Interim Action Work Plan

Bay Wood Products Site
Everett, Washington
Agreed Order No. DE 5490

for
Washington State Department of Ecology
on behalf of Port of Everett

July 20, 2012

GeoEngineers

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File No. 0676-021-01

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1.0 INTRODUCTION

This document presents a Work Plan for the Washington State Department of Ecology (Ecology) required Interim Action at the Bay Wood Products Site (Site) located at 200 West Marine View Drive in Everett, Washington (Figure 1). This Interim Action Work Plan has been prepared to meet the requirements of Washington Administrative Code (WAC) 173-340-430.

The Site is formally listed on the Ecology Hazardous Site List as "Bay Wood Products" with Facility Site Identification No. 4438651. In accordance with Ecology Agreed Order No. DE 5490 (Agreed Order; Ecology, 2008), the Port of Everett (Port) completed Remedial Investigation (RI) activities in both the upland and marine portions of the Site to evaluate soil, groundwater and sediment conditions. Results of these investigations have confirmed the presence of contaminants (carcinogenic polycyclic aromatic hydrocarbons [cPAHs]) at concentrations exceeding preliminary cleanup levels in soil stockpiles located in the uplands portion of the Site. Contaminants of concern were also detected in subsurface soil, however, as discussed in the Draft Bay Wood Products Site Remedial Investigation/Feasibility Study (Draft RI/FS; Anchor et al., 2011), empirical evidence indicates that these soil exceedances are not adversely impacting groundwater at the Site. In addition, results of biological tests performed during the RI confirm sediment quality standards (SQS) exceedances in near shore sediments.

The purpose of this Interim Action Work Plan is to provide an overview of the scope of work that will be completed to remove soil piles that are contaminated with carcinogenic polycyclic aromatic hydrocarbons (cPAHs) at the Site. The following sections provide a description of the nature and extent of cPAH contamination in the soil piles at the Site as well as the proposed remedial, compliance monitoring and restoration activities that will be completed as part of this interim action.

2.0 BACKGROUND INFORMATION

2.1. SITE DESCRIPTION

The Site is generally located in the northeastern portion of Port Gardner Bay near the mouth of the Snohomish River. The Site is comprised of three adjoining parcels (Parcel No. 29050700100300, 29050700100500, and 29050700101000) with a combined area (both upland and marine) of approximately 41.32 acres (Figure 2). The upland portion of the Site includes approximately 13 acres of land at elevations above the tidal mudflats. The northern 100 feet of the Site (encompassing a total of 4.12 acres) are part of an easement to the U.S. Army Corps of Engineers for dike maintenance. The Site is bound to the north by the Snohomish River, to the east by West Marine View Drive and vacant land (Parcel No. 29050700100100) owned by Kimberly-Clark Worldwide, Inc., and to the south by the Former Nord Door Site (JELD-WEN).

The upland portion of the Site is generally flat, with an average elevation of approximately 16 feet (1988 North American Vertical Datum [NAVD 88]). The southeastern and central areas of the upland area currently contain piles of soil that were placed at the Site in 2005 and 2006. The imported soil originated from the Port's 14th Street bulkhead replacement project at the Everett Marina.

2.2. SITE HISTORY

Prior to 1946 and ending in 1979, the Site was used for sawmilling. The sawmill was initially operated by Washington Wood Products, later known as Washington Timber Products, Ltd. Between 1970 and 1994, Site operations transitioned between following companies:

- Publishers Timber Company from 1970 to 1976;
- West Coast Orient Lumber Mills, Inc. from 1976 to 1978;
- West Coast Lumber Operations, Inc. from 1978 to 1979;
- Bay Wood Products, Inc. from 1979 to 1994.

Prior to 1985, the sawmill was reportedly dismantled and the primary use of the Site transitioned to log handling, storage and processing until approximately 1994, when the Bay Wood Products' lease was discontinued. In 1995, the Port removed approximately 130,000 to 140,000 cubic yards of bark, rock, and wood chips from the northern two thirds of the uplands area. Wood debris, present as both surface and subsurface deposits, were encountered to depths reaching an elevation of approximately 4 feet MLLW. Removal of these deeper deposits involved construction of a dike around a portion of the uplands area. The diked area was later filled with approximately 200,000 cubic yards of dredge sediments from the Snohomish River to match the existing grades on the remaining portions of the Site. As part of the construction, the Bay Wood Products buildings were also removed from the Site. Following the removal of the Bay Wood Products building, the Site remained unoccupied and unused until 2005. As previously indicated, soil and sediment excavated as part of the Port's 14th Street bulkhead replacement project was transferred to the Site in 2005 and 2006. Since the placement of these soil piles, the physical condition of the Site has remained unchanged.

Detailed information describing the Site including its known history, current uses, existing property features, soil, groundwater and sediment conditions, and a summary of previous environmental investigations completed at the Site is presented in the Draft RI/FS (Anchor et al., 2011).

2.1. CURRENT AND FUTURE SITE USE

The City of Everett Comprehensive Plan land use map indicates that the Site is zoned as Waterfront Commercial. Currently the Site is vacant and the Port does not have specific future plans for use of the Site.

3.0 NATURE AND EXTENT OF CONTAMINATION

Several environmental investigations have been completed at the Site. The initial Phase I Environmental Site Assessment (GeoEngineers, 1989) was completed in 1989. The most recent investigation was completed at the Site in March 2012 (SLR, 2012). Investigations conducted prior to 2010 and their findings are summarized in Draft RI/FS (Anchor et al., 2011). Investigations conducted after 2010 and their findings are summarized in the Interim Soil Sampling Summary Report (SLR, 2012) is included as Attachment 1 to this document. The following sections provide a brief summary of the investigative findings. Points of compliance and preliminary cleanup levels referenced below are discussed in Section 4.1.

3.1. SUBSURFACE SOIL CONDITIONS

Soil encountered during the previous Site investigation activities consisted mainly of sands and silts. Concrete, asphalt as well as gravel, brick, and/or wood debris were encountered in several borings at depths up to 9 feet below ground surface (bgs).

Contaminants include cPAHs, diesel- and/or heavy oil-range petroleum hydrocarbons and metals (nickel, silver and thallium) were detected in soil at concentrations of exceeding preliminary soil cleanup levels in one or more soil samples obtained from the Site. However, as discussed in the Draft RI/FS (Anchor et al. 2011), these contaminants were only detected in soil samples at a depths greater than the 6-foot conditional point of compliance proposed for the Site. Results of soil samples obtained within the 0 to 6-foot interval either were not detected or were less than preliminary soil cleanup levels. Sample locations and chemical analytical results are detailed in the Draft RI/FS (Anchor et al. 2011).

In 2012, a supplemental soil investigation was completed to further evaluate subsurface conditions at the Site. During this investigation, two additional boring (PB-3CR and PB-5A-R) were completed in the vicinity of PB-3C and PB-5A. The purpose of these borings was to collect soil samples below an approximately 3-foot thick fill layer observed across the southeastern portion of the Site. Chemical analytical results of soil samples obtained indicated that contaminants including cPAHs, diesel- and heavy oil-range petroleum hydrocarbons and metals (nickel, silver and thallium) either were not detected or were detected at concentrations less than preliminary cleanup levels, with one exception. One sample obtained at a depth ranging from 5.5 to 6 feet bgs in boring PB-3CR exceeded the preliminary soil cleanup level for diesel- and heavy oil-range petroleum hydrocarbons.

Field activities for the 2012 investigation are presented in the Interim Soil Sampling Summary Report (SLR, 2012). A copy of the Interim Soil Sampling Summary is presented in Attachment 1. Subsurface Explorations completed as part of SLR's 2012 study are shown relative to the Site on Figure 3.

3.2. CONTAMINATED SOIL PILE CONDITIONS

The southeastern and central portions of the upland area contain piles of soil that were transferred to the Site from the Port's 14th Street bulkhead replacement project. As described in the Everett Marina PSDDA Sediment Characterization Report (Retec, 2005; Attachment 2), this material primarily consisted of silt and sand.

Concentrations including cPAHs and copper were detected in soil at concentrations of exceeding preliminary soil cleanup levels in one or more soil stockpile samples obtained from the Site. However, based on the rational presented in the Draft RI/FS (Anchor et al., 2011), copper is not considered a contaminant of potential concern because:

- Soil with low level copper detections is only present in shallow soil at the Site and is not in direct contact with groundwater;
- There is no identified relationship between the copper in the shallow soil and the concentration of detected copper in groundwater;

- Copper concentrations identified in the soil piles are below the Model Toxics Control Act (MTCA) Method B soil direct contact cleanup level of 3,000 milligrams per kilogram (mg/kg) and the terrestrial ecological evaluation (TEE) value of 100 mg/kg;
- There are no known or suspected sources of copper at the Site; and
- Copper is not found in the adjacent sediment at concentrations that exceeded sediment screening criteria.

To refine the extent of cPAHs contamination in soil piles at the Site, SLR completed interim soil sampling activities on behalf of the Port between December 2011 and March 2012. Concentrations of cPAHs were detected at concentrations greater than preliminary soil cleanup levels in 30 of the 68 interim soil samples submitted for chemical analysis.

The approximate extent of soil piles at the Site and soil sample locations are shown on Figure 3. Field activities for the soil pile investigations completed prior to 2012 are presented in the Draft RI/FS (Anchor et al., 2011). A copy of SLR's Interim Soil Sampling Summary Report (SLR, 2012) is presented in Attachment 1.

3.3. GROUNDWATER CONDITIONS

Groundwater conditions based on previous RI activities identified a shallow, unconfined groundwater-bearing zone at depths ranging from 2.5 to 6 feet bgs. Groundwater flow is inferred to be generally toward Port Gardner Bay west of the Site (Anchor et al., 2011).

Contaminants including include cPAHs, arsenic, cadmium, copper, nickel, selenium and silver were detected in groundwater at concentrations greater than preliminary groundwater cleanup levels in one or more groundwater samples obtained from the Site. However, as described in the Draft RI/FS (Anchor et al., 2011), these constituents are not considered to be contaminants of potential concern because:

- There are no known or suspected sources of these contaminants at the Site;
- Detected contaminant concentrations only slightly exceed the preliminary cleanup levels; and
- Samples were collected from direct-push borings, which can result in artificially elevated metals concentrations.

Based on the analysis, the Draft RI/FS Report concluded that there are no COPCs for groundwater at the Site.

3.4. SEDIMENT CONDITIONS

The Snohomish River in the vicinity of the Site is a low salinity estuary, with flow velocities highly influenced by both tides and river discharges. Tides are diurnal, with two high tides and two low tides in each 24-hour period. Maximum annual flows in the Snohomish River occur from November through February as a result of winter precipitation and in May and June as a result of mountain snowmelt. Low flows occur in August and September. The geology of the lower Snohomish estuary in the vicinity of the Site generally consists of alluvial sand and gravel that may contain silt, clay, and organics.

The results of sediment investigation activities completed in 2009 indicated that contaminant concentrations in marine sediments at the Site were less than SQS levels. However, biological test results indicated that surface sediments at one location in the southeastern portion of the marine area of the Site exceeded the biological criteria under the sediment management standards (SMS). In addition, dioxin concentrations (toxicity equivalent [TEQ] concentration of 62 parts per trillion [ppt]) were detected in subsurface sediments at this location. Results of chemical and biological analyses of sediment samples obtained from the Site are presented in the Draft RI/FS Report (Anchor et al., 2011).

In response to public comments received on the Draft RI/FS, additional sediment sampling activities are being completed in general accordance with the Bay Wood Products Site Sediment Sampling and Analysis Plan (SAPA; GeoEngineers, 2012) to further evaluate the nature and extent of contaminants within the Marine portion of the Site. Supplemental sediment samples were collected from the Site on June 28 and 29, 2012

4.0 INTERIM ACTION

The proposed interim action consists of excavation and off-site disposal of the contaminated soil piles located in the upland area of the Site. The general objectives of the interim action is to eliminate, reduce, or otherwise control to the extent feasible and practicable, unacceptable risks to human health and the environment posed by cPAHs in stockpiled soil at the Site in accordance with MTCA (WAC 173-340) and other applicable regulatory requirements. Specifically, the objective of the cleanup action is to mitigate risks associated with the following potential receptors and exposure routes:

- Direct contact (dermal, incidental ingestion, or inhalation) with contaminated shallow soils by Site visitors and workers (including construction workers).
- Direct contact (dermal, incidental ingestion, or inhalation) with contaminated shallow soils by terrestrial wildlife.
- Leaching/migration of contamination from soil into groundwater.

The Interim Action will mitigate these risks by meeting the preliminary soil cleanup levels discussed in the following section (Section 4.1).

4.1. CLEANUP REQUIREMENTS

Interim actions conducted under MTCA must comply with MTCA cleanup standards for the identified contaminants of potential concern and affected media, as well as applicable regulatory requirements based on Federal and State laws (WAC 173-340-710). Cleanup standards and applicable regulatory requirements for the proposed Interim Action are summarized below.

4.1.1. *Cleanup Standards*

Cleanup standards consist of: 1) cleanup levels that are protective of human health and the environment; and 2) the point of compliance at which the cleanup levels must be met.

4.1.1.1. CLEANUP LEVELS

Preliminary cleanup levels for soil, groundwater and sediment were developed during preparation of the Draft RI/FS (Anchor et al., 2011). For this Interim Action Work Plan, the preliminary soil cleanup levels presented in the Draft RI/FS (Anchor et al., 2011) have been adopted as the cleanup level.

A toxicity equivalence quotient (TEQ) cleanup level of is 0.14 milligrams per kilogram (mg/kg) will be used for cPAHs to evaluate the completeness of the contaminated soil removal at the Site.

4.1.1.2. POINTS OF COMPLIANCE

The proposed conditional points of compliance for affected media are presented in the Draft RI/FS (Anchor et al., 2011). For this Interim Action Work Plan, a conditional point of compliance of six feet (biologically active zone according to MTCA default assumptions) will be used to protect against potential terrestrial ecological exposures. This conditional point of compliance applicable provided that institutional controls are incorporated in to the final cleanup action to address potential excavation of deeper soil (WAC 173-340-7490[4][a]) at the Site.

4.2. APPLICABLE REGULATORY REQUIREMENTS

The interim action at the Site will be performed pursuant to MTCA under the terms of the Agreed Order between Ecology and the Port. Accordingly, the Interim Action meets the permit exemption provisions of MTCA, obviating the need to follow most procedural requirements of the various local and State regulations that would otherwise apply to the action. Ecology will determine the substantive provisions of State and local laws and regulations that are applicable to this project, following consultation with appropriate State and local regulators.

As the lead agency for the cleanup action, Ecology is responsible for identifying and evaluating the potential adverse impacts of the cleanup action on the environment. The Port will perform a review and provide an environmental determination under the State Environmental Policy Act (RCW 43.21). A copy of the State Environmental Policy Act (SEPA) Checklist will be provided to Ecology prior to implementation of the Interim Action to facilitate the SEPA review process.

The permits or other Federal, State or local requirements that are applicable to the cleanup action and that are known at this time include the following:

- Solid Waste Handling Standards (RCW 70.95).
- Dangerous Waste Regulations (RCW 70.105).
- Washington Industrial Safety and Health Act (RCW 49.17).
- Federal Occupational Safety and Health Act (29 CFR 1910, 1926).
- Washington Construction Stormwater General Permit.
- Archeological and Historical Preservation (16 USCA 496a-1).

The Port will submit to Ecology a notice-of-Intent for the Construction Stormwater General Permit during the design phase for the Interim Action.

Ecology is working with stakeholders, including local Indian tribes, to keep them informed of the cleanup of contaminated sites and sediments in the vicinity of 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). Local tribes that have been engaged by Ecology under the PSI at Port Gardner include the Tulalip, Suquamish, Swinomish and Lummi.

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 of 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. Procedures that will be used in the event cultural resources are encountered during site activities are outlined in Section 4.5.

4.3. REMEDIAL ACTION ALTERNATIVES CONSIDERED

Three remedial alternatives were generally evaluated as a means to address contaminants in upland soil as part of the Draft RI/FS (Anchor et al., 2011). Remedial alternatives evaluated included leaving contaminated stockpiled soil on Site (Alternative 1), grading and capping of the contaminated stockpile soil on site (Alternative 2), and excavation and offsite disposal of the contaminated stockpiled soil (Alternative 3). Under Alternatives 1 and 2, contaminated soil would be managed on site through soil and/or vegetative caps to isolate the contaminants from direct human contact and minimize erosion. Under Alternative 3 and based on the frequency of exceedances in the soil characterization, all of the soil piles identified at the Site associated with the Port's 14th Street bulkhead replacement project will be transferred from the Site for permitted landfill disposal.

Based on a comparative evaluation of these three alternatives, summarized in the Draft RI/FS (Anchor et al., 2011), the total effectiveness and implementability scores for the three alternatives differed by 4 points and although the estimated cost of Alternative 3 is higher than the other alternatives, it was not determined to be disproportionate. Additionally, it was determined that Alternative 3 would provide the highest degree of protectiveness, permanence and long term effectiveness by completely removing the contaminated soil from the Site. As a result, Alternative 3 is the preferred alternative to address cPAH contamination in stockpiled soil at the Site and will be implemented for the Interim Action.

4.4. PROPOSED INTERIM ACTION

The Interim Action consists of the excavation and off-site disposal of soil piles created at the site as part of the Port's 14th Street bulkhead replacement project. Soil located within these piles has been identified to contain contaminant concentrations in excess of the Site soil preliminary cleanup level. As indicated in above, SLR completed interim stockpile characterization activities to evaluate the extent of cPAH contamination in soil piles at the Site in 2012 (SLR, 2012; Attachment 1). Results of this investigation and previous soil pile investigations indicate that cPAHs exceed soil cleanup levels in 30 (27 discrete and 2 composite) of the 68 soil samples submitted for chemical analysis (Figure 3). Given the frequency of the detected exceedances, it

was identified that full removal of the soil piles would provide the most cost-effective means to achieve the cleanup objectives of the Interim Action.

The following activities will be completed during the Interim Action to address the contaminated soil piles at the Site:

- Implementation of environmental protection measures consisting of Best Management Practices (BMPs) for stormwater and erosion control, spill prevention and pollution control, and all other controls, as needed, to protect environmental quality. Environmental protection measures including a Spill Prevention and Control Plan will be detailed in the contractor's Construction Quality Control Plan. Required environmental protection measures may include the use of silt fencing and/or silt dikes and other BMP, as necessary, to control erosion and cross-contamination.
- Implementation of Site access and traffic control measures will be completed to maintain safe working conditions and protect the public during the Interim Action.
- Removal of soil piles containing detected concentrations of cPAHs that exceed the preliminary soil cleanup level. Soil removal will be completed using standard earthmoving equipment (i.e., excavators, front end loaders, dump trucks, etc.). Existing site data will be used by the Port to obtain pre-authorization for disposal at the approved disposal facility. This approach will allow excavated material to be transported directly to the landfill without further characterization. The initial limits of remedial excavation are shown on Figure 4. The base of the remedial excavation will be completed to match the local Site topography in the vicinity of each stockpile. A typical cross-section for the planned remedial excavation is shown on Figure 5. Final excavation limits will be determined by confirmation soil samples. Verification soil sample locations are shown relative to the initial remedial excavation limits on Figure 6. Soil sampling activities are discussed in Section 4.4.1. Currently, it is anticipated that approximately 7,930 cubic yards will be exported from the Site for offsite disposal following completion of remedial excavation activities.
- Loading and hauling the contaminated soil for offsite disposal at a permitted soil solid waste landfill. The permitted disposal facility will be identified in the contractor's Construction Quality Assurance Plan and approved by the Port. Waste manifest procedures and contaminated soil disposal receipts will be documented in the cleanup report.
- Soil verification sampling to confirm the completeness of the soil removal activities.
- Final grading to level the ground surface to generally match the surrounding ground surface elevation and to provide a sufficient soil thickness in the area of boring location PB-3CR to ensure that the detected contaminant concentrations are below the conditional point of compliance thickness of six feet. Based on the variation of the surface topography observed, the Site has been subdivided into five grading areas (Grading Areas 1 through 5; Figure 7). The planned final surface elevation within each grading area will range between 16 and 17 feet

(NAVD 88)[1]. Planned grading areas and final surface elevations are shown relative to the Site on Figure 7. In the event that remedial excavation activities are completed to a depth below the local ground surface elevation, backfill material will be imported to the Site, as necessary, to meet the planned final surface grade.

- Site restoration, including hydroseeding of the exposed surface soil at the Site. These activities are intended to provide permanent erosion and sediment control following completion of the Interim Action.

4.4.1. *Performance Monitoring*

Performance monitoring will be conducted to verify that the Interim Action attained soil cleanup standards discussed in Section 4.1.1. Performance monitoring methods including soil verification sampling and chemical analysis are summarized in the following sections.

