	0.000906	0.001	90.62833
Acenaphthene	0.000229	0.000457	0.001143	7.28E-05	0.000922	0.001	92.18391
Fluorene	0.00058	0.00116	0.002901	0.000185	0.001017	0.001	101.6982
Phenanthrene	0.000482	0.000964	0.00241	0.000153	0.00106	0.001	106.0034
Anthracene	0.000358	0.000717	0.001791	0.000114	0.0009	0.001	90.02417
Fluoranthene	0.000277	0.000554	0.001385	8.82E-05	0.000799	0.001	79.91524
Pyrene	0.000268	0.000536	0.00134	8.54E-05	0.000766	0.001	76.59951
Benz(a)anthracene	0.000187	0.000373	0.000933	5.94E-05	0.001091	0.001	109.1336
Chrysene	0.000171	0.000343	0.000857	5.46E-05	0.000837	0.001	83.74474
Benzo(b)fluoranthene	0.000282	0.000565	0.001411	8.99E-05	0.000717	0.001	71.68063
Benzo(k)fluoranthene	0.000282	0.000565	0.001412	8.99E-05	0.000746	0.001	74.64433
Benzo(a)pyrene	0.000257	0.000513	0.001283	8.17E-05	0.000548	0.001	54.84034
Indeno(1,2,3-cd)pyrene	0.000129	0.000258	0.000646	4.11E-05	0.000557	0.001	55.69187
Dibenz(a,h)anthracene	0.000228	0.000456	0.00114	7.26E-05	0.000637	0.001	63.65533
Benzo(g,h,i)perylene	0.000177	0.000354	0.000885	5.64E-05	0.000798	0.001	79.76777

Method 200.8 Soil
Method Detection Limit (MDL) Study

Location: g:\fbi\mdls\icp_ms\icpmsmdl2011.xls
Date Analyzed: 02/25/11
Analyst: AP
Units: mg/Kg (ppm)
Spike Level: 0.5 mg/Kg (ppm) Samples were diluted 1000x for analysis
Parts per Million

Analyte	Ion	MDL (3.14*STD)	PQL (2*MDL)	PQL (5*MDL)	mdl1	mdl2	mdl3	mdl4	mdl5	mdl6	mdl7	STD
Antimony	Sb 121	0.0270	0.054	0.135	0.500	0.506	0.514	0.518	0.503	0.495	0.515	0.009
	Sb 123	**0.0326**	0.065	0.163	0.525	0.527	0.539	0.530	0.509	0.518	0.513	0.010
Arsenic	**As 75**	**0.4615**	0.923	2.308	0.238	0.297	0.407	0.360	0.385	0.084	0.553	0.147
Berylium	**Be 9**	**0.0556**	0.111	0.278	0.716	0.716	0.708	0.709	0.696	0.666	0.711	0.018
Cadmium	Cd 106	0.1396	0.279	0.698	0.066	0.102	0.000	0.012	0.118	0.035	0.037	0.044
	Cd 108	0.0841	0.168	0.420	0.397	0.464	0.414	0.405	0.377	0.412	0.401	0.027
	Cd 111	**0.0289**	0.058	0.145	0.378	0.381	0.382	0.385	0.362	0.377	0.363	0.009
	Cd 114	0.0585	0.117	0.293	0.366	0.390	0.411	0.412	0.369	0.377	0.391	0.019
Chromium	**Cr 52**	**0.2075**	0.415	1.038	0.799	0.853	0.999	0.873	0.820	0.832	0.836	0.066
	Cr 53	8.2615	16.523	41.307	13.347	18.170	20.173	20.215	19.914	19.415	21.251	2.631
Copper	**Cu 63**	**0.0684**	0.137	0.342	0.438	0.461	0.487	0.479	0.445	0.437	0.483	0.022
	Cu 65	0.0837	0.167	0.419	0.428	0.428	0.460	0.457	0.485	0.436	0.494	0.027
Lead	**Pb 208**	**0.0359**	0.072	0.179	0.495	0.487	0.481	0.479	0.502	0.468	0.493	0.011
Nickel	**Ni 60**	**0.0876**	0.175	0.438	0.485	0.509	0.561	0.511	0.521	0.485	0.541	0.028
	Ni 62	0.0622	0.124	0.311	0.479	0.521	0.526	0.529	0.528	0.491	0.512	0.020
Selenium	Se 77	2.2147	4.429	11.073	13.852	14.834	14.930	15.896	14.210	15.187	15.476	0.705
	Se 82	**0.1695**	0.339	0.848	0.464	0.508	0.571	0.468	0.432	0.468	0.567	0.054
Silver	**Ag 107**	**0.0535**	0.107	0.267	0.559	0.566	0.548	0.557	0.521	0.551	0.526	0.017
	Ag 109	0.0224	0.045	0.112	0.525	0.515	0.514	0.524	0.508	0.510	0.508	0.007
Thallium	Tl 203	0.0141	0.028	0.071	0.426	0.432	0.431	0.426	0.437	0.431	0.424	0.005
	Tl 205	**0.0268**	0.054	0.134	0.471	0.463	0.455	0.459	0.469	0.467	0.447	0.009
Zinc	**Zn 66**	**0.1278**	0.256	0.639	0.109	0.111	0.111	0.093	0.157	0.119	0.211	0.041
	Zn 67	2.6211	5.242	13.105	0.968	2.048	2.718	2.975	3.210	2.966	3.343	0.835
	Zn 68	0.2016	0.403	1.008	0.039	0.037	0.051	0.085	0.177	0.087	0.192	0.064