4.4.1.1. VERIFICATION SOIL SAMPLE DISTRIBUTION

Soil verification sampling will be performed within the footprint of contaminated soil piles after they are removed to verify that the cleanup objectives have been achieved. If verification samples collected from the excavation base exceed soil cleanup levels prior to reaching the conditional point of compliance of six feet, additional soil will be removed at that location until subsequent verification samples are shown to meet the cleanup criteria or until the excavation depth reaches the 6-foot conditional point of compliance. In the event an excavation is completed to the 6-foot conditional point of compliance sampling will be conducted to document concentration of contaminants that will remain at the Site. Additional excavation and soil verification sampling activities beyond the conditional point of compliance will not be performed.

In circumstances where the soil removal requires excavation of 1-foot or more below the local ground surface, sidewall verification soil sampling will also be performed. If the verification samples obtained from the excavation sidewall indicate that further lateral excavation is necessary to achieve the cleanup objectives, additional excavation will be performed laterally until subsequent verification samples obtained from the excavation sidewalls indicate that cleanup objectives have been achieved.

4.4.1.2. VERIFICATION SAMPLE FREQUENCY

Base verification samples will be collected at a frequency of one per 2,500 square feet (50 feet by 50 feet) of remedial excavation base area[2]. If the area of the base is less than 2,500 square feet, a minimum of one base sample will be obtained.

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[1] Planned grading activities shown on Figure 7 will result in an overall increase of the ground surface elevation in the vicinity boring PB-3C-R in which diesel- and heavy oil-range petroleum hydrocarbons were detected at concentrations exceeding soil cleanup levels such that soil contamination at this location will be isolated beneath a 6-foot minimum soil cap (i.e., conditional point of compliance proposed for the Site).

[2] Frequency of base verification soil samples is on the same order as for the soil pile characterization activities completed by SLR.

In circumstances where soil removal requires excavation of 1-foot or more below the local ground surface, verification soil samples will be collected at a frequency of one sample per 40 linear feet of sidewall. If the perimeter of the excavation is less than 40 feet, a minimum of one sample will be obtained per sidewall.

Field procedures for verification soil sampling activities that will be completed during the Interim Action are presented in the Sampling and Analysis Plan (SAP; Appendix A).

4.4.1.3. CHEMICAL ANALYSIS

Verification soil samples obtained from the Site will be submitted to an Ecology-approved analytical laboratory for the chemical analysis of carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270-SIM.

4.5. HISTORICAL AND CULTURAL RESOURCES

Buried cultural artifacts such as chipped or ground stone, historic refuse, buildings foundations or human bone could be discovered during subsurface activities. Initial field activities will include the removal of above ground soil stockpiles which will result in a minimal amount of disturbance to the subsurface soils at the site. As such, a professional archaeologist will not be on site during these activities. Cultural Resource review and the need for any on-site archaeologist will be determined by Ecology in communication with the Department of Archaeology and Historic Preservation (DAHP) and the concerned tribal government.

If any remedial excavations extending significantly below the ground surface are required based on initial verification soil sample results, the need for additional cultural resources assessment and be developed in cooperation with Ecology pursuant to the Revised Code of Washington (RCW) 27.44 (Indian Graves and Records) and 27.53 (Archaeological Sites and Resources). In the event deeper excavations are required, a professional archaeologist may be utilized to monitor the excavation activities.

If any archaeological resources are discovered during field activities, work will be stopped and Ecology immediately notified. Ecology will coordinate communications with the DAHP, the City of Everett Planning and Community Development Department, and the Tulalip Tribes Cultural Resources Department, as appropriate. The Port will arrange for a professional archaeologist to complete an on-site inspection and invite the parties to attend. The professional archaeologist will document the discovery and provide a professionally documented site form and report to Ecology. In the event of an inadvertent 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 DAHP and authorized Tribal representatives. A treatment plan by the professional archaeologist shall be developed in consultation with the above-listed parties consistent with RCW 27.44 and RCW 27.53 and implemented according to WAC 25-48.

4.6. ENVIRONMENTAL PROTECTION

Environmental protection measures consisting of BMPs for stormwater, sediment, drainage, and erosion control; spill prevention and pollution control; and all other controls needed to protect environmental quality will be implemented. Environmental protection measures including a Spill

Prevention and Control Plan (SPCC) will be detailed in the contractor's Construction Quality Control Plan. The Contractor will be required to conform to all applicable permit conditions for the project and to develop and implement Stormwater Pollution Prevention Plan (SWPPP; if required) including installation, inspection and maintenance necessary for stormwater management, surface water runoff control, temporary erosion and sediment control measures, and SPCC measures, as necessary, for the duration of the project.

4.7. WORKER HEALTH AND SAFETY

Cleanup-related construction activities will be performed in accordance with the requirements of the Washington Industrial Safety and Health Act (RCW 49.17) and the Federal Occupational Safety and Health Act (29 CFR 1910, 1926). These regulations include requirements that workers are to be protected from exposure to contaminants. A Site-specific health and safety plan (HASP) applicable to GeoEngineers' work is included as Appendix B. The Port's construction Contractor will be required to prepare a separate HASP for use by the Contractor's personnel. Personnel engaged in work that involves hazardous material excavation and handling shall comply with the provisions of WAC 173-340-810 (MTCA Cleanup Regulation, Worker Safety and Health) and be HAZWOPER, OSHA, and WISHA certified.

4.8. QUALITY ASSURANCE/QUALITY CONTROL

This section describes general quality assurance and quality control (QA/QC) procedures that will be implemented during the Interim Action, including contractor quality control, construction monitoring and field documentation, and analytical QA/QC. Details regarding analytical QA/QC are presented in the Quality Assurance Project Plan (QAPP; Appendix C).

4.8.1. *Contractor Quality Control*

The contractor will prepare a Construction Quality Assurance Plan before commencing work. This plan will be subject to review and approval by the Port to ensure that the planned actions are in accordance with the project contract requirements. The Construction Quality Assurance Plan will include construction plans for each of the primary elements of work, as well as a quality control plan for each relevant construction element. The quality control plan will address the following:

- General requirements;
- Quality control organization;
- Documentation of methods and procedures;
- Requirements for corrective action when QC and/or acceptance criteria are not met; and
- Any additional elements that the contractor deems necessary to adequately control construction processes required by the contract.

The contractor will maintain QC records. These records will include evidence that the required inspections or tests have been performed, including the type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, proposed corrective action, and corrective actions taken.

In addition to the contractor's Construction Quality Assurance Plan, the Port and/or their representative will perform oversight of the contractor's field activities.

4.8.2. *Construction Monitoring and Field Documentation*

Construction monitoring will be performed by the Port and/or their representative. A comprehensive record of field activities will be maintained. Field documentation for this project will include field notes, field forms, field reports, and chain-of-custody forms for samples submitted for analytical testing. The field documentation will record construction, sampling, and monitoring activities, sampling personnel, and weather conditions, as well as decisions, corrective actions, and/or modifications to the project plans and procedures discussed in this report.

4.8.3. *Analytical QA/QC*

Analytical QA/QC is described in the QAPP (Appendix C). The QAPP describes soil sample QA and QC procedures that will be implemented to produce chemical and field data that are representative, valid, and accurate for use in evaluating the effectiveness of the Interim Action construction.

4.9. SCHEDULE

Pending Ecology approvals, Interim Action-related construction work is scheduled to begin in the fall of 2012. A detailed construction schedule will be determined after selection of the contractor.

4.10. REPORTING

Following completion of the Interim Action, the results will be reported in both the Remedial Investigation/Feasibility Study (RI/FS) report and the Cleanup Action Plan for the Site. These reports will include a description of the Interim Action activities and the current condition of the Site upland area, the lateral and vertical limits of any excavations, the volume of contaminated soil removed from each excavation, and the results of post-excavation compliance monitoring.

Analytical data collected as part of the Interim Action will be submitted to the Ecology Information Management (EIM) System referencing Facility Site Identification No. 4438651 in the format required by Ecology's EIM Policy 840.

5.0 LIMITATIONS

This Interim Action Work Plan has been prepared for the exclusive use of the Port of Everett, their authorized agents and regulatory agencies in their evaluation of the Bay Wood Products Site located at 200 West Marine View Drive, Everett, Washington. No other party may rely on the product of our services unless we agree in advance and in writing to such reliance.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

6.0 REFERENCES

Anchor QEA, LLC and SLR International Corp, "Draft Remedial Investigation and Feasibility Study, Former Bay Wood Products Site, Everett, Washington," dated April 2011.

GeoEngineers, Inc., "Phase I Environmental Site Assessment, Existing Log Yard, Everett, Washington," dated September 25, 1989.

GeoEngineers, Inc., "Sediment Sampling and Analysis Plan Addendum, Bay Wood Products Site, Everett, Washington," dated April 30, 2012. GeoEngineers Job No. 0676-021-00.

Science Applications International Corporation (SAIC), "Sediment Characterization Study in Port Gardner and Lower Snohomish Estuary Port Gardner, Washington," dated July 2009.

SLR International Corp, "Final Work Plan for Remedial Investigation/Feasibility Study and Cleanup Action Plan, Port of Everett, Bay Wood Products Site, 200 West Marine View Drive, Everett, Washington 98201," dated May 4, 2009.

SLR International Corp, "Interim Soil Sampling Summary, Bay Wood Products Site, Everett, Washington," dated May 22, 2012.

Retec Group, Inc., 2005, "Everett Marina PSDDA Sediment Characterization Report, 14th Street Bulkhead Replacement, Everett, Washington" dated February 24, 2005.

Washington State Department of Ecology (Ecology), "Agreed Order No. DE 5490 for Remedial Investigation/Feasibility Study and Draft Cleanup Action Plan – Bay Wood Products Site, In the Matter of Remedial Action by: The Port of Everett," dated October 3, 2008.

FIGURES

N
W E
S

2,000 0 2,000

Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

Bay Wood Products Site
Everett, Washington

GeoEngineers

Figure 1

Office: SEA Path: P:\0\0676021\GIS\0676021 00_VicinityMap.mxd Map Revised: 26 June 2012 tward

Legend

- Property Boundary
- MHHW Line (el. 11.09)
- MHHW Mean Higher High Water

N
W E
S

300 0 300
FEET

Notes

1. Horizontal Datum: NAD83 WA SP N.
2. Vertical Datum: NAVD88.
3. The locations of all features shown are approximate.
4. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

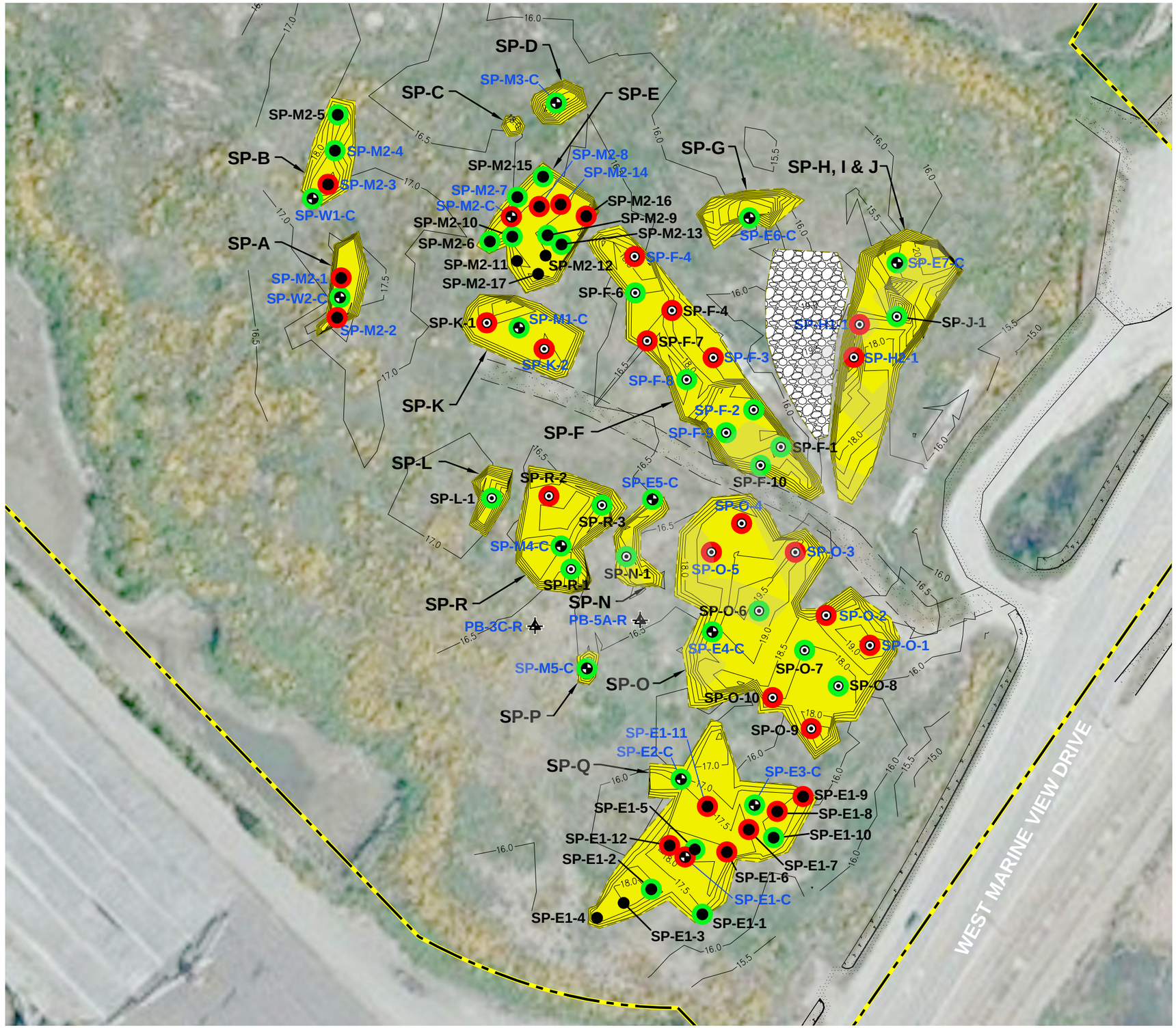
Reference: Base aerial photo from Aerials Express, 2009. Base Survey by Metron and Associated Inc. dated June 2012.

Site Plan

Bay Wood Products Site
Everett, Washington

GeoEngineers | **Figure 2**

P:\0\067602\1\CAD\Ecology Negotiations\067602I-00 Fig 2 Site Plan.dwg\TAB:LANDSCAPE modified by tmichaud on Jul 12, 2012 - 13:31



Legend

- Property Boundary
- Soil Pile
- Rip Rap Stockpile
- Soil Pile Composite Sample Location (June 2009 - SLR)
- Soil Pile Sample Location (December 2011/February 2012 - SLR)
- Soil Pile Sample Location (March 2012 - SLR)
- Direct-Push Soil Sample Location (March 2012 - SLR)
- Contaminant (cPAHs) Greater Than Preliminary Soil Cleanup Level
- Contaminant (cPAHs) Less Than Preliminary Soil Cleanup Level
- **BLACK ID** Surveyed Sample Location
- **BLUE ID** Approximate Sample Location
- cPAH = Carcinogenic Polycyclic Aromatic Hydrocarbons
- 16.0 Elevation Contour

N W E S

80 0 80
FEET

Notes

1. Horizontal Datum: NAD83 WA SP N.
2. Vertical Datum: NAVD88.
3. The locations of all features shown are approximate.
4. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base aerial photo from Aerials Express, 2009. Base Survey by Metron and Associated Inc. dated June 2012.

Soil Pile Sample Locations

Bay Wood Products Site
Everett, Washington

GeoEngineers | **Figure 3**

P:\10\067602\CAD\Ecology Negotiations\067602I-00 Fig 3 Soil Stockpile Sample Locations.dwg\TAB:Fig 3 modified modified by tmichaud on Jul 12, 2012 - 13:33

Legend

- Property Boundary
- Contaminated Soil Pile to be Removed
- Rip Rap Stockpile (to Remain)
- A — A' Cross-Section Location
- 16.0 Elevation Contour

N
W E
S

80 0 80
FEET

Notes

1. Horizontal Datum: NAD83 WA SP N.
2. Vertical Datum: NAVD88.
3. The locations of all features shown are approximate.
4. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base aerial photo from Aerials Express, 2009. Base Survey by Metron and Associated Inc. dated June 2012.

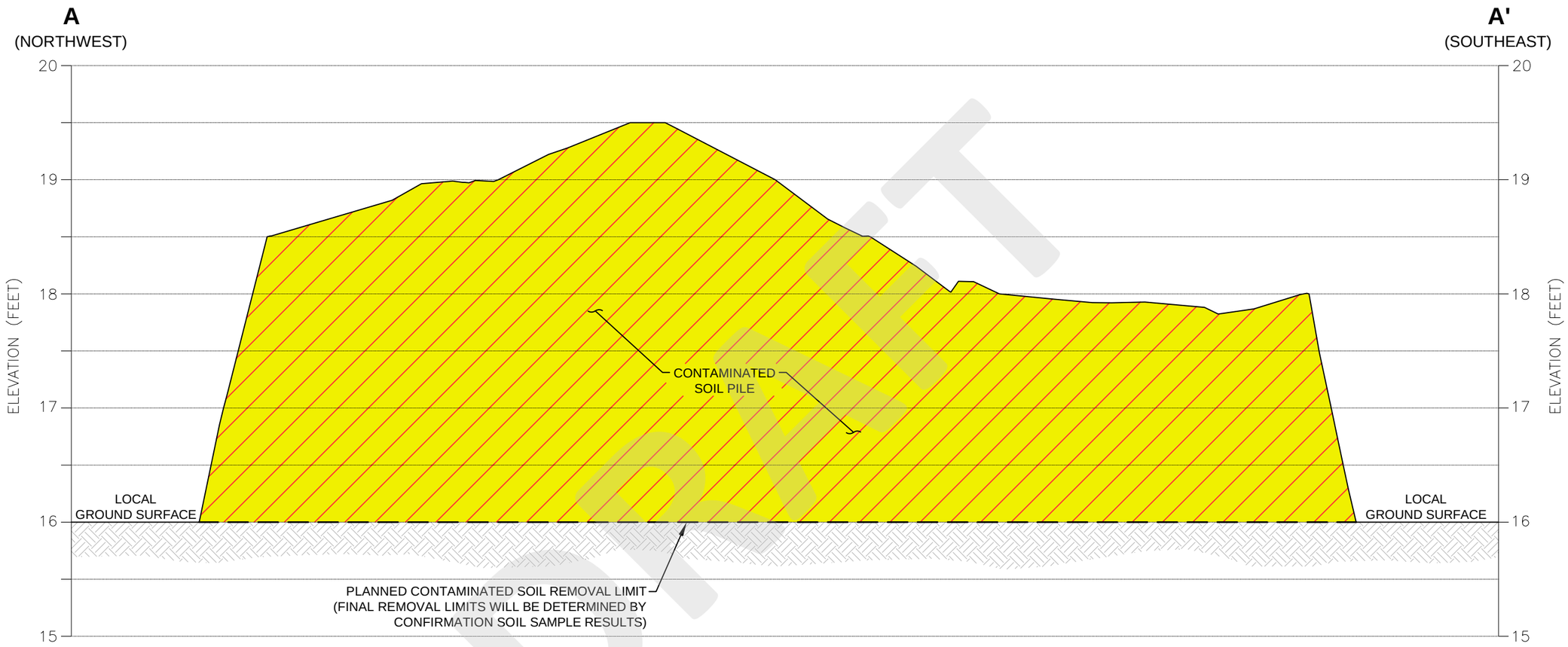
Contaminated Soil Removal

Bay Wood Products Site
Everett, Washington

GeoEngineers

Figure 4

P:\0\067602\CAD\Ecology Negotiations\067602I-00 Fig 4 Contaminated Soil Removal.dwg\TAB:Fig 4 modified by tmichaud on Jul 12, 2012 - 13:39



Notes

1. Horizontal Datum: NAD83 WA SP N.
2. Vertical Datum: NAVD88.
3. The locations of all features shown are approximate.
4. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base Survey by Metron and Associated Inc. dated June 2012.

Legend

Contaminated Soil to be Removed

HORIZONTAL SCALE: 1"= 20'
VERTICAL SCALE: 1"= 1'
VERTICAL EXAGGERATION: 20X

20 0 20
FEET

Cross-Section A-A'
(Typical)

Bay Wood Products Site
Everett, Washington

GeoEngineers

Figure 5

P:\0106760211CAD\Ecology Negotiations\0676021-00 Fig 5 Cross-Section AA.dwg\TAB:Fig 5 Modified by TMichaud on Jul 12, 2012 - 13:55

Legend

- Property Boundary
- Verification Sample Location (Approximately 50' x 50' Grid Spacing)
- Footprint of Contaminated Soil Pile
- Rip Rap Stockpile (to Remain)

N
W E
S

80 0 80
FEET

Notes

1. Horizontal Datum: NAD83 WA SP N.
2. Vertical Datum: NAVD88.
3. The locations of all features shown are approximate.
4. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base aerial photo from Aerials Express, 2009. Base Survey by Metron and Associated Inc. dated June 2012.

Compliance Monitoring Plan

Bay Wood Products Site
Everett, Washington

GeoEngineers

Figure 6

P:\0\067602I\CAD\Ecology Negotiations\067602I-00 Fig 6 Compliance Monitoring Plan.dwg\TAB:Fig 6 modified by TMichaud on Jul 19, 2012 - 14:48

Legend

- Property Boundary
- Proposed Grading Area
- Rip Rap Stockpile (to Remain)
- 16.0 Elevation Contour

Grading Area No.	Proposed Surface Elevation (ft)
1	17.0
2	16.5
3	16.0
4	16.5
5	16.0

N
W E
S

80 0 80
FEET

Notes

1. Horizontal Datum: NAD83 WA SP N.
2. Vertical Datum: NAVD88.
3. The locations of all features shown are approximate.
4. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base aerial photo from Aerials Express, 2009. Base Survey by Metron and Associated Inc. dated June 2012.

Grading Plan

Bay Wood Products Site
Everett, Washington

GeoEngineers | **Figure 7**

P:\0\067602I\CAD\Ecology Negotiations\067602I-00 Fig 7 Grading Plan.dwg\TAB:Fig 7 modified by TMichaud on Jul 12, 2012 - 13:44

APPENDICES

APPENDIX A
Sampling and Analysis Plan (SAP)

Sampling and Analysis Plan (SAP)

Bay Wood Products Site Interim Action
Everett, Washington
Agreed Order No. DE 5490

for
Washington State Department of Ecology
on Behalf of Port of Everett

July 20, 2012

GeoEngineers

Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

Table of Contents

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared for the planned Interim Action that will be completed at the Port of Everett's (Port's) Bay Wood Product Site (Site) located at 200 West Marine View Drive in Everett, Washington. This SAP serves as the primary guide for standard operating procedures for field verification soil sampling activities that will be completed during the Interim Action.

The Interim Action is being conducted by the Port in accordance with Washington Administrative Code (WAC) 173-340-430 to address carcinogenic polycyclic aromatic hydrocarbon (cPAH) contamination identified in soil piles located within the uplands portion of the Site. The objectives of the Interim Action are discussed in the Interim Action Work Plan (GeoEngineers, 2012). A Site-specific Health and Safety Plan (HASP) will be used for field activities and is presented in Appendix A of the Interim Action Work Plan. Project quality assurance and quality control for field activities are discussed in the Quality Assurance Project Plan (QAPP) presented in Appendix C of Interim Action Work Plan.

2.0 BACKGROUND

2.1. Problem Definition

Between 2005 and 2006, soil and sediment from construction of the Port's 14th Street bulkhead replacement project at the Everett Marina in Everett, Washington was placed in distinct piles at the Site. The remedial investigation (RI) activities completed by the Port on the Site between 2009 and 2010 indicated the presence of carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) at concentrations greater than the Site-specific cleanup levels in the soil piles that are located within the uplands portion of the Site. The results of the RI activities are presented in the Former Bay Wood Products Site Draft Remedial Investigation/Feasibility Study (RI/FS; Anchor et al., 2011). To refine extent of these contaminated soil piles, interim soil sampling activities were completed in 2012 by SLR on behalf of the Port. Results of these sampling activities are documented in Interim Soil Sampling Summary Report (SLR, 2012).

The Interim Action is being conducted by the Port in accordance with WAC 173-340-430 to remove the contaminated soil piles located at the Site.

2.2. Site Description

The Site is generally located in the northeastern portion of Port Gardner Bay near the mouth of the Snohomish River. The Site is comprised of three adjoining parcels (Parcel No. 29050700100300, 29050700100500, and 29050700101000) with a combined area (both upland and marine) of approximately 41.32 acres. The upland portion of the Site includes approximately 13 acres of land at elevations above the tidal mudflats. The northerly 100 feet of the Site (encompassing a total of 4.12 acres) are encumbered by an easement to the U.S. Army Corps of Engineers for dike maintenance. The Site is bounded to the north by the Snohomish River, to the east by West Marine View Drive and vacant land (Parcel No. 29050700100100) owned by Kimberly-Clark Worldwide, Inc., and to the south by the JELD-WEN site.

The upland portion of the Site is relatively flat with an approximate average elevation of 16 feet mean lower low water (MLLW). The southeastern and central areas of the upland area currently contain several piles of soil that originated from the Port's 14th Street bulkhead replacement project and were placed at the site between 2005 and 2006. The marine area of the Site consists primarily of tideland mudflats ranging in elevation from approximately 0 to 6 feet MLLW.

General Site features are shown on Figure 2 of the Interim Action Work Plan.

2.3. Site History

Prior to 1946 and ending in 1979, sawmill operations were completed at the Site. The sawmill was initially operated by Washington Wood Products, later known as Washington Timber Products, Ltd.

Prior to 1985, the sawmill was reportedly dismantled and the primary use of the Site transitioned to log handling, storage and processing until approximately 1994, when the Bay Wood Products' lease was discontinued. In 1995, the Port removed approximately 130,000 to 140,000 cubic yards of bark, rock, and wood chips from the northern two thirds of the uplands area. Wood debris, present as both surface and subsurface deposits, were encountered to depths reaching an elevation of approximately -4 feet MLLW. Removal of these deeper deposits involved construction of a dike around a portion of the uplands area. The diked area was later filled with approximately 200,000 cubic yards of dredge sediments from the Snohomish River to match the existing grades on the remaining portions of the Site. As part of the construction, the Bay Wood Products buildings were also removed from the Site. Following the removal of the Bay Wood Products building, the Site remained unoccupied and unused until 2005. As previously indicated, soil and sediment excavated as part of the Port's 14th Street bulkhead replacement project was transferred to the Site in 2005 and 2006. Since the placement of these soil piles, the physical condition of the Site has remained unchanged.

Detailed information describing the Site including its known history, current uses, existing property features, soil, groundwater and sediment conditions, and a summary of previous environmental investigations completed at the Site is presented in the Draft RI/FS (Anchor et al., 2011).

2.4. Project Description and Schedule

The Interim Action consists of excavation and off-site disposal of soil piles containing cPAHs at concentrations greater than cleanup levels, confirmational sampling, and grading and restoration activities. Verification soil sampling activities are described in Section 3.0. Pending Ecology approvals, Interim Action-related construction work is scheduled to begin in the fall of 2012. The duration of construction will be determined after selection of the construction contractor.

3.0 SAMPLING PROCEDURES

The following sections describe the field sampling procedures that will be used during the Interim Action.

3.1. Soil Verification Sampling

Soil verification sampling and analyses will be completed during the Interim Action as described in the Interim Action Work Plan (GeoEngineers, 2012) to verify that the cleanup levels have been achieved and/or to document concentrations of contaminants remaining at the Site.

Soil verification samples will be collected by GeoEngineers field personnel using a clean stainless steel spoon/trowel or directly by hand using a fresh and clean pair of nitrile gloves either from the excavation equipment (i.e., backhoe or excavator) or from the excavated surfaces. Samples obtained from backhoe or excavator buckets will be from the center of the bucket or from an area of soil that the surface of the bucket has not touched. Collected samples will be transferred into clean sample containers provided by the analytical laboratory. Sampling equipment (if used) will be decontaminated prior to sample collection at each location. Decontamination procedures are described in the QAPP (Appendix B of the Interim Action Work Plan). Each sample container will be securely capped, labeled, and placed in a cooler with ice immediately upon collection.

Each sample will be designated with a unique, sequential sample identification number. The field representative will visually classify the soils in accordance with American Society for Testing and Materials (ASTM) Method D 2488 and record soil descriptions and other relevant field screening details (e.g., staining, sheen, debris, odors, etc.) in the field log. Field screening procedures are presented below.

3.2. Field Screening

The potential presence of petroleum and/or volatile organics contamination in soil samples will be evaluated using field screening techniques. Field screening results will be recorded on the field logs and the results will be used as a general guideline to delineate areas of possible contamination. In addition, screening results will be used as a basis for selecting soil samples for chemical analysis. The following screening methods will be used: (1) visual screening; (2) water sheen screening; and (3) headspace vapor screening.

3.2.1. Visual Screening

The soil will be observed for unusual color and/or staining indicative of possible contamination.

3.2.2. Water Sheen Screening

Water sheen screening involves placing a portion of the soil sample in a pan containing distilled water, and observing the water surface for signs of sheen. This is a relatively sensitive, qualitative field screening method that can help identify the presence or absence of petroleum hydrocarbons and other contaminants, sometimes at concentrations lower than regulatory cleanup guidelines. The following sheen classifications will be used:

Classification	Identifier	Description
No Sheen	(NS)	No visible sheen on the water surface.
Slight Sheen	(SS)	Light, colorless, dull sheen; spotty to globular; spread is irregular, not rapid; sheen dissipates rapidly; areas of no sheen remain.

Classification	Identifier	Description
Moderate Sheen	(MS)	Light to heavy sheen; may have some color/iridescence; globular to stringy; spread is irregular to flowing, may be rapid; few remaining areas of no sheen on the water surface.
Heavy Sheen	(HS)	Heavy sheen with color/iridescence; stringy; spread is rapid; entire water surface may be covered with sheen; sheen flows off the sample.

3.2.3. Headspace Vapor Screening

This is a semi-quantitative field screening method that can help identify the presence or absence of volatile organic compounds (VOCs) in soil samples. A portion of the soil sample will be placed in a resealable plastic bag. The bag will be sealed capturing air in the bag. The bag is then shaken gently to expose the soil to the air trapped in the bag. The bag will remain closed for approximately 5 minutes at ambient temperature before the headspace vapors are measured. Vapors present within the sample bag's headspace will be measured by inserting the probe of a photoionization detector (PID) through a small opening in the bag, taking care not to clog the probe with soil. The maximum PID reading (in parts per million [ppm]) and the ambient air temperature will be recorded on the field log for each sample. The PID will be calibrated to 100 ppm isobutylene each day prior to soil sampling. No soil sample used for headspace screening will be submitted to the laboratory for chemical analysis.

3.3. Decontamination

Non-disposable sampling equipment will be decontaminated using the procedures described in the QAPP (Appendix B of the Interim Action Work Plan).

3.4. Sample Handling

Sample handling procedures, including labeling, container and preservation requirements and holding times are described in QAPP (Appendix B of the Interim Action Work Plan).

3.5. Disposal of Sampling Related Waste Materials

Incidental waste generated during sampling activities includes items such as gloves, plastic sheeting, paper towels and similar expended and discarded field supplies. These materials are considered *de minimis* (Ecology, 2006) and will be disposed of in a local trash receptacle or county disposal facility.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL

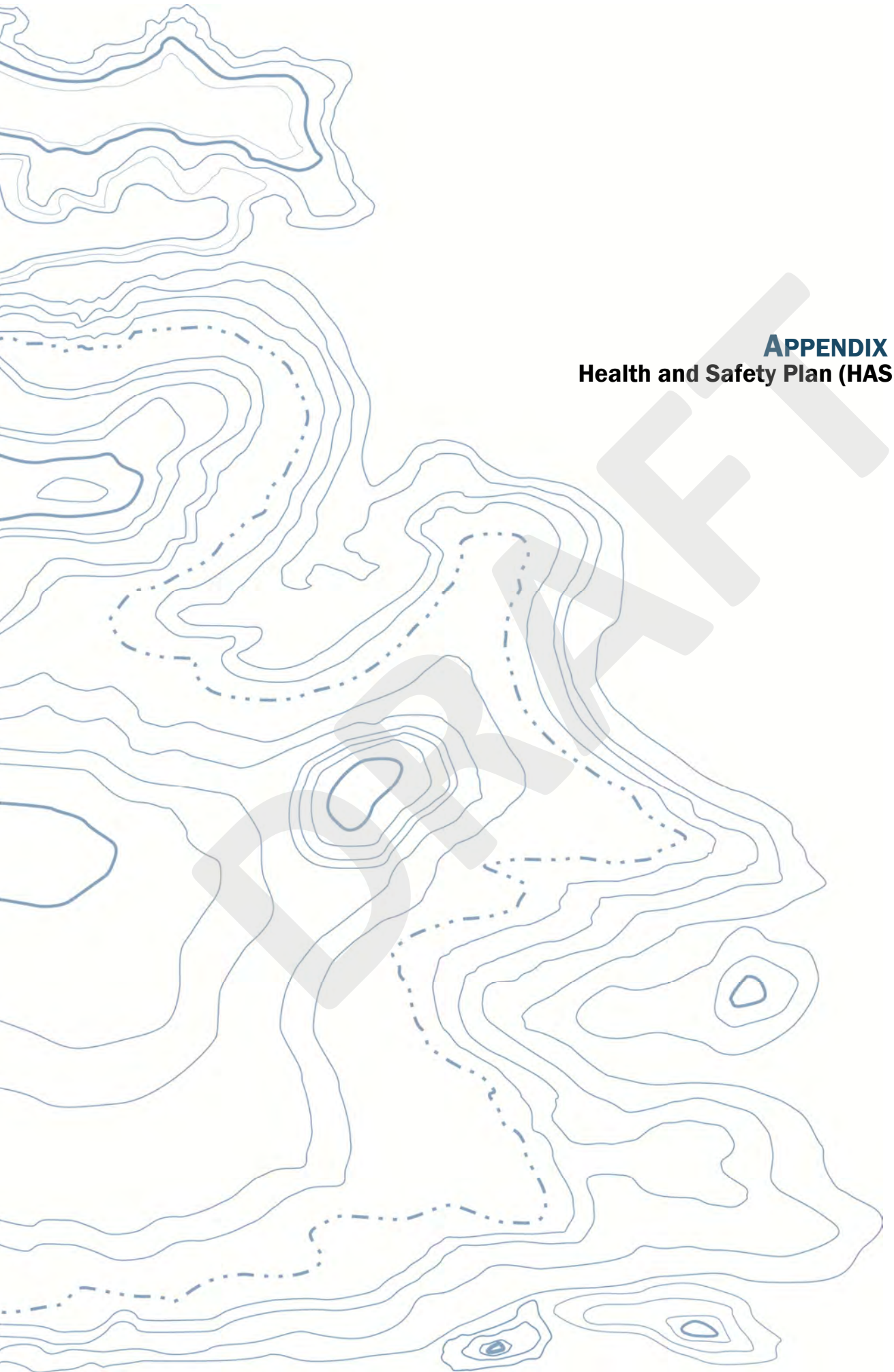
Quality assurance/quality control (QA/QC) procedures and standards that will be implemented during Cleanup Action activities are presented in the QAPP (Appendix B of the Interim Action Work Plan). The purpose of this document is to describe analysis and quality control procedures that will be implemented to produce chemical and field data that are representative, valid and accurate for use in evaluating the cleanup action alternatives.

5.0 REFERENCES

Anchor QEA and SLR International Corp, 2011, "Draft Remedial Investigation and Feasibility Study, Former Bay Wood Products Site, Everett, Washington," dated April 2011.

GeoEngineers, Inc., 2012, "Draft Interim Action Work Plan, Bay Wood Products Site, Everett, Washington, Agreed Order No. DE 5490," GEI File No. 0676-021-01, dated July 13, 2012.

Washington State Department of Ecology, 2008, "Agreed Order No. DE 5490 for Remedial Investigation/Feasibility Study and Draft Cleanup Action Plan – Bay Wood Products Site, In the Matter of Remedial Action by: The Port of Everett," dated October 3, 2008.



APPENDIX B
Health and Safety Plan (HASP)

Health and Safety Plan (HASP)

Bay Wood Products Site Interim Action
Everett, Washington
Agreed Order No. DE 5490

for
Washington State Department of Ecology
on Behalf of Port of Everett

July 20, 2012

GeoEngineers

Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

Table of Contents

Health and Safety Plan
Bay Wood Products Site
Everett, Washington

This HASP is to be used in conjunction with the GeoEngineers Safety Program Manual. Together, the written safety programs and this HASP constitute the Site safety plan for this Site. This plan is to be used by GeoEngineers personnel on this Site and must be available on-site. If the work entails potential exposures to other substances or unusual situations, additional safety and health information will be included, and the plan will need to be approved by the GeoEngineers Health and Safety Manager. All plans are to be used in conjunction with current standards and policies outlined in the GeoEngineers Health and Safety Program Manual.

Liability Clause: If requested by subcontractors, this Site safety plan may be provided for informational purposes only. In this case, Form C-3 shall be signed by the subcontractor. Please be advised that this Site Safety Plan is intended for use by GeoEngineers Employees only. Nothing herein shall be construed as granting rights to GeoEngineers' subcontractors or any other contractors working on this Site to use or legally rely on this Site Safety Plan. GeoEngineers specifically disclaims any responsibility for the health and safety of any person not employed by them.

1.0 GENERAL PROJECT INFORMATION

Project Name:	Bay Wood Products Site
Project Number:	0676-021-01
Type of Project:	Remedial excavation. Field activities to be performed by GeoEngineers field staff includes construction monitoring and soil sampling.
Start/Completion:	Interim Action-related construction work is expected to begin in the fall of 2012. Construction work is expected to be completed within approximately two months of inception.
Subcontractors:	Currently not known but will include excavation contractor/survey contractor

2.0 WORK PLAN

Remedial activities are planned for the Port of Everett's (Port's) Bay Wood Product Site (Site) as part of the Interim Action. The objectives of the Interim Action are discussed in the Interim Action Work Plan (GeoEngineers, 2012). The Interim Action is being conducted by the Port in accordance with WAC 173-340-430 to address contaminated soil stockpiles located within the uplands portion of the Site.

Our scope for the Interim Action includes:

- Assisting the cleanup contractor in identifying and removing contaminated soil from the Site for permitted disposal.
- Obtaining soil samples from the limits of excavation and submitting samples to an Ecology accredited laboratory for chemical analysis of carcinogenic polycyclic aromatic hydrocarbons (cPAHs).
- Monitoring grading/restoration activities following the completion of remedial excavation activities.

2.1. Site Description

The Site is generally located in the northeastern portion of Port Gardner Bay near the mouth of the Snohomish River. The Site is comprised of three adjoining parcels (Parcel No. 29050700100300, 29050700100500, and 29050700101000) with a combined area (both upland and marine) of approximately 41.32 acres. The upland portion of the Site includes approximately 13 acres of land at elevations above the tidal mudflats. The northern 100 feet of the Site (encompassing a total of 4.12 acres) are part of an easement to the U.S. Army Corps of Engineers for dike maintenance. The Site is bound to the north by the Snohomish River, to the east by West Marine View Drive and vacant land (Parcel No. 29050700100100) owned by Kimberly-Clark Worldwide, Inc., and to the south by the Former Nord Door Site (JELD-WEN).

The upland portion of the Site is generally flat, with an average elevation of approximately 16 feet (1988 North American Vertical Datum [NAVD 88]). The southeastern and central areas of the upland area currently contain piles of soil that were placed at the Site in 2005 and 2006. The imported soil originated from the Port's 14th Street bulkhead replacement project at the Everett Marina.

2.2. Site History

Prior to 1946 and ending in 1979, sawmill operations were completed at the Site. The sawmill was initially operated by Washington Wood Products, later known as Washington Timber Products, Ltd.

Prior to 1985, the sawmill was reportedly dismantled and the primary use of the Site transitioned to log handling, storage and processing until approximately 1994, when the Bay Wood Products' lease was discontinued. In 1995, the Port removed approximately 130,000 to 140,000 cubic yards of bark, rock, and wood chips from the northern two thirds of the uplands area. Wood debris, present as both surface and subsurface deposits, were encountered to depths reaching an elevation of approximately -4 feet MLLW. Removal of these deeper deposits involved construction of a dike around a portion of the uplands area. The diked area was later filled with approximately 200,000 cubic yards of dredge sediments from the Snohomish River to match the existing grades on the remaining portions of the Site. As part of the construction, the Bay Wood Products buildings were also removed from the Site. Following the removal of the Bay Wood Products building, the Site remained unoccupied and unused until 2005. As previously indicated, soil and sediment excavated as part of the Port's 14th Street bulkhead replacement project was transferred to the Site in 2005 and 2006. Since the placement of these soil piles, the physical condition of the Site has remained unchanged.

Detailed information describing the Site including its known history, current uses, existing property features, soil, groundwater and sediment conditions, and a summary of previous environmental investigations completed at the Site is presented in the Draft RI/FS (Anchor et al., 2011).

2.3. List of Field Activities

Check the activities to be completed during the project:

X	Site reconnaissance	X	Field Screening of Soil Samples
___	Exploratory Borings	X	Vapor Measurements
X	Construction Monitoring	___	Groundwater Sampling
X	Surveying	___	Groundwater Depth and Free Product Measurement
___	Test Pit Exploration	___	Product Sample Collection
___	Monitoring Well Installation	X	Soil Testing
___	Monitoring Well Development	X	Remedial Excavation
X	Soil Sample Collection	X	Grading
___	Remediation System Monitoring	X	Restoration

3.0 LIST OF FIELD PERSONNEL AND TRAINING

Anticipated field personnel include the following:

- John Peters
- Abhijit Joshi
- Robert Trahan

Field personnel will have appropriate training and up to date certifications.