Method 200.8 Water
Method Detection Limit (MDL) Study

Location: g:\fbi\MDLs\icp_ms\icpmsmdl2011.xls
Date Analyzed: 01/21/11 Linear range analyzed 03/09/11
Analyst: AP
Units: ug/L (ppb)
Spike Level: 0.5 ug/L (ppb)

Parts per Billion

Analyte	Ion	MDL (3.14*STD)	PQL (2*MDL)	PQL (5*MDL)	mdl1	mdl2	mdl3	mdl4	mdl5	mdl6	mdl7	STD	Linear range mg/L
Antimony	Sb 121	0.0452	0.090	0.226	0.549	0.550	0.561	0.530	0.549	0.559	0.577	0.014	10
	Sb 123	**0.0351**	0.070	0.176	0.557	0.540	0.560	0.540	0.536	0.535	0.558	0.011	10
Arsenic	**As 75**	**0.1560**	0.312	0.780	0.348	0.354	0.435	0.351	0.364	0.457	0.446	0.050	10
Berylium	**Be 9**	**0.0571**	0.114	0.286	0.547	0.572	0.527	0.539	0.527	0.543	0.569	0.018	0.5
Cadmium	Cd 106	0.1717	0.343	0.858	0.880	0.962	0.907	0.861	1.010	0.982	0.923	0.055	10
	Cd 108	0.0928	0.186	0.464	1.052	1.024	1.045	1.027	1.044	1.103	1.086	0.030	10
	Cd 111	**0.0505**	0.101	0.253	0.552	0.539	0.581	0.540	0.532	0.541	0.548	0.016	10
	Cd 114	0.0624	0.125	0.312	0.517	0.534	0.545	0.510	0.523	0.540	0.569	0.020	10
Chromium	**Cr 52**	**0.2007**	0.401	1.003	0.756	0.579	0.612	0.586	0.572	0.590	0.612	0.064	10
	Cr 53	0.3248	0.650	1.624	0.432	0.275	0.251	0.191	0.157	0.121	0.183	0.103	10
Copper	**Cu 63**	**0.1495**	0.299	0.748	0.693	0.725	0.625	0.596	0.604	0.626	0.653	0.048	1
	Cu 65	0.1499	0.300	0.749	0.685	0.710	0.601	0.589	0.592	0.626	0.654	0.048	10
Lead	**Pb 208**	**0.0685**	0.137	0.343	0.550	0.565	0.546	0.524	0.510	0.507	0.544	0.022	10
Nickel	**Ni 60**	**0.0710**	0.142	0.355	0.601	0.599	0.551	0.551	0.557	0.571	0.593	0.023	10
	Ni 62	0.0681	0.136	0.340	0.588	0.577	0.543	0.572	0.552	0.525	0.554	0.022	1
Selenium	Se 77	0.5053	1.011	2.526	1.207	1.369	1.016	1.266	1.227	1.096	0.897	0.161	10
	Se 82	**0.2209**	0.442	1.104	0.406	0.479	0.455	0.352	0.301	0.414	0.304	0.070	10
Silver	**Ag 107**	**0.0432**	0.086	0.216	0.556	0.536	0.576	0.553	0.544	0.564	0.567	0.014	2
	Ag 109	0.0357	0.071	0.178	0.566	0.550	0.569	0.561	0.556	0.571	0.585	0.011	5
Thallium	Tl 203	0.0368	0.074	0.184	0.549	0.553	0.552	0.538	0.547	0.548	0.576	0.012	10
	Tl 205	**0.0422**	0.084	0.211	0.539	0.529	0.529	0.525	0.531	0.506	0.550	0.013	10
Zinc	**Zn 66**	**0.3316**	0.663	1.658	0.830	0.819	0.593	0.671	0.561	0.623	0.673	0.106	10
	Zn 67	0.3103	0.621	1.552	0.643	0.661	0.556	0.519	0.385	0.450	0.563	0.099	10
	Zn 68	0.3185	0.637	1.592	0.792	0.812	0.578	0.676	0.554	0.603	0.686	0.101	10