4.0 CHAIN OF COMMAND

Chain of Command	Title	Name	Telephone Numbers
1	Project Manager	John Herzog	(c) 206.406.6431
2	Health and Safety Program Manager	Wayne Adams	(o) 253.383.4940 (c) 253.350.4387
3	HAZWOPER Supervisor	Robert Trahan	(o) 206.239.3253 (c) 206.240.2300
4	Site Safety and Health Supervisor*	Abhijit Joshi	(o) 206.239.3256 (c) 425.223.9028

5	Field Engineer/Geologist	John Peters Abhijit Joshi	(c) 360.790.8570 (c) 425.223.9028
N/A	Client Assigned Site Supervisor	TBD	TBD
N/A	Subcontractor(s)	TBD	TBD
N/A	Current Owner	Port of Everett representative Erik Gerking	(o) 425.388.0604 (c) 425.754.8413

***Site Safety and Health Supervisor --** The individual present at a hazardous waste Site responsible to the employer and who has the authority and knowledge necessary to establish the Site-specific health and safety plan and verify compliance with applicable safety and health requirements.

5.0 EMERGANCY INFORMATION

Hospital Name and Address:

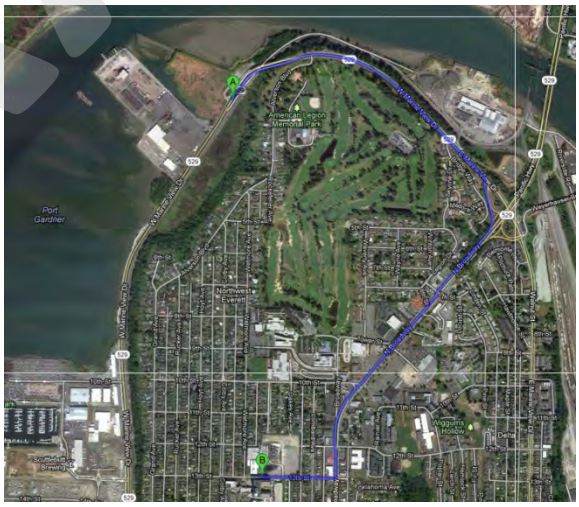
Providence Regional Medical Center
1321 Colby Avenue
Everett, Washington 98201

Phone Numbers (Hospital ER):

Phone: 425.861.6000

Distance: 2.1 miles

1. Head northwest on W Marine View Drive toward Alverson Blvd
2. Exit onto N Broadway
3. Turn right onto 13th Street
4. Destination will be on the left



6.0 STANDARD EMERGENCY PROCEDURES

- **Get help**
  - Send another worker to phone 9-1-1 (if necessary)
  - As soon as feasible, notify GeoEngineers' Project Manager
- **Reduce risk to injured person**
  - Turn off equipment
  - Move person from injury location (if in life-threatening situation only)
  - Keep person warm
  - Perform CPR (if necessary)
- **Transport injured person to medical treatment facility (if necessary)**
  - By ambulance (if necessary) or GeoEngineers vehicle
  - Stay with person at medical facility
  - Keep GeoEngineers manager apprised of situation and notify Human Resources Manager of situation

7.0 HAZARD ANALYSIS

A hazard assessment will be completed at every Site prior to beginning field activities. Updates will be included in the daily log. This list is a summary of hazards listed on the form.

7.1. Physical Hazards

	Drill rigs
X	Backhoe
X	Trackhoe and Trucks
	Crane
X	Front End Loader
X	Excavations/trenching (1:1 slopes for Type B soil)
X	Shored/braced excavation if greater than 4 feet of depth
	Overhead hazards/power lines
X	Tripping/puncture hazards (debris on-site, steep slopes or pits)
X	Unusual traffic hazard – Truck and Trailer traffic
X	Heat/Cold, Humidity
	Utilities/utility locate

- Work areas will be marked with reflective cones, barricades and/or caution tape. High-visibility vests will be worn by on-site personnel to ensure they can be seen by vehicle and equipment operators.
- Field personnel will be aware at all times of the location and motion of heavy equipment in the area of work to ensure a safe distance between personnel and the equipment. Personnel will

be visible to the operator at all times and will remain out of the swing and/or direction of the equipment apparatus. Personnel will approach operating heavy equipment only when they are certain the operator has indicated that it is safe to do so through hand signal or other acceptable means.

- Heavy equipment and/or vehicles used on this Site will not work within 20 feet of overhead utility lines without first ensuring that the lines are not energized. This distance may be reduced to 10 feet depending on the client and the use of a safety watch.
- Personnel entry into unshored or unsloped excavations deeper than 4 feet is not allowed. Any trenching and shoring requirements will follow guidelines established in WAC 296-155, the Washington State Construction Standards or OSHA 1926.651 Excavation Requirements. In the event that a worker is required to enter an excavation deeper than 4 feet, a trench box or other acceptable shoring will be employed or the side walls of the excavation will be sloped according to the soil type and guidelines as outlined in DOSH/OSHA regulations. If the shoring/sloping deviates from that outlined in the WAC, it will be designed and stamped by a PE. Prior to entry, personnel will conduct air monitoring as described later in this plan. All hazardous encumbrances and excavated material will be stockpiled at least 2 feet from the edge of a trench or open pit. If concentrations of volatile gases accumulate within an open trench or excavation, the means of entering shall adhere to confined space entry and air monitoring procedures outlined under the air monitoring recommendations in this Plan and/or the GeoEngineers Health and Safety Program.
- Personnel will avoid tripping hazards, steep slopes, pits and other hazardous encumbrances. If it becomes necessary to work within 6 feet of the edge of a pit, slope or other potentially hazardous area, appropriate fall protection measures will be implemented by the Site Safety and Health Supervisor in accordance with OSHA/DOSH regulations and the GeoEngineers Health and Safety Program.
- Cold stress control measures will be implemented according to the GeoEngineers Health and Safety Program to prevent frost nip (superficial freezing of the skin), frost bite (deep tissue freezing), or hypothermia (lowering of the core body temperature). Heated break areas and warm beverages shall be available during periods of cold weather.
- Heat stress control measures required for this Site will be implemented according to GeoEngineers Health and Safety Program with water provided on-site.
- Excessive levels of noise (exceeding 85 dBA) are anticipated during drilling. Personnel potentially exposed will wear ear plugs or muffs with a noise reduction rating (NRR) of at least 25 dB whenever it becomes difficult to carry on a conversation 3 feet away from a co-worker or whenever noise levels become bothersome. (Increasing the distance from the source will decrease the noise level noticeably.)

7.2. Engineering Controls

X Trench shoring (1:1 slope for Type B Soils)
X Location work spaces upwind/wind direction monitoring
X Other soil covers (as needed)
X Other (specify): Dust control

7.3. Chemical Hazards

CHEMICAL HAZARDS (POTENTIALLY PRESENT AT SITE)

Substance	Pathways
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAH)	Airborne Dust/Soil/Water

SPECIFIC CHEMICAL HAZARDS AND EXPOSURES (POTENTIALLY PRESENT AT SITE)

Compound/ Description	Exposure Limits/IDLH	Exposure Routes	Symptoms/Health Effects
PAHs	PEL 0.2 mg/m^3 TLV 0.2 mg/m^3 REL 0.1 mg/m^3 IDLH 80 mg/m^3	Inhalation, ingestion, skin and/or eye contact	Dermatitis, bronchitis, potential carcinogen

Notes:
OSHA = Occupational Safety and Health Administration
ACGIH = American Conference of Governmental Industrial Hygienists
mg/m^3 = milligrams per cubic meter
PEL = permissible exposure limit
TLV = threshold limit value (over 10 hrs.)
REL = recommended exposure level
IDLH = immediately dangerous to life or health

Sample handling, packaging, and processing: Skin contact with contaminated media and preservative acids. Wear modified Level D PPE.

Decontamination of equipment: Inhalation or eye contact or skin contact with airborne mists or vapors, or contaminated liquids. Wear safety glasses; decontaminate clothing and skin prior to eating, drinking or other hand to mouth contact.

7.4. Biological Hazards and Procedures

Y/N	Hazard	Procedures
Y	Poison Ivy or other vegetation	Hard hat, gloves and long sleeve shirt
Y	Insects or snakes	Hard hat, gloves and long sleeve shirt
N	Used hypodermic needles or other infectious Hazards	Do not pick up or contact
	Others:	

7.5. Additional Hazards

Update in Daily Report. Include evaluation of:

- Physical Hazards (excavations and shoring, equipment, traffic, tripping, heat stress, cold stress and others)
- Chemical Hazards (odors, spills, free product, airborne particulates and others present)
- Biological Hazards (snakes, spiders, other animals, discarded needles, poison ivy, pollen, bees/wasps and others present)

8.0 AIR MONITORING PLAN

Work upwind if at all possible.

Check instrumentation to be used:

X Photoionization Detector (PID)

____ Other (i.e., detector tubes): _____

Check monitoring frequency/locations and type (specify: work space, borehole, breathing zone):

X 15 minutes - Continuous during soil disturbance activities or handling samples

____ 15 minutes

____ 30 minutes

____ Hourly (in breathing zone during excavations, drilling, sampling)

If excavation activities generate visible dust, the Site Safety and Health Supervisor will be notified immediately to assess the need for air monitoring and lab analysis for inhalable and respirable particulates.

AIR MONITORING ACTION LEVELS

Contaminant	Activity	Monitoring Device	Frequency of Monitoring Breathing Zone	Action Level	Action
Organic Vapors	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes and in event of odors	Background to 5 ppm in breathing zone	Use Level D or Modified Level D PPE

Contaminant	Activity	Monitoring Device	Frequency of Monitoring Breathing Zone	Action Level	Action
Organic Vapors	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes and in event of odors	5 to 25 ppm in breathing zone	Upgrade to Level C PPE
Organic Vapors	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes	> 25 ppm in breathing zone	Stop work and evacuate the area. Contact Health and Safety Manager for guidance.
Combustible Atmosphere	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes	>10% LEL or >1,000 ppm	Depends on contaminant. The PEL is usually exceeded before the lower explosive limit (LEL).
Combustible Atmosphere	Environmental Remedial Actions	PID or 4-gas meter	Start of shift; prior to excavation entry; every 30 to 60 minutes	>10% LEL or >1,000 ppm	Stop work and evacuate the Site. Contact Health and Safety Manager for guidance.
Oxygen Deficient/ Enriched Atmosphere	Environmental Remedial Actions Confined Spaces	Oxygen meter or 4-gas meter	Start of shift; prior to excavation entry; every 30 to 60 minutes	<19.5>23.5%	Continue work if inside range. If outside range, evacuate area and contact Health and Safety Manager.

9.0 SITE CONTROL PLAN

The site control plan minimizes employee exposure to hazardous substances and includes the following.

9.1. Traffic or Vehicle Access Control Plans

The Site is bounded by West Marine View Drive to the east. Traffic related to construction vehicle including trucks and trailers entering and exiting the Site will be controlled by contractor with the help of signs, cones and/or flagger, as appropriate.

9.2. Site Work Zones

Site work zones include construction staging areas, soil stockpiling areas and remedial excavation areas. In general, hot zones/exclusion zones will be located around each excavation. Only persons with the appropriate training will enter this perimeter while work is being conducted there.

A contamination reduction zone will be established just outside the exclusion zone for the decontamination of sampling equipment. Care will be taken to prevent the spread of contamination. Equipment and personnel decontamination are discussed in the following sections, and the following types of equipment will be available to perform these activities:

- Scrub brushes;
- Spray rinse applicator;
- Plastic garbage bags; and
- Container of Alconox/water solution and Alconox powder.

Method of delineation/excluding non-site personnel

__X__ Fence

_____ Survey Tape

__X__ Traffic Cones

_____ Other

9.3. Buddy System

Personnel on-site should use the buddy system (pairs), particularly whenever communication is restricted. If only one GeoEngineers employee is on-site, a buddy system can be arranged with subcontractor/ contractor personnel.

9.4. Site Communication Plan

Positive communications (within sight and hearing distance or via radio) should be maintained between pairs on-site, with the pair remaining in proximity to assist each other in case of emergencies. The team should prearrange hand signals or other emergency signals for communication when voice communication becomes impaired (including cases of lack of radios or radio breakdown). In these instances, you should consider suspending work until communication can be restored; if not, the following are some examples for communication:

1. Hand gripping throat: Out of air, can't breathe.
2. Gripping partner's wrist or placing both hands around waist: Leave area immediately, no debate.
3. Hands on top of head: Need assistance.
4. Thumbs up: Okay, I'm all right: or I understand.

5. Thumbs down: No, negative.

9.5. Decontamination Procedures

Decontamination consists of removing outer protective Tyvek clothing and washing soiled boots and gloves using bucket and brush provided on-site in the contamination reduction zone. Inner gloves and respirator will then be removed, hands and face will be washed in either a portable wash station or a bathroom facility in the support zone. Employees will perform decontamination procedures and wash prior to eating, drinking or leaving the Site.

Sampling equipment will be decontaminated using wet decontamination procedures:

- Wash and scrub equipment with Alconox/Liquinox and tap water solution
- Rinse with tap water
- Rinse with distilled water
- Repeat entire procedure or any parts of the procedure as necessary.

In addition to wet decontamination procedures, other measures will be taken to prevent cross-contamination. These measures include changing out disposable gloves between each sampling location, using fresh paper towels at each sample location, and maintaining a clean work area. Downhole drilling equipment will be decontaminated using a hot-water, high-pressure washer. Decontamination water will be stored on-site in 55-gallon drums.

9.6. Waste Disposal or Storage

Used PPE to be placed in on-site drums pending characterization and disposal.

10.0 PERSONAL PROTECTIVE EQUIPMENT

PPE will consist of standard Level D equipment. Air monitoring will be conducted to determine the level of respiratory protection.

- Half-face combination organic vapor/high efficiency particulate air (HEPA) or P100 cartridge respirators will be available on-site to be used as necessary. P100 cartridges are to be used only if PID measurements are below the Site action limit. P100 cartridges are used for protection against dust, metals and asbestos, while the combination organic vapor/HEPA cartridges are protective against both dust and vapor. Ensure that the PID or TLV will detect the chemicals of concern on-site.
- Level D PPE unless a higher level of protection is required will be worn at all times on the Site. Potentially exposed personnel will wash gloves, hands, face and other pertinent items to prevent hand-to-mouth contact. This will be done prior to hand-to-mouth activities including eating, smoking, etc.
- Adequate personnel and equipment decontamination will be used to decrease potential ingestion and inhalation.

Check applicable personal protection gear to be used:

X	Hardhat (if overhead hazards, or client requests)
X	Steel-toed boots (if crushing hazards are a potential or if client requests)
X	Safety glasses (if dust, particles, or other hazards are present or client requests)
X	Hearing protection (if it is difficult to carry on a conversation 3 feet away)
X	Rubber boots (if wet conditions)
X	Life Jackets (for work near/over water)

Gloves (specify):

X	Nitrile
X	Latex
	Liners
	Leather

Protective clothing:

	Tyvek (if dry conditions are encountered, Tyvek is sufficient)
	Saranex (personnel shall use Saranex if liquids are handled or splash may be an issue)
X	Cotton
X	Rain gear (as needed)
X	Layered warm clothing (as needed)

Inhalation hazard protection:

X	Level D
	Level C (respirators with organic vapor/HEPA or P100 filters)

10.1. Personal Protective Equipment Inspections

PPE clothing ensembles designated for use during Site activities shall be selected to provide protection against known or anticipated hazards. However, no protective garment, glove, or boot is entirely chemical-resistant, nor does any PPE provide protection against all types of hazards. To obtain optimum performance from PPE, Site personnel shall be trained in the proper use and inspection of PPE. This training shall include the following:

- Inspect PPE before and during use for imperfect seams, non-uniform coatings, tears, poorly functioning closures or other defects. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Inspect PPE during use for visible signs of chemical permeation such as swelling, discoloration, stiffness, brittleness, cracks, tears or other signs of punctures. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Disposable PPE should not be reused after breaks unless it has been properly decontaminated.

10.2. Respirator Selection, Use and Maintenance

If respirators are required, Site personnel shall be trained before use on the proper use, maintenance and limitations of respirators. Additionally, they must be medically qualified to wear a respiratory protection in accordance with 29 CFR 1910.134. Site personnel who will use a tight-fitting respirator must have passed a qualitative or quantitative fit test conducted in accordance with an OSHA-accepted fit test protocol. Fit testing must be repeated annually or whenever a new type of respirator is used. Respirators will be stored in a protective container.

10.2.1. Respirator Cartridges

If Site personnel are required to wear air-purifying respirators, the appropriate cartridges shall be selected to protect personnel from known or anticipated Site contaminants. The respirator/cartridge combination shall be certified and approved by the National Institute for Occupational Safety and Health (NIOSH). A cartridge change-out schedule shall be developed based on known Site contaminants, anticipated contaminant concentrations and data supplied by the cartridge manufacturer related to the absorption capacity of the cartridge for specific contaminants. Site personnel shall be made aware of the cartridge change-out schedule prior to the initiation of Site activities. Site personnel shall also be instructed to change respirator cartridges if they detect increased resistance during inhalation or detect vapor breakthrough by smell, taste or feel, although breakthrough is not an acceptable method of determining the change-out schedule.

10.2.2. Respirator Inspection and Cleaning

The Site Safety and Health Supervisor shall periodically (weekly) inspect respirators at the project Site. Site personnel shall inspect respirators prior to each use in accordance with the manufacturer's instructions. In addition, Site personnel wearing a tight-fitting respirator shall perform a positive and negative pressure user seal check each time the respirator is donned, to ensure proper fit and function. User seal checks shall be performed in accordance with the GeoEngineers respiratory protection program or the respirator manufacturer's instructions.

10.2.3. Facial Hair and Corrective Lenses

Site personnel with facial hair that interferes with the sealing surface of a respirator shall not be permitted to wear respiratory protection or work in areas where respiratory protection is required. Normal eyeglasses cannot be worn under full-face respirators because the temple bars interfere with the sealing surface of the respirator. Site personnel requiring corrective lenses will be provided with spectacle inserts designed for use with full-face respirators. Contact lenses should not be worn with respiratory protection.

11.0 ADDITIONAL ELEMENTS

11.1. Cold Stress Prevention

Working in cold environments presents many hazards to Site personnel and can result in frost nip (superficial freezing of the skin), frost bite (deep tissue freezing), or hypothermia (lowering of the core body temperature).

The combination of wind and cold temperatures increases the degree of cold stress experienced by Site personnel. Site personnel shall be trained on the signs and symptoms of cold-related illnesses, how the human body adapts to cold environments, and how to prevent the onset of cold-related illnesses. Heated break areas and warm beverages shall be provided during periods of cold weather.

11.2. Heat Stress Prevention

State and federal OSHA regulations provide specific requirements for handling employee exposure to heat stress. GeoEngineers' program complies with these requirements and will be implemented in all areas where heat stress is identified as a potential health issue.

General requirements for preventing heat stress apply to outdoor work environments from May 1 through September 30, annually, only when employees are exposed to outdoor heat at or above an applicable temperature listed in the table below. To determine which temperature applies to each worksite, select the temperature associated with the general type of clothing or personal protective equipment (PPE) each employee is required to wear.

HEAT STRESS

Type of Clothing	Outdoor Temperature Action Levels (Degrees Fahrenheit)
Non-breathing clothes including vapor barrier clothing or PPE such as chemical resistant suits	52°
Double-layer woven clothes including coveralls, jackets and sweatshirts	77°
All other clothing	89°

Keeping workers hydrated in a hot outdoor environment requires that more water be provided than at other times of the year. GeoEngineers is prepared to supply at least one quart of drinking water per employee per hour. When employee exposure is at or above an applicable temperature listed in the table above, Project Managers shall ensure that:

- A sufficient quantity of drinking water is readily accessible to employees at all times; and
- All employees have the opportunity to drink at least one quart of drinking water per hour.

11.3. Emergency Response

- Personnel on-site should use the "buddy system" (pairs).
- Visual contact should be maintained between "pairs" on-site, with the team remaining in proximity to assist each other in case of emergencies.
- If any member of the field crew experiences any adverse exposure symptoms while on-site, the entire field crew should immediately halt work and act according to the instructions provided by the Site Safety and Health Supervisor.

- Wind indicators visible to all on-site personnel should be provided by the Site Safety and Health Supervisor to indicate possible routes for upwind escape. Alternatively, the Site Safety and Health Supervisor may ask on-site personnel to observe the wind direction periodically during Site activities.
- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team, contact of the PM, and reevaluation of the hazard and the level of protection required.
- If an accident occurs, the Site Safety and Health Supervisor and the injured person are to complete, within 24 hours, an Accident Report for submittal to the PM, the Health and Safety Program Manager and Human Resources. The PM should ensure that follow-up action is taken to correct the situation that caused the accident or exposure.

11.4. Personnel Medical Surveillance

GeoEngineers employees are not in a medical surveillance program because they do not fall into the category of "Employees Covered" in OSHA 1910.120(f)(2), which states a medical surveillance program is required for the following employees:

1. All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year.
2. All employees who wear a respirator for 30 days or more a year or as required by state and federal regulations.
3. All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation; and Members of HAZMAT teams.

11.5. Sampling, Managing and Handling Drums and Containers

Containers used during the Interim Action shall meet the appropriate Department of Transportation (DOT), OSHA and U.S. Environmental Protection Agency (EPA) regulations for the waste that they contain. Site operations shall be organized to minimize the amount of drum or container movement. When practicable, drums and containers shall be inspected and their integrity shall be ensured before they are moved. Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled. Before drums or containers are moved, all employees involved in the transfer operation shall be warned of the potential hazards associated with the contents.

Drums or containers and suitable quantities of proper absorbent shall be kept available and used where spills, leaks or rupture may occur. Where major spills may occur, a spill containment program shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred. Fire extinguishing equipment shall be on hand and ready for use to control incipient fires.

11.5.1. Spill Containment Plans (Drum and Container Handling)

Drums will be fitted with secure lids to limit the potential for spills. A spill containment plan will be prepared if required by the client.

11.6. Entry Procedures for Tanks or Vaults (Confined Spaces)

GeoEngineers employees shall not enter confined spaces to perform work unless they have been properly trained and with hands-on experience in the use of retrieval equipment. If a project requires confined space entry, please include a copy of the confined space permit and include the training documentation in this HASP.

Trenches greater than 4 feet in depth with the potential for buildup of a hazardous atmosphere are considered confined spaces.

11.7. Sanitation

If necessary, portable toilets will be provided during work activities.

11.8. Lighting

Field work will be generally conducted during daylight hours; artificial lighting is not anticipated to be necessary.

11.9. Excavation, Trenching and Shoring

All employees working on project sites where there is an excavation greater than 4 feet in depth shall be trained in excavation safety and shall utilize safe procedures. OSHA designates a 5-foot depth for instituting excavation safety procedures; however GeoEngineers will use the more conservative depth of 4 feet as specified by states such as Washington, Oregon and California. This program is for the protection of employees while working in excavations; however, employees should not enter excavations if there is an alternative.

GeoEngineers employees often do not have stop work authority on projects controlled by other contractors. However, any GeoEngineers employee, regardless of job title, working in the field will be responsible for contacting the Project Manager if they observe practices on the job Site that are serious safety violations that are not under their control. They will document the unsafe practices and will contact the Site safety coordinator as identified by the client. If no one is on-site, the Project Manager, once notified, will contact the client. This action establishes GeoEngineers' commitment to Site health and safety on all job Sites as our duty of care to the public, contractors and clients.

GeoEngineers is responsible for its subcontractors and will also be providing inspections and corrections of any work that subcontractors perform around excavations.

12.0 DOCUMENTATION TO BE COMPLETED FOR HAZWOPER PROJECTS

The following forms are required for Hazardous Waste Operations and Emergency Response (HAZWOPER) projects:

- Field Log
- Health and safety pre-entry briefing acknowledgment (Form B-1)
- Health and Safety Plan acknowledgment by GeoEngineers employees (Form B-2)
- Contractor's Health and Safety Plan Disclaimer (Form B-3)
- Conditional forms available at GeoEngineers office: Accident Report

The Field Log is to contain the following information:

- Updates on hazard assessments, field decisions, conversations with subcontractors, client or other parties, etc.;
- Air monitoring/calibration results, including: personnel, locations monitored, activity at the time of monitoring, etc.;
- Actions taken;
- Action level for upgrading PPE and rationale; and
- Meteorological conditions (temperature, wind direction, wind speed, humidity, rain, snow, etc.).

13.0 REFERENCES

Anchor QEA and SLR International Corp, 2011, "Draft Remedial Investigation and Feasibility Study, Former Bay Wood Products Site, Everett, Washington," dated April 2011.

GeoEngineers, Inc., 2012, "Draft Interim Action Work Plan, Bay Wood Products Site, Everett, Washington, Agreed Order No. DE 5490," GEI File No. 0676-021-01, dated July13, 2012.

Ecology, 2008, "Agreed Order No. DE 5490 for Remedial Investigation/Feasibility Study and Draft Cleanup Action Plan – Bay Wood Products Site, In the Matter of Remedial Action by: The Port of Everett," dated October 3, 2008.

14.0 APPROVALS

1. Plan Prepared	Signature	Date
2. Plan Approval	PM Signature	Date
3. Health & Safety Officer	Wayne Adams Health & Safety Program Manager	Date

FORM A-1
HEALTH AND SAFETY PRE-ENTRY BRIEFING
BAY WOOD PRODUCTS SITE INTERIM ACTION, EVERETT, WASHINGTON
FILE NO. 0676-021-01

Inform employees, contractors and subcontractors or their representatives about:

- The nature, level and degree of exposure to hazardous substances they're likely to encounter;
- All Site-related emergency response procedures; and
- Any identified potential fire, explosion, health, safety or other hazards.

Conduct briefings for employees, contractors and subcontractors, or their representatives as follows:

- A pre-entry briefing before any Site activity is started; and
- Additional briefings, as needed, to make sure that the Site-specific HASP is followed.

Make sure all employees working on the Site are informed of any risks identified and trained on how to protect themselves and other workers against the Site hazards and risks

Update all information to reflect current sight activities and hazards.

All personnel participating in this project must receive initial health and safety orientation. Thereafter, brief tailgate safety meetings will be held as deemed necessary by the Site Safety and Health Supervisor.

The orientation and the tailgate safety meetings shall include a discussion of emergency response, Site communications and Site hazards.

Company Employee

Date	Topics	Attendee	Name	Initials

FORM A-2
SITE SAFETY PLAN – GEOENGINEERS' EMPLOYEE ACKNOWLEDGMENT
BAY WOOD PRODUCTS SITE INTERIM ACTION, EVERETT, WASHINGTON
FILE NO. 0676-021-01

(All GeoEngineers' Site workers shall complete this form, which should remain attached to the Safety Plan and filed with other project documentation).

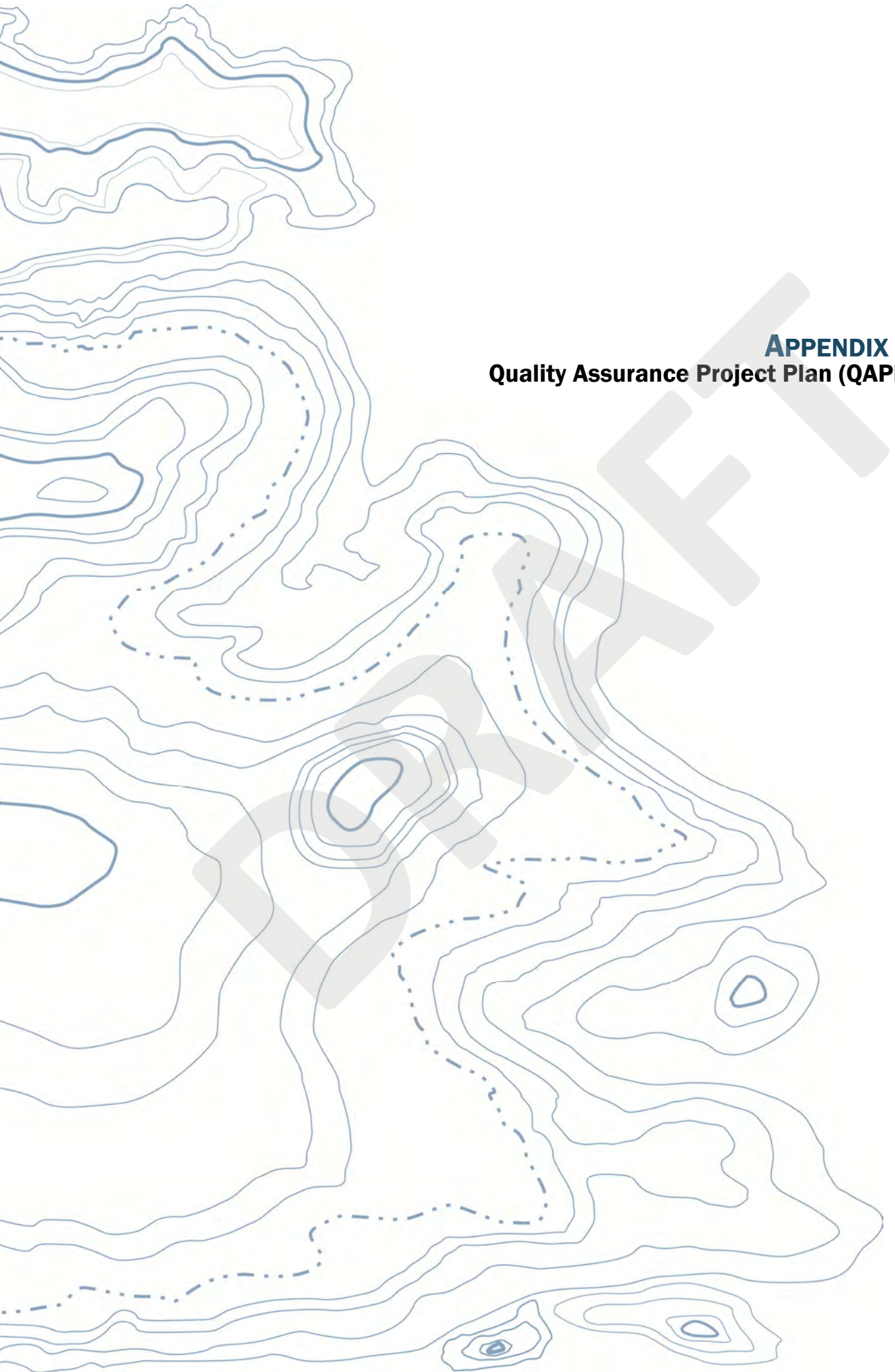
I hereby verify that a copy of the current Safety Plan has been provided by GeoEngineers, Inc., for my review and personal use. I have read the document completely and acknowledge an understanding of the safety procedures and protocol for my responsibilities on site. I agree to comply with all required, specified safety regulations and procedures.

Print Name	**Signature**	**Date**

FORM A-3
SUBCONTRACTOR AND SITE VISITOR SITE SAFETY FORM
BAY WOOD PRODUCTS SITE INTERIM ACTION, EVERETT, WASHINGTON
FILE NO. 0676-021-01

I verify that a copy of the current Site Safety Plan has been provided by GeoEngineers, Inc. to inform me of the hazardous substances on site and to provide safety procedures and protocols that will be used by GeoEngineers' staff at the Site. By signing below, I agree that the safety of my employees is the responsibility of the undersigned company.

Print Name	Signature	Firm	Date



APPENDIX C
Quality Assurance Project Plan (QAPP)

Quality Assurance Project Plan (QAPP)

Bay Wood Products Site Interim Action
Everett, Washington
Agreed Order No. DE 5490

for
Washington State Department of Ecology
on behalf of Port of Everett

July 20, 2012

GeoEngineers

Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

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LIST OF TABLES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been developed for the performance and compliance monitoring sampling and analysis activities to be performed for the Interim Action at the Port of Everett's (Port's) Bay Wood Products Site (Site), located at 200 West Marine View Drive in Everett, Washington. This QAPP serves as the primary guide for the integration of quality assurance (QA) and quality control (QC) functions into the performance and compliance monitoring sampling and analysis activities. The QAPP presents the objectives, procedures, organization, and specific QA and QC activities designed to achieve data quality goals established for the project. Environmental measurements will be conducted to produce data that are scientifically valid, of known and acceptable quality and that meet established objectives. QA/QC procedures will be implemented so that the precision, accuracy, representativeness, completeness and comparability (PARCC) of the data generated meet the specified data quality objectives.

The U.S. Environmental Protection Agency (EPA) defines quality assurance and quality control as follows:

> *"Quality assurance/quality control measures are those activities you undertake to demonstrate the accuracy (how close to the real result you are) and precision (how reproducible your results are) of your monitoring. Quality Assurance (QA) generally refers to a broad plan for maintaining quality in all aspects of a program. This plan should describe how you will undertake your monitoring effort: proper documentation of all your procedures, training of volunteers, study design, data management and analysis, and specific quality control measures. Quality Control (QC) consists of the steps you will take to determine the validity of specific sampling and analytical procedures."*

The Interim Action is being conducted by the Port in accordance with WAC 173-340-430 to address carcinogenic polycyclic aromatic hydrocodone (cPAH) contamination in soil piles located within the uplands portion of the Site. The objectives of the Interim Action are discussed in the Interim Action Work Plan (GeoEngineers, 2012). Sampling procedures are outlined in the Sampling and Analysis Plan (SAP) presented in Appendix A of the Interim Action Work Plan. A Site-specific Health and Safety Plan (HASP) will be used for field activities and is presented in Appendix B of the Interim Action Work Plan.

The QAPP has been prepared following the EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5), Guidance for Quality Assurance Project Plans (USEPA, 2002), EPAs Contract Laboratory Program (USEPA, 2004) and guidelines for Preparing Quality Assurance Project Plans for Environmental Studies (Ecology, 2004).

2.0 BACKGROUND

2.1. Problem Definition

Between 2005 and 2006, soil and sediment from construction of the Port's 14th Street bulkhead replacement project at the Everett Marina in Everett, Washington was placed at the Site. This

material was characterized in accordance with the Puget Sound Dredged Disposal Analysis (PSDDA) Program for suitability for open-water disposal, as documented in the Everett Marina PSDDA Sediment Characterization Report (Retec, 2005). The remedial investigation (RI) activities completed by the Port on the Site between 2009 and 2010 indicated the presence of carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) at concentrations greater than the Site-specific cleanup levels in the soil piled soil located within the uplands portion of the Site. The results of the RI activities are presented in the Former Bay Wood Products Site Draft Remedial Investigation/Feasibility Study (RI/FS; Anchor et al., 2011). To refine extent of these contaminated soil piles, interim soil sampling activities were completed in 2012 by SLR on behalf of the Port. Results of these sampling activities are documented in Interim Soil Sampling Summary Report (SLR, 2012).

The Interim Action is being conducted by the Port in accordance with WAC 173-340-430 to address contaminated soil piles located within the uplands portion of the Site.

2.2. Site Description

The Site is generally located in the northeastern portion of Port Gardner Bay near the mouth of the Snohomish River. The Site is comprised of three adjoining parcels (Parcel No. 29050700100300, 29050700100500, and 29050700101000) with a combined area (both upland and marine) of approximately 41.32 acres. The upland portion of the Site includes approximately 13 acres of land at elevations above the tidal mudflats. The northerly 100 feet of the Site (encompassing a total of 4.12 acres) are encumbered by an easement to the U.S. Army Corps of Engineers for dike maintenance. The Site is bounded to the north by the Snohomish River, to the east by West Marine View Drive and vacant land (Parcel No. 29050700100100) owned by Kimberly-Clark Worldwide, Inc., and to the south by the JELD-WEN site.

The upland portion of the Site is relatively flat, with a maximum elevation of approximately 18 feet above mean lower low water (MLLW). The southeastern and central areas of the upland area currently contain several piles of soil that were reportedly placed between 2005 and 2006. This material reportedly was generated from the Port's 14th Street bulkhead replacement project at the Everett Marina. The marine area of the Site consists primarily of tideland mudflats ranging in elevation from approximately 0 to 6 feet MLLW.

General Site features are shown on Figure 2 of the Interim Action Work Plan.

2.3. Site History

Prior to 1946 and ending in 1979, sawmill operations were completed at the Site. The sawmill was initially operated by Washington Wood Products, later known as Washington Timber Products, Ltd.

Prior to 1985, the sawmill was reportedly dismantled and the primary use of the Site transitioned to log handling, storage and processing until approximately 1994, when the Bay Wood Products' lease was discontinued. In 1995, the Port removed approximately 130,000 to 140,000 cubic yards of bark, rock, and wood chips from the northern two thirds of the uplands area. Wood debris, present as both surface and subsurface deposits, were encountered to depths reaching an elevation of approximately -4 feet MLLW. Removal of these deeper deposits involved construction of a dike around a portion of the uplands area. The diked area was later filled with approximately

200,000 cubic yards of dredge sediments from the Snohomish River to match the existing grades on the remaining portions of the Site. As part of the construction, the Bay Wood Products buildings were also removed from the Site. Following the removal of the Bay Wood Products building, the Site remained unoccupied and unused until 2005. As previously indicated, soil and sediment excavated as part of the Port's 14th Street bulkhead replacement project was transferred to the Site in 2005 and 2006. Since the placement of these soil piles, the physical condition of the Site has remained unchanged.

Detailed information describing the Site including its known history, current uses, existing property features, soil, groundwater and sediment conditions, and a summary of previous environmental investigations completed at the Site is presented in the Draft RI/FS (Anchor et al., 2011).

2.4. Project Description and Schedule

The Interim Action consists of excavation and off-site disposal of soil piles containing cPAHs at concentrations greater than cleanup levels, confirmational sampling, and grading and restoration activities.

Verification sampling and analyses will be performed and will involve collecting soil samples from base of the contaminated soil pile excavation to verify that the cleanup levels have been achieved and/or to document concentrations of contaminants remaining at the Site.

Selected samples will be submitted for chemical analysis to an Ecology-approved analytical laboratory for the following analysis:

- Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAH) by EPA Method 8270-SIM.

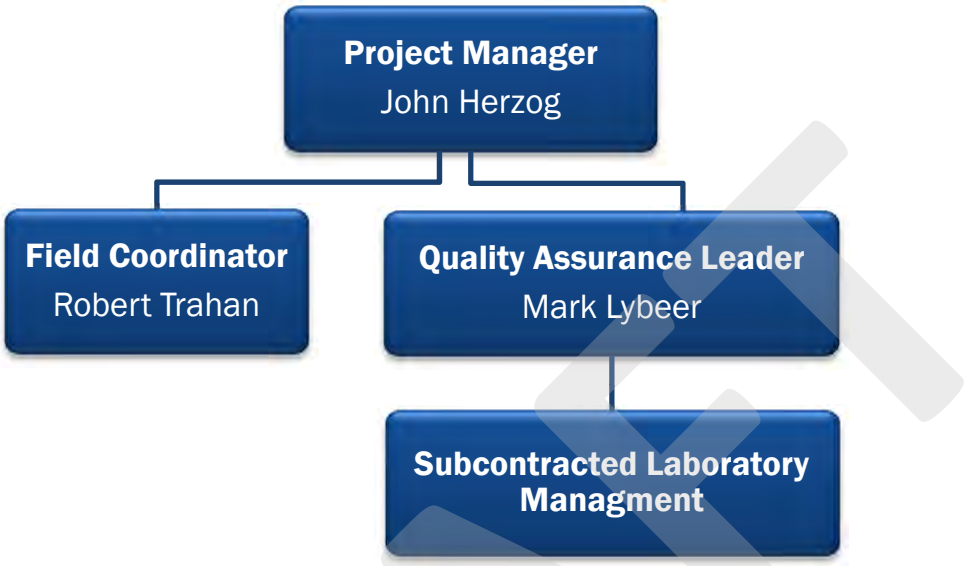
Pending Ecology approvals, Interim Action-related construction work is scheduled to begin in the fall of 2012.

3.0 PROJECT MANAGMENT

3.1. Project Organization and Responsibilities

Descriptions of the responsibilities, lines of authority and communication for the key positions providing quality assurance and quality control are shown in Figure 3-1. The project organization facilitates the efficient production of project work, allows for an independent quality review, and permits resolution of any QA issues.

Figure 3-1. Project Organization Chart



3.1.1. *Project Management*

The Project Manager has overall responsibility for executing the project in accordance with contractual requirements. The Project Manager is also responsible for selecting project team members, assigning and coordinating project tasks, determining subcontractor participation, establishing and adhering to budgets and schedules, providing technical oversight, and coordinating production and review of project deliverables.

For the Bay Wood Products Site Interim Action, John Herzog is the Project Manager and can be reached at (206) 406-6431.

3.1.2. *Field Coordinator*

The Field Coordinator is responsible for the daily management of activities in the field. Specific responsibilities include the following:

- Provides technical direction to the field staff.
- Coordinates data collection activities to be consistent with information requirements.
- Supervises the collection of field data and submittal of samples for laboratory analysis.
- Assures that field information is correctly and completely reported.
- Implements and oversees field sampling in accordance with project plans.
- Supervises field personnel.