MDL for Hg in Soil (EPA 1631)

	MDL (StdDev*3.14)	PQL (2*MDL)	PQL (5*MDL)		MDL #1	MDL#2	MDL#3	MDL#4	MDL#5	MDL#6	MDL#7	Std Dev
Hg mg/kg (ppm	0.001821	0.003641	0.00910		0.0157	0.0155	0.0145	0.0146	0.0156	0.0143	0.0152	0.000580

Spike: 25 uL of 1 ppm made from 10 ppm I2-07A
Init digestion: 2g to 50 mL
Final dilution: 100 ul to 50 ml (12,500x dilution)
Analyst: AP
Date Digested: 01/26/12
Date Analyzed: 01/31/12

Location : SWCOMP Off:\FBI\MDLs\Hg.xls
Sequence HG 01-31-12

MDL for Hg in Water (EPA 1631)

	MDL (StdDev*3.14)	PQL (2*MDL)	PQL (5*MDL)		MDL #1	MDL#2	MDL#3	MDL#4	MDL#5	MDL#6	MDL#7	Std Dev
Hg ug/L (ppb)	0.000323	0.000647	0.001616		0.00148	0.00147	0.00141	0.00136	0.00169	0.00147	0.00148	0.000103

Spike: 5.0 uL of 10 ppb I2-07C
Initial Vol: 50mL
Final Vol: 50 ml
Analyst: AP
Date Digested: 01/13/12
Date Analysed: 01/20/12

Location : SWCOMP Off:\FBI\MDLs\Hg.xls
Sequence HG 01-20-12

Metals in Brackish Water (CAS Kelso, subcontracted)

ICPMS for Waters						
Element	**Method**	**Matrix**	**Digestion**	**MRL**	**MDL**	**Units**
Antimony	200.8 / 6020	Water	CLP (ILM04.0)	**0.05**	**0.02**	ug/L
Arsenic	200.8 / 6020	Water	CLP (ILM04.0)	**0.5**	**0.1**	ug/L
Beryllium	200.8 / 6020	Water	CLP (ILM04.0)	**0.02**	**0.006**	ug/L
Cadmium	200.8 / 6020	Water	CLP (ILM04.0)	**0.02**	**0.005**	ug/L
Chromium	200.8 / 6020	Water	CLP (ILM04.0)	**0.2**	**0.04**	ug/L
Copper	200.8 / 6020	Water	CLP (ILM04.0)	**0.1**	**0.02**	ug/L
Lead	200.8 / 6020	Water	CLP (ILM04.0)	**0.02**	**0.005**	ug/L
Nickel	200.8 / 6020	Water	CLP (ILM04.0)	**0.2**	**0.03**	ug/L
Selenium	200.8 / 6020	Water	CLP (ILM04.0)	**1.0**	**0.3**	ug/L
Silver	200.8 / 6020	Water	CLP (ILM04.0)	**0.02**	**0.004**	ug/L
Thallium	200.8 / 6020	Water	CLP (ILM04.0)	**0.02**	**0.005**	ug/L
Zinc	200.8 / 6020	Water	CLP (ILM04.0)	**0.5**	**0.2**	ug/L
ICP for Waters						
Element	**Method**	**Matrix**	**Digestion**	**MRL**	**MDL**	**Units**
Antimony	200.7 / 6010	Water	CLP (ILM04.0)	**10**	**3.0**	ug/L
Arsenic	200.7 / 6010	Water	CLP (ILM04.0)	**10**	**4.0**	ug/L
Beryllium	200.7 / 6010	Water	CLP (ILM04.0)	**0.2**	**0.09**	ug/L
Cadmium	200.7 / 6010	Water	CLP (ILM04.0)	**0.5**	**0.3**	ug/L
Chromium	200.7 / 6010	Water	CLP (ILM04.0)	**2.0**	**0.4**	ug/L
Copper	200.7 / 6010	Water	CLP (ILM04.0)	**2.0**	**0.8**	ug/L
Lead	200.7 / 6010	Water	CLP (ILM04.0)	**10**	**4.0**	ug/L
Nickel	200.7 / 6010	Water	CLP (ILM04.0)	**2.0**	**0.7**	ug/L
Selenium	200.7 / 6010	Water	CLP (ILM04.0)	**20**	**5.0**	ug/L
Silver	200.7 / 6010	Water	CLP (ILM04.0)	**2.0**	**0.7**	ug/L
Thallium	200.7 / 6010	Water	CLP (ILM04.0)	**10**	**2.0**	ug/L
Zinc	200.7 / 6010	Water	CLP (ILM04.0)	**2.0**	**0.7**	ug/L
Mercury in Water						
Element	**Method**	**Matrix**		**MRL**	**MDL**	**Units**
Mercury	7470A	Water		0.2	0.02	ug/L
Mercury	1631E	Water		**1.0**	**0.06**	ng/L

Priority Pollutant Metal by ICP / ICP-MS / AA in Seawater				
		MRL	**MDL**	**Units**
Antimony	20x dil./ICP-MS	1.0	0.4	ug/L
Arsenic	Red. Ppt./ICP-MS	0.5	0.04	ug/L
Beryllium	Red. Ppt./ICP-MS	0.02	0.0007	ug/L
Cadmium	Red. Ppt./ICP-MS	0.02	0.002	ug/L
Chromium	Red. Ppt./ICP-MS	0.2	0.03	ug/L
Copper	Red. Ppt./ICP-MS	0.1	0.004	ug/L
Lead	Red. Ppt./ICP-MS	0.02	0.009	ug/L
Nickel	Red. Ppt./ICP-MS	0.2	0.04	ug/L
Silver	Red. Ppt./ICP-MS	0.02	0.004	ug/L
Thallium	Red. Ppt./ICP-MS	0.02	0.004	ug/L
Zinc	Red. Ppt./ICP-MS	0.5	0.06	ug/L
Selenium	BRAAS (7742)	1.0	0.05	ug/L
Mercury	CVAAS (7740A)	0.2	0.02	ug/L
	P&T AFS (1631)	0.001	0.00006	ug/L