- Coordinates work with on-site subcontractors.
- Schedules sample shipment with the analytical laboratory.
- Monitors that appropriate sampling, testing, and measurement procedures are followed.
- Coordinates the transfer of field data, sample tracking forms, and log books to the Project Manager for data reduction and validation.
- Participates in QA corrective actions as required.

For the Bay Wood Products Site Interim Action, Robert Trahan is the Field Coordinator and can be reached at (206) 240-2300.

3.1.3. *Quality Assurance Leader*

The QA Leader and is responsible for coordinating QA/QC activities as they relate to chemical analytical data. Specific responsibilities include the following:

- Serves as the official contact for laboratory data QA concerns.
- Reviews the implementation of the QAPP and the adequacy of the data generated from a quality perspective.
- Maintains the authority to implement corrective actions as necessary.
- Reviews and approves the laboratory QA Plan.
- Evaluates the laboratory's final QA report for any condition that adversely impacts data generation.
- Ensures that appropriate sampling, testing, and analysis procedures are followed and that correct quality control checks are implemented.
- Monitors laboratory compliance with data quality requirements.

For the Bay Wood Products Site Interim Action, Mark Lybeer is the QA Leader and can be reached at (206) 265-3665.

3.1.4. *Laboratory Management*

An Ecology-approved analytical laboratory will provide laboratory analytical services for the project. The approved laboratory will designate a Laboratory's QA Coordinator for the project.

The subcontracted laboratories conducting sample analyses for this project are required to obtain approval from the QA Leader before the initiation of sample analysis to assure that the laboratory QA plan complies with the project QA objectives. The Laboratory's QA Coordinator administers the Laboratory QA Plan and is responsible for QC. Specific responsibilities of this position include:

- Ensure implementation of the QA Plan.
- Serve as the laboratory point of contact.
- Activate corrective action for out-of-control events.
- Issue the final QA/QC report.

- Administer QA sample analysis.
- Comply with the specifications established in the project plans as related to laboratory services.
- Participate in QA audits and compliance inspections.

3.2. Health and Safety

A Site-specific health and safety plan (HASP) will be used for Interim Action field activities. A copy of the HASP is presented in Appendix C of the Interim Action Work Plan. The Field Coordinator will be responsible for implementing the HASP during sampling activities. The Project Manager will discuss health and safety issues with the Field Coordinator on a routine basis during the completion of field activities.

The Field Coordinator will terminate any work activities that do not comply with the HASP. Companies providing services for this project on a subcontracted basis will be responsible for developing and implementing their own HASP.

4.0 QUALITY OBJECTIVES AND CRITERIA

The quality assurance objective for technical data is to collect environmental monitoring data of known, acceptable, and documentable quality. The QA objectives established for the project are:

- Implement the procedures outlined herein for field sampling, sample custody, equipment operation and calibration, laboratory analysis, and data reporting that will facilitate consistency and thoroughness of data generated.
- Achieve the acceptable level of confidence and quality required so that data generated are scientifically valid and of known and documented quality. This will be performed by establishing criteria for precision, accuracy, representativeness, completeness, and comparability, and by testing data against these criteria.

The sampling design, field procedures, laboratory procedures, and QC procedures are set up to provide high-quality data for use in this project. Specific data quality factors that may affect data usability include quantitative factors (bias, detection limits, precision, accuracy and completeness) and qualitative factors (representativeness and comparability). The measurement quality objectives (MQO) associated with the data quality factors are summarized in Table C-1 and are discussed below.

4.1. Detection Limits

Analytical methods have quantitative limitations at a given statistical level of confidence that are often expressed as the method detection limit (MDL). Although results reported near the MDL provide insight to Site conditions, quality assurance dictates that analytical methods achieve a consistently reliable level of detection known as the practical quantitation limit (PQL), which is typically demonstrated with the lowest point of a linear calibration. The contract laboratory will provide numerical results for all analytes and report them as detected above the PQL or undetected at the PQL.

The reporting limits for Site Chemicals of Potential Concern (COPCs) in soil are presented in Table C-2. These reporting limits were obtained from an Ecology-certified laboratory. The reporting limits presented in Table C-2 are the laboratory PQLs that are considered target reporting limits (TRLs) because several factors may influence final reporting limits. First, moisture and other physical conditions of soil affect detection limits. Second, analytical procedures may require sample dilutions or other practices to accurately quantify a particular analyte at concentrations above the range of the instrument. The effect is that other analytes could be reported as undetected but at a value higher than a specified TRL. Data users must be aware that high non-detect values, although correctly reported, can bias statistical summaries and careful interpretation is required to correctly characterize Site conditions.

4.2. Precision

Precision is the measure of mutual agreement among replicate or duplicate measurements of an analyte from the same sample and applies to field duplicate or split samples, replicate analyses, and duplicate spiked environmental samples (matrix spike duplicates). The closer the measured values are to each other, the more precise the measurement process. Precision error may affect data usefulness. Good precision is indicative of relative consistency and comparability between different samples. Precision will be expressed as the relative percent difference (RPD) for spike sample comparisons of various matrices and field duplicate comparisons for soil/sediment and water samples. This value is calculated by:

$$RPD\,(\%) = \frac{|D_1 - D_2|}{(D_1 + D_2)/2} X\ 100,$$

Where

D_1 = Concentration of analyte in sample.

D_2 = Concentration of analyte in duplicate sample.

The calculation applies to split samples, replicate analyses, duplicate spiked environmental samples (matrix spike duplicates), and laboratory control duplicates. The RPD will be calculated for samples and compared to the applicable criteria. Precision can also be expressed as the percent difference (%D) between replicate analyses. Persons performing the evaluation must review one or more pertinent documents (USEPA, 2004) that address criteria exceedances and courses of action. Project RPD goals for all analyses are 35 percent for water samples and 50 percent for soil/sediment samples, unless the primary and duplicate sample results are less than 5 times the MRL, in which case RPD goals will not apply for data quality assessment purposes.

4.3. Accuracy

Accuracy is a measure of bias in the analytic process. The closer the measurement value is to the true value, the greater the accuracy. This measure is defined as the difference between the reported values versus the actual value and is often measured with the addition of a known compound to a sample. The amount of known compound reported in the sample, or percent recovery, assists in determining the performance of the analytical system in correctly quantifying

the compounds of interest. Since most environmental data collected represent one point spatially and temporally rather than an average of values, accuracy plays a greater role than precision in assessing the results. In general, if the percent recovery is low, non-detect results may indicate that compounds of interest are not present when in fact these compounds are present. Detected compounds may be biased low or reported at a value less than actual environmental conditions. The reverse is true when recoveries are high. Non-detect values are considered accurate while detected results may be higher than the true value.

For this project, accuracy will be expressed as the percent recovery of a known surrogate spike, matrix spike, or laboratory control sample (blank spike), concentration:

$$Recovery\,(\%) = \frac{Spiked\ Result - Unspiked\ Result}{Known\ Spike\ Concentration}\ X\ 100$$

Persons performing the evaluation must review one or more pertinent documents (USEPA, 1999; USEPA, 2004) that address criteria exceedances and courses of action. Accuracy criteria for surrogate spikes, matrix spikes, and laboratory control spikes are found in Table C-1 of this QAPP.

4.4. Representativeness

Representativeness expresses the degree to which data accurately and precisely represent the actual Site conditions. The determination of the representativeness of the data will be performed by completing the following:

- Comparing actual sampling procedures to those delineated within the SAP and this QAPP.
- Comparing analytical results of field duplicates to determine the variations in the analytical results.
- Invalidating non-representative data or identifying data to be classified as questionable or qualitative.

Only representative data will be used in subsequent data reduction, validation, and reporting activities.

4.5. Completeness

Completeness establishes whether a sufficient amount of valid measurements were obtained to meet project objectives. The number of samples and results expected establishes the comparative basis for completeness. Completeness goals are 90 percent useable data for samples/analyses planned. If the completeness goal is not achieved an evaluation will be made to determine if the data are adequate to meet study objectives.

$$Completeness = \frac{number\ of\ valid\ measurements}{total\ number\ of\ data\ points\ planned}\ x\ 100$$

4.6. Comparability

Comparability expresses the confidence with which one set of data can be compared to another. Although numeric goals do not exist for comparability, a statement on comparability will be prepared to determine overall usefulness of data sets, following the determination of both precision and accuracy.

4.7. Holding Times

Holding times are defined as the time between sample collection and extraction, sample collection and analysis, or sample extraction and analysis. Some analytical methods specify a holding time for analysis only. For many methods, holding times may be extended by sample preservation techniques in the field. If a sample exceeds a holding time, then the results may be biased low. For example, if the extraction holding time for volatile analysis of soil sample is exceeded, then the possibility exists that some of the organic constituents may have volatilized from the sample or degraded. Results for that analysis would be qualified as estimated to indicate that the reported results may be lower than actual Site conditions. Holding times are presented in Table C-3.

4.8. Blanks

According to the *National Functional Guidelines for Organic Data Review* (USEPA, 2008), "The purpose of laboratory (or field) blank analysis is to determine the existence and magnitude of contamination resulting from laboratory (or field) activities. The criteria for evaluation of blanks apply to any blank associated with the samples (e.g., method blanks, instrument blanks, trip blanks, and equipment blanks)."

Trip blanks are not planned because volatile compounds are not expected to be present. Method blanks are created during sample preparation and follow samples throughout the analysis process. Analytical results for method blanks will be interpreted in general accordance with National Functional Guidelines for Organic Data Review (USEPA, 2008) and professional judgment.

4.9. Special Training Requirements/Certification

The Superfund Amendments and Reauthorization Act of 1986 required the Secretary of Labor to issue regulations providing health and safety standards and guidelines for workers engaged in hazardous waste operations. Occupational Safety and Health Administration (OSHA) regulations (29 CFR 1910.120) require training to provide employees with the knowledge and skills necessary to enable them to perform their jobs safely and with minimum risk to their personal health. All sampling personnel will have completed the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training course and 8-hour refresher courses, as necessary, to meet OSHA regulations.

5.0 DOCUMENTATION AND RECORDS

5.1. Field observations

Field documentation provides important information about potential problems or special circumstances surrounding sample collection. Field personnel will maintain daily field logs. The field logs will be prepared on field report forms or in a bound logbook. Entries in the field logs and

associated sample documentation forms will be made in waterproof ink, and corrections will consist of line-out deletions that are initialed and dated. Individual logbooks will become part of the project files at the conclusion of the field work.

At a minimum, the following information will be recorded during the collection of each sample.

- Sample location and description;
- Site or sampling area sketch showing sample location and measured distances;
- Sampler's name(s)
- Date and time of sample collection;
- Designation of sample as composite or discrete;
- Sample matrix (soil/sediment or water);
- Type of sampling equipment used;
- Field instrument (e.g., PID) readings (if applicable);
- Field observations and details that are pertinent to the integrity/condition of the samples (e.g., weather conditions, performance of the sampling equipment, sample depth control, sample disturbance, etc.);
- Preliminary sample descriptions (e.g., lithologies, field screening results);
- Sample preservation;
- Sample transport/shipping arrangements; and
- Name of recipient laboratory.

In addition to the sampling information, the following specific information also will be recorded in the field log for each day of sampling.

- Sampling team members;
- Time of arrival/entry on Site and time of Site departure;
- Other personnel present at the Site;
- Summary of pertinent meetings or discussions with regulatory agency or contractor personnel;
- Deviations from sampling plans, QAPP procedures, and HASP;
- Changes in field personnel and responsibilities with reasons for the changes;
- Levels of safety protection; and
- Calibration readings for any field instruments used.

The handling, use, and maintenance of field log books are the Field Coordinator's responsibility.

5.2. Analytical chemistry records

Laboratories will be responsible for internal checks on data reporting and will correct errors identified during the QA review. All laboratories must be accredited by Ecology for the required analytical methods. Close contact will be maintained with the laboratories to resolve any quality control problems in a timely manner. The laboratories will be required to provide the following:

- **Project narrative –** This summary, in the form of a cover letter, will present any problems encountered during any aspect of analysis. The summary will include, but not be limited to, a discussion of QC, sample shipment, sample storage, and analytical difficulties. Any problems encountered by the laboratory, and their resolutions, will be documented in the project narrative.
- **Records –** Legible copies of the chain-of-custody (COC) forms will be provided as part of the data package. This documentation will include the time of receipt and the condition of each sample received by the laboratory. Additional internal tracking of sample custody by the laboratory will also be documented.
- **Sample results –** The data package will summarize the results for each sample analyzed. The summary will include the following information, as applicable:
    - Field sample identification code and the corresponding laboratory identification code
    - Sample matrix
    - Date of sample extraction/digestion
    - Date and time of analysis
    - Weight and/or volume used for analysis
    - Final dilution volumes or concentration factor for the sample
    - Total solids in the samples
    - Identification of the instruments used for analysis
    - MDLs and RLs
    - All data qualifiers and their definitions
- **QA/QC summaries –** These summaries will contain the results of all QA/QC procedures. Each QA/QC sample analysis will be documented with the same information as that required for the sample results (see above). The laboratory will make no recovery or blank corrections. The required summaries are listed below.
    - The calibration data summary will contain the concentrations of the initial calibration and daily calibration standards and the date and time of analysis. The response factor, percent standard deviation (%RSD), RPDs, and retention time for each analyte will be listed, as appropriate. Results for standards analyzed at the RL to determine instrument sensitivity will be reported.
    - The internal standard area summary will report the internal standard areas, as appropriate.
    - The method blank analysis summary will report the method blank analysis associated with each sample and the concentrations of all compounds of interest identified in these blanks.

- The surrogate spike recovery summary will report all surrogate spike recovery data for organic analyses. The names and concentrations of all compounds added, percent recoveries, and QC limits will be listed.
- The matrix spike (MS) recovery summary will report the MS or MS duplicate (MSD) recovery data for analyses, as appropriate. The names and concentrations of all compounds added, percent recoveries, and QC limits will be included in the data package. The RPD for all MS/MSD analyses will be reported.
- The laboratory replicate summary will report the RPD for all laboratory replicate analyses. The QC limits for each compound or analyte will be listed.
- The laboratory control sample (LCS) analysis summary will report the results of the analyses of the LCS. The QC limits for each compound or analyte will be included in the data package.
- The relative retention time summary will report the relative retention times for the primary and confirmational columns of each analyte detected in the samples, as appropriate.

EQuIS four-file format electronic data deliverables will be obtained from the laboratory and data will be submitted into Ecology's Environmental Information Management (EIM) system after data quality assessments are completed.

5.3. Data reduction

Data reduction is the process by which original data are converted or reduced to a specified format or unit to facilitate the analysis of the data. For example, a final analytical concentration may need to be calculated from a diluted sample result. Data reduction requires that all aspects of sample preparation that could affect the test result, such as sample volume analyzed or dilutions required, be taken into account in the final result. The laboratory personnel will reduce the analytical data for review by the Quality Assurance Leader and Project Manager.

During chemical analysis, samples are occasionally diluted after the initial analysis if the estimated concentration curve for one or more of the target analytes is above the calibration curve. In these instances, concentrations from the initial analysis will be identified as the "best result" for all target analytes other than the chemical(s) that was originally above the calibration range. The "best result" for this qualified analyte(s) will be taken from the diluted sample.

6.0 DATA GENERATION AND ACQUISITION

6.1. Sample Process Design

As described in the Interim Action Work Plan, soil sampling activities will involve collecting verification soil samples from base of the contaminated soil pile excavation to verify that the cleanup levels have been achieved and/or to document concentrations of contaminants remaining at the Site. Soil sampling will be conducted by GeoEngineers' field personnel. Table C-2 summarizes the chemical analyses to be performed for soil samples. Verification sample procedures and sample frequencies are described in Section 3.1 of the Sampling and Analyses Plan (Appendix B of the Interim Action Work Plan).

6.2. Sample Methods

6.2.1. *Sampling Equipment and Decontamination Procedures*

Reusable sampling equipment that comes in contact with soil will be decontaminated before each use. Decontamination procedures for this equipment will consist of the following:

1. Washing with a brush and non-phosphate detergent solution (e.g., Liqui-Nox and distilled water),
2. Rinsing with distilled water, and
3. Wrapping or covering the decontaminated equipment with aluminum foil. Field personnel will limit cross-contamination by changing gloves between sampling locations.

Wash water used to decontaminate the reusable sampling equipment will be collected and stored on-site in 55-gallon drums.

6.2.2. *Field Screening Procedures*

Field screening procedures are described in Sampling and Analyses Plan (Appendix B of the Interim Action Work Plan).

6.2.3. *Sample Containers and Labeling*

The Field Coordinator will establish field protocol to manage field sample collection, handling, and documentation. Soil, sediment, and groundwater samples will be placed in appropriate laboratory-prepared containers. Sample containers are listed in Table C-3.

Sample containers will be labeled with the following information at the time of sample collection:

- Project name and number
- Type of sample preservative used (where applicable)
- Sample name, which will include a reference to date and sampling depth (if applicable)
- Date and time of collection

The sample collection activities will be noted in the field log books. The Field Coordinator will monitor consistency between sample containers/labels, field log books, and chain-of-custody (COC) forms.

6.3. Sample Handling and Custody

6.3.1. *Sample Storage*

Samples will be placed in a cooler with ice after they are collected. The objective of the cold storage will be to attain a sample temperature of 2 to 6 degrees Celsius. Holding times (Table C-3) will be observed during sample storage.

6.3.2. *Sample Shipment*

Samples will be transported and delivered to the analytical laboratory in the sample coolers. The samples will either be transported by field personnel, laboratory personnel, or by courier service. The Field Coordinator will ensure that the cooler has been properly secured using clear plastic tape and custody seals.

6.3.3. *Chain-of-Custody Records*

Field personnel are responsible for the security of samples from the time the samples are collected until the samples have been received by the courier service or laboratory personnel. A COC form will be completed for each group of samples being shipped to the laboratory. Information to be included on the COC form includes:

- Project name and number;
- Sample identification numbers;
- Date and time of sampling;
- Sample matrix (soil/sediment and groundwater), preservative, and number of containers for each sample;
- Analyses to be performed;
- Names of sampling personnel;
- Project manager name and contact information including phone number; and
- Shipping information including shipping container number, if applicable.

The original COC form will be signed by a member of the field team. Field personnel will retain copies and place the original and remaining copies in a plastic bag. The plastic bag containing the COC form will be placed in the cooler before sealing the cooler for transport to the laboratory.

6.3.4. *Laboratory Custody Procedures*

The laboratory will follow their standard operating procedures (SOPs) to document sample handling from time of receipt (sample log-in) to reporting. Documentation will include, at a minimum, the analyst's name or initials, time, and date.

6.4. Analytical Methods

The methods of chemical analysis are identified in Table C-2. The laboratory project manager will determine the remedy to be used if the project RLs cannot be attained, in consultation with GeoEngineers Quality Assurance Leader.

6.5. Quality Control

Table C-4 summarizes the types and frequency of QC samples to be analyzed, including both field QC and laboratory QC samples.

6.5.1. *Field Quality Control*

Field QC samples serve as a control and check mechanism to monitor the consistency of field sampling methods and the potential influence of off-site factors on project samples. Table C-4 summarizes the types and frequency of field QC samples to be analyzed and the following sections discuss field QC samples.

6.5.1.1. FIELD DUPLICATES

Field duplicates serve as a measure for precision. Under ideal field conditions, field duplicates (sometimes referred to as splits), are created by thoroughly mixing a volume of the sample matrix, placing aliquots of the mixed sample in separate containers, and identifying one of the aliquots as the primary sample and the other as the duplicate sample. Field duplicates measure the precision and consistency of laboratory analytical procedures and methods, as well as the consistency of the sampling techniques used by field personnel.

One field duplicate will be collected for every ten soil sample collected.

6.5.1.2. TRIP BLANKS

Trip blanks are not planned because volatile compounds have not been detected at the Site and are not expected to be present.

6.5.1.3. EQUIPMENT RINSATE BLANKS

Equipment rinsate blanks will be used to evaluate the effectiveness of decontamination procedures for preventing possible cross-contamination of project samples. Rinsate samples will be collected by slowly pouring distilled water over decontaminated sampling equipment and collecting the rinse water in appropriate sample containers for analysis.

Equipment rinsate blank will be collected only if reusable are used for sampling. A minimum of one equipment rinsate blank will be collected for every 20 soil samples collected using reusable equipment.

6.5.2. *Laboratory Quality Control*

Laboratory QC procedures will be evaluated through a formal data quality assessment process. The analytical laboratory will follow standard analytical method procedures that include specified QC monitoring requirements. These requirements will vary by method, but generally include:

- Method blanks
- Internal standards
- Instrument calibrations
- Matrix spike/matrix spike duplicates (MS/MSD)
- Laboratory control samples/laboratory control sample duplicates (LCS/LCSD)
- Laboratory replicates or duplicates
- Surrogate/Labeled compounds

6.5.2.1. LABORATORY BLANKS

Laboratory procedures utilize several types of blanks, but the most commonly used blanks for QC monitoring are method blanks. Method blanks are laboratory QC samples that consist of either a soil-like material having undergone a contaminant destruction process, or reagent (contaminant-free) water. Method blanks are extracted and analyzed with each batch of environmental samples undergoing analysis. If a substance is detected in a method blank, then one (or more) of the following occurred:

- Sample containers, measurement equipment, and/or analytical instruments were not properly cleaned and contained contaminants.
- Reagents used in the process were contaminated with a substance(s) of interest.

It is difficult to determine which of the above scenarios took place if blank contamination occurs. However, it is assumed that the conditions that affected the blanks also likely affected the project samples. If target analytes are detected in method blanks, data validation guidelines assist in determining which substances in project samples are considered "real," and which ones are attributable to the analytical process. Furthermore, the guidelines state, ". . . there may be instances where little or no contamination was present in the associated blank, but qualification of the sample is deemed necessary. Contamination introduced through dilution water is one example."

6.5.2.2. CALIBRATIONS

Several types of instrument calibrations are used, depending on the analytical method, to assess the linearity of the calibration curve and assure that the sample results reflect accurate and precise measurements. The main calibrations used are initial calibrations, daily calibrations, and continuing calibration verification.

6.5.2.3. MATRIX SPIKE/MATRIX SPIKE DUPLICATES (MS/MSD)

MS/MSD samples are used to assess influences or interferences caused by the physical or chemical properties of the sample itself. For example, extreme pH can affect the results for semivolatile organic compounds. Or, the presence of a particular compound may interfere with accurate quantitation of another analyte. MS/MSD data is reviewed in combination with other QC monitoring data to determine matrix effects. In some cases, matrix effects cannot be determined due to dilution and/or high levels of related substances in the sample. A matrix spike is evaluated by spiking a project sample with a known amount of one or more of the target analytes, ideally at a concentration that is 5 to 10 times higher than the sample result. A percent recovery is then calculated by subtracting the un-spiked sample result from the spiked sample result, dividing by the known concentration of the spike, and multiplying by 100.

MS/MSD samples will be analyzed at a frequency of one MS/MSD per analytical batch. The samples for the MS/MSD analyses should be collected from a boring or sampling location that is believed to have only low-level contamination. A sample from an area of low-level contamination is needed because the objective of MS/MSD analyses is to determine the presence of matrix interferences, which can best be achieved with low levels of contaminants. Additional sample volume will be collected for the MS/MSD analyses as required by the laboratory.

6.5.2.4. LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATES (LCS/LCSD)

Also known as blanks spikes, laboratory control samples (LCS) are similar to MS samples in that a known amount of one or more of the target analytes are spiked into a prepared sample medium, and a percent recovery of the spiked substances is calculated. The primary difference between LCS and MS samples is that the LCS uses a contaminant-free sample medium. For example, reagent water is typically used for LCS water analyses. The purpose of an LCS is to help assess the overall accuracy and precision of the analytical process including sample preparation, instrument performance, and analyst performance.

6.5.2.5. LABORATORY REPLICATES/DUPLICATES

Laboratories utilize MS/MSDs, LCS/LCSDs, and/or replicates to assess precision. Replicates are a second analysis of a field-collected environmental sample. Replicates can be split at varying stages of the sample preparation and analysis process and most commonly consist of a second analysis on the extracted media.

6.5.2.6. SURROGATES/LABELED COMPOUNDS

Surrogate spikes are used to verify proper extraction procedures and the accuracy of the analytical instrument. Surrogates are substances with characteristics similar to the target analytes. A known concentration of surrogate is added to the project sample and passed through the instrument and the percent recovery is calculated. Each surrogate used has acceptance limits (i.e., an acceptable range) for percent recovery. If a surrogate recovery is low, sample results may be biased low and depending on the recovery value, a possibility of false negatives may exist. Conversely, when recoveries are above the specified acceptance limits, a possibility of false positives exist, although non-detect results are considered accurate.

6.6. Instrument Testing, Inspection and Maintenance

The field coordinator will be responsible for overseeing the testing, inspection, and maintenance of all field equipment. The laboratory project manager will be responsible for laboratory equipment testing, inspection, and maintenance requirements. The calibration methods used in calibrating the analytical instrumentation are described in the following section.

6.7. Instrument Calibration and Frequency

6.7.1. *Field Instrumentation*

Field instrument calibration and calibration checks facilitate accurate and reliable field measurements. The calibration of field instruments used on the project will be checked and adjusted as necessary in general accordance with the manufacturer's recommendations. Methods and intervals of calibration checks and instrument maintenance will be based on the type of instrument, stability characteristics, required accuracy, intended use, and environmental conditions. The basic calibration check frequencies are described below.

The calibration of the PID used for headspace vapor screening will be checked at the start of each day it is used. If necessary (based on the calibration check results), the instrument will be calibrated in general accordance with the manufacturer's specifications. Calibration check and calibration results will be recorded in the field logbook.

6.7.2. *Laboratory Instrumentation*

For chemical analytical testing, calibration procedures will be performed in general accordance with the analytical methods used and the laboratory's SOPs. Calibration documentation will be retained at the laboratory.

All instrument calibrations and their appropriate chemical standards are to comply with the specific methods within EPA SW-846, Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, 3rd Edition, December 1996 and the Laboratory SOPs. Calibration documentation, initial (ICALs) and continuing (CCALs), will be retained at the Laboratory.

6.8. Inspection of Supplies and Consumables

Supplies and consumables for the field sampling effort will be inspected upon delivery and accepted if the condition of the supplies is satisfactory. For example, jars will be inspected to ensure that they are the correct size and quantity and were not damaged in shipment.

6.9. Data Management

Laboratories will report data in formatted hardcopy and digital formats. Analytical laboratory measurements will be recorded in standard formats that display, at a minimum, the field sample identification, the laboratory identification, reporting units, data qualifiers, analytical method, analyte tested, analytical result, extraction and analysis dates, and quantitation limits. Each sample delivery group will be accompanied by sample receipt forms and a case narrative identifying data quality issues. Laboratory electronic data deliverable (EDD) requirements will be established by GeoEngineers, Inc. with the contract laboratory. The laboratory will send final analytical testing results to the Project Manager.

7.0 ASSESSMENT AND OVERSIGHT

7.1. Review of Field Documentation and Laboratory Receipt Information

Documentation of field sampling data will be reviewed periodically for conformance with project QC requirements described in this QAPP. At a minimum, field documentation will be checked for proper documentation of the following:

- Sample collection information (date, time, location, matrices, etc.);
- Field instruments used and calibration data;
- Sample collection protocol;
- Sample containers, preservation, and volume;
- Field QC samples collected at the frequency specified;
- COC protocols; and
- Sample shipment information.

Sample receipt forms provided by the laboratory will be reviewed for QC exceptions. The final laboratory data package will describe (in the case narrative) the effects that any identified QC

exceptions have on data quality. The laboratory will review transcribed sample collection and receipt information for correctness prior to delivering the final data package.

7.2. Response Actions for Field Sampling

The Field Coordinator, or a designee, will be responsible for correcting equipment malfunctions throughout the field sampling effort and resolving situations in the field that may result in nonconformance or noncompliance with the QAPP. All corrective measures will be documented in the field logbook.

7.3. Corrective Action for Laboratory Analyses

Laboratories are required to comply with their current written standard operating procedures. The laboratory project manager will be responsible for ensuring that appropriate corrective actions are initiated as required for conformance with this QAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data to the laboratory project manager. A narrative describing the anomaly, the steps taken to identify and correct it, and the treatment of the relevant sample batch (i.e., recalculation, reanalysis, re-extraction) will be submitted with the data package.

8.0 DATA VALIDATION AND USABILITY

8.1. Data Review, Verification and Validation

The data validation and usability elements of the QAPP as detailed below address the QA/QC activities that occur after data collection and/or data generation is complete. Implementation of these elements ensures that the data conform to the specified criteria and will achieve the project objectives

The data are not considered final until validated. All data, including laboratory and field QC sample results, will be summarized in a data validation report. The data validation report will focus on data that did not meet the MQOs specified in Table C-1. The data validation reports will be included as an appendix to the Construction Completion Report and the Confirmation Groundwater Monitoring Report. These reports will also describe any deviations from this QAPP and actions taken to address those deviations.

Level III laboratory data packages will be obtained for all soil samples. These data will be reviewed for the following QC parameters, as applicable:

- Holding times and sample preservation
- Method blanks
- MS/MSD analyses
- LCS/LCSD analyses
- Surrogate spikes
- Field/Lab duplicates

- Calibrations (Initial and Continuing)
- Internal Standards
- Instrument Tunes

In addition to these QC parameters, other documentation such as sample receipt forms and case narratives will be reviewed to evaluate laboratory QA/QC.

8.2. Verification and Validation Methods

Hard-copy laboratory reports will be method detection limit (MDL)-generated providing the analysis-specific information including final sample analytical results, reportable field and laboratory QA/QC analytical results, MDLs and MRLs. The laboratory data will also be reported via electronic media using the tabular outputting capabilities of standard software formats.

The term "reporting limit" will be used interchangeably with "quantitation limit" to mean the lowest concentration at which an analyte can be quantified subject to the quality control criteria of the analytical method. These terms are different from "MDL," which refers to the lowest concentration that the analytical method can ideally detect.

Data validation qualifiers including "U," "J,", and "R" will be used following the reported laboratory results to explain data quality issues affecting the laboratory data to the data user. These qualifiers are explained as follows:

- "U" indicates that a compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit, which is corrected for dilution and percent moisture.
- "J" indicates that a compound was detected below the reporting limit and the value is estimated or the value was estimated by the validator because the of instrument bias reasons.
- If any target analytes are found in a laboratory method blank, it will be regarded as blank contamination. In these cases, the result of a given analyte in the method blank will be compared to any positive result of the same analyte in the associated field samples. If a field sample result is less than five times (ten times for common laboratory contaminants like acetone, phthalates, etc.) the result that is reported in the method blank, the result will be considered blank contamination. Accordingly, the result will be qualified as not-detected "U" at the elevated reporting limit.
- If there are two analyses reported by the laboratory for one sample (as in the case of dilutions), the validator will make a decision as to which analysis to use in the final assessment. As there should be only one reported result per analyte for a given sample, any extraneous results will be qualified as not-reportable "R" and will not be used.

8.3. Reconciliation with User Requirements

A data quality assessment will be conducted by the project Quality Assessment Leader to identify cases where the projects MQOs were not met.

9.0 REFERENCES

Anchor QEA and SLR International Corp, 2011, "Draft Remedial Investigation and Feasibility Study, Former Bay Wood Products Site, Everett, Washington," dated April 2011.

GeoEngineers, Inc., 2012, "Draft Interim Action Work Plan, Bay Wood Products Site, Everett, Washington, Agreed Order No. DE 5490," GEI File No. 0676-021-01, dated July 13, 2012.

USEPA (U.S. Environmental Protection Agency), 2002, "Guidance for Quality Assurance Project Plans, EPA QA/R-5," EPA-240/R-02/009, Office of Emergency and Remedial Response, US Environmental Protection Agency, Washington, DC, dated December 2002.

USEPA, 2004, "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," EPA 540-R-04-004, Office of Emergency and Remedial Response, US Environmental Protection Agency, Washington, DC, dated October 2004.

USEPA, 2008, "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review," EPA-540-R-08-01. June 2008.

Ecology (Washington State Department of Ecology), 2004, "Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies," 04-03-030, dated July 2004.

Ecology, 2008, "Agreed Order No. DE 5490 for Remedial Investigation/Feasibility Study and Draft Cleanup Action Plan – Bay Wood Products Site, In the Matter of Remedial Action by: The Port of Everett," dated October 3, 2008.

Table C-1

Measurement Quality Objectives

Bay Wood Products Site
Everett, Washington

Laboratory Analysis	Reference Method	Soil				
		LCS %R Limits[1,2]	MS %R Limits[2]	SS %R Limits[1,2,3]	MS Duplicate or Lab Duplicate Samples RPD Limits[4]	Field Duplicate Samples RPD Limits[4]
PAHs	EPA 8270/SIM	42%-134%	35%-139%	33%-128%	≤26%	≤50%

Notes:

Method numbers refer to EPA SW-846 Analytical Methods or Washington State Department of Ecology (Ecology) recommended analytical methods.

[1]Recovery ranges are estimates. Actual ranges will be provided by the laboratory when contracted.

[2]Percent recovery limits are expressed as ranges based on laboratory control limits. Limits will vary for individual analytes.

[3]Individual surrogate recoveries are compound-specific

[4]RPD control limits are only applicable if the primary and duplicate sample concentrations are greater than 5 times the method reporting limit (MRL). For results less than 5 times the MRL, the difference between the primary and duplicate samples must be less than 2X the MRL for soils/solids.

PAHs = Polycyclic Aromatic Hydrocarbons

LCS = Laboratory control sample

MS = Matrix spike

SS = Surrogate standards

RPD = Relative percent difference

NA = Not applicable

Table C-2

Methods of Analysis and Target Reporting Limits for Soil Samples

Bay Wood Products Site
Everett, Washington

Analyte	Analytical Method	Practical Quantitation Limit (PQL)	Method Detection Limits (MDL)
PAHs (mg/kg)			
1-Methylnaphthalene	EPA 8270D-SIM	0.0067	0.000232
2-Methylnaphthalene	EPA 8270D-SIM	0.0067	0.000462
Acenaphthene	EPA 8270D-SIM	0.0067	0.000124
Acenaphthylene	EPA 8270D-SIM	0.0067	0.000252
Benzo[g,h,i]perylene	EPA 8270D-SIM	0.0067	0.000207
Fluoranthene	EPA 8270D-SIM	0.0067	0.000244
Fluorene	EPA 8270D-SIM	0.0067	0.000835
Naphthalene	EPA 8270D-SIM	0.0067	0.000407
Phenanthrene	EPA 8270D-SIM	0.0067	0.000172
Pyrene	EPA 8270D-SIM	0.0067	0.000163
Benzo[a]anthracene	EPA 8270D-SIM	0.0067	0.000184
Benzo[a]pyrene	EPA 8270D-SIM	0.0067	0.000131
Benzo[b]fluoranthene	EPA 8270D-SIM	0.0067	0.000221
Benzo[k]fluoranthene	EPA 8270D-SIM	0.0067	0.000172
Chrysene	EPA 8270D-SIM	0.0067	0.000179
Dibenz[a,h]anthracene	EPA 8270D-SIM	0.0067	0.000180
Indeno[1,2,3-c,d]pyrene	EPA 8270D-SIM	0.0067	0.000172

Notes:

EPA = U.S. Environmental Protection Agency
PAH = Polycyclic aromatic hydrocarbon
SIM = Selective ion monitoring
mg/kg = Milligrams per kilogram

Table C-3

Test Methods, Sample Containers, Preservation and Holding Times

Bay Wood Products Site
Everett, Washington

Analysis	Method	Soil			
		Minimum Sample Size	Sample Containers	Sample Preservation	Holding Times[1]
PAHs	EPA 8270/SIM	100 g	4 oz glass wide mouth with Teflon-lined lid	Cool 4°C	7 days to extraction, 40 days from extraction to analysis

Notes:

[1]Holding times are based on elapsed time from date of collection.
PAH = Polycyclic aromatic hydrocarbon
HCl = Hydrochloric acid
HNO_3 = Nitric acid
oz = Ounce
mL = Milliliter
L = Liter
g = Gram

Table C-4

Quality Control Samples - Type and Frequency

Bay Wood Products Site
Everett, Washington

Parameter	Field QC		Laboratory QC			
	Field Duplicates	Trip Blanks	Method Blanks	LCS	MS / MSD	Lab Duplicates
PAHs	1/10 soil samples	NA	1/batch	1/batch	1 set/batch	NA

Notes:

An analytical lot or batch is defined as a group of samples taken through a preparation procedure and sharing a method blank, LCS, and MS/MSD (or MS and lab duplicate). No more than 20 field samples can be contained in one batch.

QC = Quality control

LCS = Laboratory control sample

MS = Matrix spike sample

MSD = Matrix spike duplicate sample

PAH = Polycyclic aromatic hydrocarbon

ATTACHMENTS

ATTACHMENT 1
Interim Soil Sampling Summary Report

May 22, 2012

Erik Gerking
Environmental Cleanup Administrator
Port of Everett
P.O. Box 538
Everett, WA 98206

Re: Interim Soil Sampling Summary
Bay Wood Products Site, Everett, Washington

Dear Erik,

SLR has prepared the following report to summarize the findings of interim soil sampling activities performed at the Bay Wood Products site located at 200 West Marine View Drive in Everett, Washington (Site).

Background

The interim soil sampling activities were performed in general accordance with December 6, 2011 and March 16, 2012 amendments to the Port of Everett (Port) Bay Wood Products Site Final Remedial Investigation/Feasibility Study Work Plan (RI/FS Work Plan, SLR 2009). The purpose of the investigation was to perform additional upland soil sampling and testing to refine areas of contaminated soil stockpiles previously identified during the Site remedial investigation. Soil sampling from Geoprobe borings was also performed at two locations to supplement existing subsurface soil sampling results. The work is being conducted under an Agreed Order with Ecology (Agreed Order No.: DE 5490).

The material in the soil stockpiles was placed on the Site during an off-site bulkhead replacement construction project performed by the Port of Everett. The stockpile material consists of individual end dump piles generally grouped into "stockpile areas" around the property. In January 2012, GeoEngineers mapped the approximate extent of the stockpile groups using GPS. For the purposes of this investigation, the stockpiles groups have been labeled as stockpile SP-A through SP-R on the attached Figure 1. GeoEngineers estimated the approximate volume of material in each stockpile group based on the average height of the piles. The approximate volume of each pile, as estimated by GeoEngineers, is provided on Table 1.

In June 2009, fourteen composite soil samples were collected from the stockpile areas. The composite samples were composed of subsamples from the separate end-dump piles. These composite samples were submitted for analysis of priority pollutant metals (PPMETS) and polycyclic aromatic hydrocarbons (PAHs). Three samples were also analyzed for semi-volatile organic compounds (SVOCs), including PAHs. All of the composite samples contained one or more PAHs. The carcinogenic PAH (cPAH) toxicity equivalency quotients (TEQs) were greater than the preliminary cleanup level (PCL) of 0.140 milligrams per kilogram (mg/Kg) in two of the

fourteen stockpile soil composite samples, SP-EI-C (0.314 mg/Kg) and SP-M2-C (0.163 mg/Kg). With the exception of PAHs, no other SVOCs were identified above laboratory method detection limits. The metals arsenic, chromium, copper, lead, nickel, zinc, and mercury were identified in nearly all samples; however, none of these metals were identified at concentrations above PCLs presented in the Draft RI/FS report. Removal and off-site disposal of portions of the existing soil piles was proposed in the Draft RI/FS report based on these composite sampling results and the analysis in the FS.

SCOPE OF WORK

Stockpile Sampling - The initial approach to the interim stockpile sampling was to better define the extent of soil in the stockpile areas with cPAHs above PCLs (SP-M2-C and SP-E1-C) by collecting discrete soil samples around the areas of samples SP-E1-C and SP-M2-C. Analysis of these discrete samples was completed in three tiers, with the samples immediately around the composite locations completed first, and stepped-out sample analysis completed based on the Tier 1 results. The analysis completed on these discrete samples identified additional locations near the composite sample locations SP-E1-C and SP-M2-C with cPAH concentrations above the PCL.

Based on the findings of the tiered sampling, the scope of work was expanded to include additional sample collection and analysis from stockpile locations where little or no previous sampling had occurred. A grid pattern was overlain on the stockpiles to evenly distribute the sampling locations across the irregularly-shaped stockpile groups. The number of samples was selected to be roughly proportional to the estimated volume of individual stockpile groups, as well as the total volume of material stockpiled on-site. Table 6.9 in Ecology's *Guidance for the Remediation of Petroleum Contaminated Sites* recommends at least 10 samples, plus one sample for each additional 500 cubic yards of material, at sites with over 2,000 cubic yards of stockpiled material. The volume of stockpiled material at the Site was estimated by GeoEngineers to total approximately 8,400 cubic yards; therefore, under Ecology's guidance, at least 23 samples would be recommended to characterize the stockpiled material. Following the initial tiered sampling approach and subsequent "grid" sampling, a total of 68 discreet samples were collected from the stockpiled material and submitted for laboratory analysis.

The samples were collected from approximately 6-inches to 1-foot below the top surface of the existing stockpile in the areas shown on Figure 1. Soil sampling locations were marked in the field with a stake displaying the sample number. Soil sampling equipment was decontaminated between each sample location using the procedures described in the Sampling and Analysis Plan (SAP). The soil samples were submitted to Analytical Resources, Inc. (ARI), an Ecology-accredited laboratory (Accreditation Number C1235), for analysis of PAHs by EPA Method 8270-SIM.