EPA Method 8082 PCBs

units : mg/kg

	MDL (Stddev*3.´	PQL (2*MDL)	PQL (5*MDL)	MDL#1	MDL#2	MDL#3	MDL#4	MDL#5	MDL#6	MDL#7	Std Dev
AR 1016	0.017059	0.034119	0.085297	0.08053	0.08467	0.09533	0.08617	0.08747	0.08097	0.09187	0.005433
AR 1260	0.017369	0.034737	0.086843	0.08297	0.08853	0.097	0.0888	0.08967	0.08353	0.0964	0.005531

Spike Level = 25 ulof 100 ppm Ar 1016/1260 #34-159

EPA Method 8290 Dioxins/Furans

DATA QUALITY OBJECTIVES FOR CAS/HOUSTON (subcontracted)

ANALYTE	CAS No.	MATRIX	EDL	MRL	DOD LOD	DOD LOQ	UNITS	Accuracy (LCS %Rec.)	Matrix Spike (%Rec.)	Precision (% RPD)	DOD QSM (LCS %Rec.)	DOD QSM (% RPD)	Precision (DUP % RPD)
2378-TCDD	1746-01-6	Solid	0.0588	1	0.3	1	ng/Kg	50-150	50-150	20	50-150	20	25
12378-PeCDD	40321-76-4	Solid	0.0482	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
123478-HxCDD	57653-85-7	Solid	0.0466	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
123678-HxCDD	39227-28-6	Solid	0.0425	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
123789-HxCDD	19408-74-3	Solid	0.0447	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
1234678-HpCDD	35822-46-9	Solid	0.0479	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
OCDD	3268-87-9	Solid	0.0695	5	1.5	5	ng/Kg	50-150	50-150	20	50-150	20	25
2378-TCDF	51207-31-9	Solid	0.0562	1	0.3	1	ng/Kg	50-150	50-150	20	50-150	20	25
12378-PeCDF	57117-41-6	Solid	0.0396	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
23478-PeCDF	57117-31-4	Solid	0.0388	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
123478-HxCDF	57117-44-9	Solid	0.0340	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
123678-HxCDF	72918-21-9	Solid	0.0335	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
123789-HxCDF	70648-26-9	Solid	0.0418	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
234678-HxCDF	60851-34-5	Solid	0.0367	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
1234678-HpCDF	67562-39-4	Solid	0.0377	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
1234789-HpCDF	55673-89-7	Solid	0.0500	2.5	0.75	2.5	ng/Kg	50-150	50-150	20	50-150	20	25
OCDF	39001-02-0	Solid	0.0644	5	1.5	5	ng/Kg	50-150	50-150	20	50-150	20	25
Total TCDD	41903-57-5	Solid	NA	1	NA	NA	ng/Kg	NA	NA	NA	NA	NA	NA
Total PeCDD	36088-22-9	Solid	NA	2.5	NA	NA	ng/Kg	NA	NA	NA	NA	NA	NA
Total HxCDD	34465-46-8	Solid	NA	2.5	NA	NA	ng/Kg	NA	NA	NA	NA	NA	NA
Total HpCDD	37871-00-4	Solid	NA	2.5	NA	NA	ng/Kg	NA	NA	NA	NA	NA	NA
Total TCDF	30402-14-3	Solid	NA	1	NA	NA	ng/Kg	NA	NA	NA	NA	NA	NA
Total PeCDF	30402-15-4	Solid	NA	2.5	NA	NA	ng/Kg	NA	NA	NA	NA	NA	NA
Total HxCDF	55684-94-1	Solid	NA	2.5	NA	NA	ng/Kg	NA	NA	NA	NA	NA	NA
Total HpCDF	38998-75-3	Solid	NA	2.5	NA	NA	ng/Kg	NA	NA	NA	NA	NA	NA
13C-2378-TCDD		Solid	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-12378-PeCDD		Solid	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-123678-HxCDD		Solid	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-1234678-HpCDD		Solid	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-OCDD		Solid	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-2378-TCDF		Solid	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-12378-PeCDF		Solid	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-123478-HxCDF		Solid	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-1234678-HpCDF		Solid	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
37Cl-2378-TCDD		Solid	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA

EPA Method 8290 Dioxins/Furans

DATA QUALITY OBJECTIVES FOR CAS/HOUSTON (subcontracted)

ANALYTE	CAS No.	MATRIX	EDL	MRL	DOD LOD	DOD LOQ	UNITS	Accuracy (LCS %Rec.)	Matrix Spike (%Rec.)	Precision (% RPD)	DOD QSM (LCS %Rec.)	DOD QSM (% RPD)	Precision (DUP % RPD)
2378-TCDD	1746-01-6	Aqueous	0.566	10	3	10	pg/L	50-150	50-150	20	50-150	20	25
12378-PeCDD	40321-76-4	Aqueous	0.877	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
123478-HxCDD	57653-85-7	Aqueous	0.740	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
123678-HxCDD	39227-28-6	Aqueous	0.669	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
123789-HxCDD	19408-74-3	Aqueous	0.714	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
1234678-HpCDD	35822-46-9	Aqueous	0.772	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
OCDD	3268-87-9	Aqueous	1.168	50	15	50	pg/L	50-150	50-150	20	50-150	20	25
2378-TCDF	51207-31-9	Aqueous	0.656	10	3	10	pg/L	50-150	50-150	20	50-150	20	25
12378-PeCDF	57117-41-6	Aqueous	0.635	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
23478-PeCDF	57117-31-4	Aqueous	0.623	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
123478-HxCDF	57117-44-9	Aqueous	0.568	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
123678-HxCDF	72918-21-9	Aqueous	0.551	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
123789-HxCDF	70648-26-9	Aqueous	0.707	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
234678-HxCDF	60851-34-5	Aqueous	0.611	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
1234678-HpCDF	67562-39-4	Aqueous	0.764	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
1234789-HpCDF	55673-89-7	Aqueous	1.032	25	7.5	25	pg/L	50-150	50-150	20	50-150	20	25
OCDF	39001-02-0	Aqueous	1.202	50	15	50	pg/L	50-150	50-150	20	50-150	20	25
Total TCDD	41903-57-5	Aqueous	NA	10	NA	NA	pg/L	NA	NA	NA	NA	NA	NA
Total PeCDD	36088-22-9	Aqueous	NA	25	NA	NA	pg/L	NA	NA	NA	NA	NA	NA
Total HxCDD	34465-46-8	Aqueous	NA	25	NA	NA	pg/L	NA	NA	NA	NA	NA	NA
Total HpCDD	37871-00-4	Aqueous	NA	25	NA	NA	pg/L	NA	NA	NA	NA	NA	NA
Total TCDF	30402-14-3	Aqueous	NA	10	NA	NA	pg/L	NA	NA	NA	NA	NA	NA
Total PeCDF	30402-15-4	Aqueous	NA	25	NA	NA	pg/L	NA	NA	NA	NA	NA	NA
Total HxCDF	55684-94-1	Aqueous	NA	25	NA	NA	pg/L	NA	NA	NA	NA	NA	NA
Total HpCDF	38998-75-3	Aqueous	NA	25	NA	NA	pg/L	NA	NA	NA	NA	NA	NA
13C-2378-TCDD		Aqueous	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-12378-PeCDD		Aqueous	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-123678-HxCDD		Aqueous	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-1234678-HpCDD		Aqueous	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-OCDD		Aqueous	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-2378-TCDF		Aqueous	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-12378-PeCDF		Aqueous	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-123478-HxCDF		Aqueous	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
13C-1234678-HpCDF		Aqueous	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA
37Cl-2378-TCDD		Aqueous	NA	NA	NA	NA	Percent	40-135	40-135	NA	40-135	NA	NA

Selected Conventionals Parameters (Aquatic Research Inc., subcontracted)

Analyte	Method	MDL	MRL	Units
Sulfide	EPA 376.1	0.02	0.05	mg/L
Ammonia	EPA 350.1	0.005	0.01	mg/L
TSS	SM2540D	0.2	0.5	mg/L
TDS	SM2540C	1	5	mg/L
TOC	EPA 415.1	0.005	0.01	%