Geoprobe Sampling – The scope of work for this investigation included collecting soil samples below the approximately three feet of fill material that was placed across the Site, and above the six foot depth that is the conditional point of compliance for terrestrial ecological receptors per WAC 173-340-7490(4). Subsurface soil samples were collected immediately adjacent to the former remedial investigation boring locations PB-3C and PB-5A. The subsurface soil samples were collected using a truck-mounted Geoprobe direct push drill rig. The borings were

advanced to six feet below ground surface (bgs). Samples were initially proposed from depths of between 3.75 feet bgs to 4.75 feet bgs in the borings; however, field-evidence of impact was observed at approximately 5.5 to 6 feet bgs in soil boring PB-3CR, therefore an additional soil sample was collected from this depth. Soil samples were collected from the disposable acetate liner of the Geoprobe and placed directly into laboratory-provided sample containers. The soil samples were submitted to ARI for laboratory analysis for total petroleum hydrocarbons (TPH) in the diesel range (TPH-Dx) using NWTPH methods and PCBs using EPA Method 8082.

Analytical Results Summary

Stockpile Sampling - A summary of the laboratory analytical results, shown in groups by stockpile area, are presented in Table 1. Toxicity equivalency factors (TEFs) were used to calculate a TEQ for total cPAHs relative to reference chemical benzo(a)pyrene in accordance with WAC 173-340-708(8)(e). Laboratory analytical results were compared to a PCL for cPAHs of 0.140 mg/Kg.

Of the 16 soil stockpiles areas that were sampled, nine had at least one sample with a cPAHs TEQ above the PCL. Sampled soil stockpiles SP-D, SP-G, SP-I, SP-J, SP-L, SP-N and SP-P did not exhibit cPAH TEQs above the PCL. A rough grid system was used to delineate areas of the stockpile groups with cPAH concentrations exceeding PCLs. Figure 2 shows the grid areas where cPAHs were identified above PCLs. Copies of the analytical reports have been included as Appendix A.

Geoprobe Sampling - A summary of the laboratory analytical results from the Geoprobe sampling locations are presented on Table 2. TPH in the diesel and heavy oil range was identified at concentrations of 690 mg/Kg and 550 mg/Kg, respectively, in the soil sample from boring PB-3CR at a depth of 5.5 to 6 feet bgs. These concentrations exceeded the PCL of 460 mg/Kg. Concentrations of TPH in soil from boring PB-3CR at 3.5 to 4 feet bgs and boring PB-5AR at 3.75 to 4 feet bgs were below the PCLs. No PCBs at concentrations above laboratory method reporting limits were identified in any of the three samples submitted for laboratory analysis.

Please feel free to contact us with any questions.

Sincerely,
SLR International Corp

Megan S. Coracci
Senior Scientist

R. Scott Miller
Principal Engineer

Attachments: Figure 1 – Soil Stockpile Sampling Locations
Figure 2 – Stockpile Areas Exceeding PCLs
Tables – Soil Analytical Summary Tables
Attachment – Analytical Summary Reports

Figures

Figure 1 - Soil Stockpile Sampling Locations

Figure 2 - Stockpile Areas Exceeding PCLs

NOTES

AERIAL PHOTOGRAPH FROM GOOGLE EARTH PRO, LICENSED TO SLR INTERNATIONAL CORP. PHOTOGRAPH DATED NOVEMBER 9, 2007

LEGEND

- LIMITS OF STOCKPILES OBSERVED 1/25/2012

DECEMBER 2011/FEBRUARY 2012

- TIER 1 SOIL STOCKPILE SAMPLE LOCATION
- TIER 2 SOIL STOCKPILE SAMPLE LOCATION
- TIER 3 SOIL STOCKPILE SAMPLE LOCATION
- JUNE 2009 SOIL STOCKPILE COMPOSITE SAMPLE LOCATION
- MARCH 2012 SOIL STOCKPILE SAMPLE LOCATIONS
- GEOPROBE BORING SAMPLE LOCATIONS

CONCENTRATIONS OF cPAHs

- 0–0.139 BELOW INTERIM ACTION SCREENING LEVEL
- ≥ 0.140 ABOVE INTERIM ACTION SCREENING LEVEL

PORT OF EVERETT
BAY WOOD PRODUCTS SITE
EVERETT, WASHINGTON

Report: SUMMARY REPORT ON SOIL STOCKPILE SAMPLING ACTIVITIES

Drawing: INTERIM SOIL SAMPLING LOCATIONS

Date: APRIL 11, 2012	Scale: AS SHOWN	Fig. No. 1
File Name: Rev 2 FIG 3-1	Project No. 105.0006.00001	

SLR

NOTES

AERIAL PHOTOGRAPH FROM GOOGLE EARTH PRO, LICENSED TO SLR INTERNATIONAL CORP., PHOTOGRAPH DATED NOVEMBER 9, 2007

LEGEND

LIMITS OF STOCKPILES OBSERVED 1/25/2012

STOCKPILE AREA EXCEEDING PCLs

PORT OF EVERETT
BAY WOOD PRODUCTS SITE
EVERETT, WASHINGTON

Report
SUMMARY REPORT ON SOIL STOCKPILE SAMPLING ACTIVITIES

Drawing
STOCKPILE AREAS EXCEEDING PCLs

Date	APRIL 11, 2012	Scale	AS SHOWN	Fig. No.
File Name	Rev 2 FIG 2-1	Project No.	108.0030.00001	2

SLR

Tables

Table 1: Soil Stockpile Analytical Summary Table

Table 2: Geoprobe Boring Analytical Summary Table

Table 1 - Soil Stockpile Analytical Summary Table
cPAHs
Bay Wood Products Site, Port of Everett, Everett, WA

Soil Pile: SP-A Volume[A]: 290 cubic yards (CY)

Sample Name	Preliminary Cleanup Levels	SP-M2-1			SP-M2-2			SP-W2-C		
Sample Depth		0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs		
Sample Date		12/21/2011			12/21/2011			6/2/2009		
		Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ
cPAHs[B] in soil (mg/Kg)										
benzo[a]anthracene	TEQ	**0.16**	0.1	**0.016**	**0.088**	0.1	**0.0088**	**0.047**	0.1	**0.0047**
benzo[a]pyrene	0.140	**0.094**	1	**0.094**	**0.096**	1	**0.096**	**0.031**	1	**0.031**
total benzofluoranthenes	TEQ	**0.33**	0.1	**0.033**	**0.34**	0.1	**0.034**	**0.128**	0.1	**0.0128**
chrysene	TEQ	**0.27**	0.01	**0.0027**	**0.28**	0.01	**0.0028**	**0.075**	0.01	**0.00075**
dibenzo[a,h]anthracene	TEQ	**0.021**	0.1	**0.0021**	**0.017**	0.1	**0.0017**	**0.005**	0.1	**0.0005**
indeno[1,2,3-cd]pyrene	TEQ	**0.056**	0.1	**0.0056**	**0.05**	0.1	**0.005**	**0.01**	0.1	**0.001**
Total TEQ	0.140			**0.153**			**0.148**			**0.051**

Soil Pile: SP-B Volume: 140 CY

Sample Name	Preliminary Cleanup Levels	SP-M2-3			SP-M2-4			SP-M2-5			SP-W1-C		
Sample Depth		0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs		
Sample Date		12/21/2011			12/21/2011			12/21/2011			6/2/2009		
		Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ
cPAHs in soil (mg/Kg)													
benzo[a]anthracene	TEQ	**0.32**	0.1	0.032	**0.061**	0.1	0.0061	**0.037**	0.1	0.0037	**0.058**	0.1	**0.0058**
benzo[a]pyrene	0.140	**0.09**	1	0.09	**0.049**	1	0.049	**0.025**	1	0.025	**0.024**	1	**0.024**
total benzofluoranthenes	TEQ	**0.49**	0.1	0.049	**0.23**	0.1	0.023	**0.095**	0.1	0.0095	**0.099**	0.1	**0.0099**
chrysene	TEQ	**0.56**	0.01	0.0056	**0.12**	0.01	0.0012	**0.069**	0.01	0.00069	**0.11**	0.01	**0.0011**
dibenzo[a,h]anthracene	TEQ	**0.03**	0.1	0.003	**0.0098**	0.1	0.00098	**0.0065**	0.1	0.00065	**0.0032**	0.1	**0.00032**
indeno[1,2,3-cd]pyrene	TEQ	**0.064**	0.1	0.0064	**0.029**	0.1	0.0029	**0.016**	0.1	0.0016	**0.0086**	0.1	**0.00086**
Total TEQ	0.140			**0.186**			**0.083**			**0.041**			**0.042**

Soil Pile: SP-C Volume: 10 CY

No soil samples collected for SP-C

Soil Pile: SP-D Volume: 140 CY

Sample Name	Preliminary Cleanup Levels	SP-M3-C		
Sample Depth		0.5 to 1 ft bgs		
Sample Date		6/2/2009		
		Value	TEF	TEQ
cPAHs in soil (mg/Kg)				
benzo[a]anthracene	TEQ	**0.087**	0.1	0.0087
benzo[a]pyrene	0.140	**0.076**	1	0.076
total benzofluoranthenes	TEQ	**0.107**	0.1	0.0107
chrysene	TEQ	**0.084**	0.01	0.00084
dibenzo[a,h]anthracene	TEQ	**0.01**	0.1	0.001
indeno[1,2,3-cd]pyrene	TEQ	**0.017**	0.1	0.0017
Total TEQ	0.140			**0.099**

Soil Pile: SP-E Volume: 1,000 CY

Sample Name	Preliminary Cleanup Levels	SP-M2-6			SP-M2-7			SP-M2-8			SP-M2-9			SP-M2-10			SP-M2-13			SP-M2-14*			SP-M2-15			SP-M2-16			SP-M2-C		
Sample Depth		0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs		
Sample Date		2/1/2012			2/1/2012			2/1/2012			2/1/2012			2/1/2012			2/1/2012			2/1/2012			2/1/2012			2/1/2012			6/2/2009		
		Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ
cPAHs in soil (mg/Kg)																															
benzo[a]anthracene	TEQ	**0.11**	0.1	**0.011**	**0.12**	0.1	**0.012**	**0.15**	0.1	0.015	**0.1**	0.1	0.01	**0.11**	0.1	0.011	**0.049**	0.1	0.0049	**0.99**	0.1	0.099	**0.024**	0.1	0.0024	**0.14**	0.1	0.014	**0.18**	0.1	0.018
benzo[a]pyrene	0.140	**0.084**	1	**0.084**	**0.071**	1	**0.071**	**0.14**	1	0.14	**0.051**	1	0.051	**0.064**	1	0.064	**0.078**	1	0.078	**0.36**	1	0.36	**0.019**	1	0.019	**0.1**	1	0.1	**0.1**	1	0.1
total benzofluoranthenes	TEQ	**0.29**	0.1	**0.029**	**0.35**	0.1	**0.035**	**0.46**	0.1	0.046	**0.24**	0.1	0.024	**0.25**	0.1	0.025	**0.23**	0.1	0.023	**1.5**	0.1	0.15	**0.055**	0.1	0.0055	**0.38**	0.1	0.038	**0.36**	0.1	0.036
chrysene	TEQ	**0.18**	0.01	**0.0018**	**0.24**	0.01	**0.0024**	**0.31**	0.01	0.0031	**0.24**	0.01	0.0024	**0.19**	0.01	0.0019	**0.12**	0.01	0.0012	**2**	0.01	0.02	**0.062**	0.01	0.00062	**0.3**	0.01	0.003	**0.31**	0.01	0.0031
dibenzo[a,h]anthracene	TEQ	**0.022**	0.1	**0.0022**	**0.022**	0.1	**0.0022**	**0.028**	0.1	0.0028	**0.016**	0.1	0.0016	**0.016**	0.1	0.0016	**0.019**	0.1	0.0019	**0.066**	0.1	0.0066	**0.0048**	0.1	0.00048	**0.023**	0.1	0.0023	**0.013**	0.1	0.0013
indeno[1,2,3-cd]pyrene	TEQ	**0.06**	0.1	**0.006**	**0.057**	0.1	**0.0057**	**0.074**	0.1	0.0074	**0.036**	0.1	0.0036	**0.047**	0.1	0.0047	**0.06**	0.1	0.006	**0.17**	0.1	0.017	**0.012**	0.1	0.0012	**0.055**	0.1	0.0055	**0.043**	0.1	0.0043
Total TEQ	0.140			**0.134**			**0.128**			**0.214**			0.093			0.108			**0.115**			**0.653**			**0.029**			**0.163**			**0.163**

Soil Pile: SP-F Volume: 1,380 CY

Sample Name	Preliminary Cleanup Levels	SP-F-1			SP-F-2			SP-F-3			SP-F-4			SP-F-5*			SP-F-6			SP-F-7			SP-F-8			SP-F-9			SP-F-10		
Sample Depth		0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs		
Sample Date		3/27/2012			3/27/2012			3/27/2012			3/27/2012			3/27/2012			3/27/2012			3/27/2012			3/27/2012			3/27/2012			3/27/2012		
		Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ
cPAHs in soil (mg/Kg)																															
benzo[a]anthracene	TEQ	**0.045**	0.1	**0.0045**	**0.041**	0.1	**0.0041**	**0.18**	0.1	0.018	**0.23**	0.1	0.023	**0.27**	0.1	0.027	**0.12**	0.1	**0.012**	**0.18**	0.1	**0.018**	**0.027**	0.1	0.0027	**0.064**	0.1	0.0064	**0.028**	0.1	0.0028
benzo[a]pyrene	0.140	**0.069**	1	**0.069**	**0.058**	1	**0.058**	**0.12**	1	0.12	**0.14**	1	0.14	**0.18**	1	0.18	**0.051**	1	**0.051**	**0.11**	1	**0.11**	**0.02**	1	0.02	**0.091**	1	0.091	**0.058**	1	0.058
total benzofluoranthenes	TEQ	**0.12**	0.1	**0.012**	**0.11**	0.1	**0.011**	**0.48**	0.1	0.048	**0.44**	0.1	0.044	**0.73**	0.1	0.073	**0.28**	0.1	**0.028**	**0.46**	0.1	**0.046**	**0.088**	0.1	0.0088	**0.16**	0.1	0.016	**0.18**	0.1	0.018
chrysene	TEQ	**0.055**	0.01	**0.00055**	**0.057**	0.01	**0.00057**	**0.3**	0.01	0.003	**0.37**	0.01	0.0037	**0.56**	0.01	0.0056	**0.2**	0.01	**0.002**	**0.32**	0.01	**0.0032**	**0.06**	0.01	0.0006	**0.069**	0.01	0.00069	**0.084**	0.01	0.00084
dibenzo[a,h]anthracene	TEQ	**0.013**	0.1	**0.0013**	**0.012**	0.1	**0.0012**	<0.028	0.1	0.0014	**0.03**	0.1	0.003	**0.028**	0.1	0.0028	**0.013**	0.1	**0.0013**	**0.025**	0.1	**0.0025**	**<0.0047**	0.1	0.000235	**0.017**	0.1	0.0017	**0.018**	0.1	0.0018
indeno[1,2,3-cd]pyrene	TEQ	**0.049**	0.1	**0.0049**	**0.039**	0.1	**0.0039**	**0.064**	0.1	0.0064	**0.075**	0.1	0.0075	**0.1**	0.1	0.01	**0.037**	0.1	**0.0037**	**0.07**	0.1	**0.007**	**0.012**	0.1	0.0012	**0.06**	0.1	0.006	**0.063**	0.1	0.0063
Total TEQ	0.140			**0.092**			**0.079**			**0.197**			**0.221**			**0.298**			**0.098**			**0.187**			**0.034**			**0.122**			**0.088**

Table 1 - Soil Stockpile Analytical Summary Table
cPAHs
Bay Wood Products Site, Port of Everett, Everett, WA

Soil Pile: SP-G Volume: 170 CY

Sample Name	Preliminary Cleanup Levels	SP-E6-C		
Sample Depth		0.5 to 1 ft bgs		
Sample Date		6/2/2009		
		Value	TEF	TEQ
cPAHs in soil (mg/Kg)				
benzo[a]anthracene	TEQ	**0.023**	0.1	0.0023
benzo[a]pyrene	0.140	**0.022**	1	0.022
total benzofluoranthenes	TEQ	**0.043**	0.1	0.0043
chrysene	TEQ	**0.022**	0.01	0.00022
dibenzo[a,h]anthracene	TEQ	**0.005**	0.1	0.0005
indeno[1,2,3-cd]pyrene	TEQ	**0.014**	0.1	0.0014
Total TEQ	0.140			**0.031**

Soil Pile: SP-H Volume: 160 CY

Sample Name	Preliminary Cleanup Levels	SP-H-1*			SP-H-2		
Sample Depth		0.5 to 1 ft bgs			0.5 to 1 ft bgs		
Sample Date		3/27/2012			3/27/2012		
		Value	TEF	TEQ	Value	TEF	TEQ
cPAHs in soil (mg/Kg)							
benzo[a]anthracene	TEQ	**2.6**	0.1	0.26	**0.13**	0.1	0.013
benzo[a]pyrene	0.140	**2**	1	2	**0.2**	1	0.2
total benzofluoranthenes	TEQ	**6.3**	0.1	0.63	**0.64**	0.1	0.064
chrysene	TEQ	**5.3**	0.01	0.053	**0.4**	0.01	0.004
dibenzo[a,h]anthracene	TEQ	**0.22**	0.1	0.022	**0.041**	0.1	0.0041
indeno[1,2,3-cd]pyrene	TEQ	**1**	0.1	0.1	**0.16**	0.1	0.016
Total TEQ	0.140			**3.065**			**0.301**

Soil Pile: SP-I Volume: 50 CY

Sample Name	Preliminary Cleanup Levels	SP-E7-C		
Sample Depth		0.5 to 1 ft bgs		
Sample Date		6/2/2009		
		Value	TEF	TEQ
cPAHs in soil (mg/Kg)				
benzo[a]anthracene	TEQ	**0.14**	0.1	0.014
benzo[a]pyrene	0.140	**0.08**	1	0.08
total benzofluoranthenes	TEQ	**0.212**	0.1	0.0212
chrysene	TEQ	**0.097**	0.01	0.00097
dibenzo[a,h]anthracene	TEQ	**0.014**	0.1	0.0014
indeno[1,2,3-cd]pyrene	TEQ	**0.028**	0.1	0.0028
Total TEQ	0.140			**0.120**

Soil Pile: SP-J Volume: 40 CY

Sample Name	Preliminary Cleanup Levels	SP-J-1		
Sample Depth		0.5 to 1 ft bgs		
Sample Date		3/27/2012		
		Value	TEF	TEQ
cPAHs in soil (mg/Kg)				
benzo[a]anthracene	TEQ	**0.012**	0.1	0.0012
benzo[a]pyrene	0.140	**0.015**	1	0.015
total benzofluoranthenes	TEQ	**0.036**	0.1	0.0036
chrysene	TEQ	**0.022**	0.01	0.00022
dibenzo[a,h]anthracene	TEQ	**<0.0048**	0.1	0.00024
indeno[1,2,3-cd]pyrene	TEQ	**0.011**	0.1	0.0011
Total TEQ	0.140			**0.021**

Soil Pile: SP-K Volume: 260 CY

Sample Name	Preliminary Cleanup Levels	SP-K-1*			SP-K-2*			SP-M1-C		
Sample Depth		0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs		
Sample Date		3/27/2012			3/27/2012			6/2/2009		
		Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ
cPAHs in soil (mg/Kg)										
benzo[a]anthracene	TEQ	**0.25**	0.1	**0.025**	**0.52**	0.1	**0.052**	**0.15**	0.1	**0.015**
benzo[a]pyrene	0.140	**0.099**	1	**0.099**	**0.2**	1	**0.2**	**0.072**	1	**0.072**
total benzofluoranthenes	TEQ	**0.45**	0.1	**0.045**	**0.98**	0.1	**0.098**	**0.3**	0.1	**0.03**
chrysene	TEQ	**0.61**	0.01	**0.0061**	**1**	0.01	**0.01**	**0.2**	0.01	**0.002**
dibenzo[a,h]anthracene	TEQ	**0.018**	0.1	**0.0018**	**0.041**	0.1	**0.0041**	**0.016**	0.1	**0.0016**
indeno[1,2,3-cd]pyrene	TEQ	**0.052**	0.1	**0.0052**	**0.12**	0.1	**0.012**	**0.035**	0.1	**0.0035**
Total TEQ	0.140			**0.182**			**0.376**			**0.124**

Table 1 - Soil Stockpile Analytical Summary Table
cPAHs
Bay Wood Products Site, Port of Everett, Everett, WA

Soil Pile: SP-L Volume: 130 CY

Sample Name	Preliminary Cleanup Levels	SP-L-1		
Sample Depth		0.5 to 1 ft bgs		
Sample Date		3/27/2012		
		Value	TEF	TEQ
cPAHs in soil (mg/Kg)				
benzo[a]anthracene	TEQ	**0.027**	0.1	0.0027
benzo[a]pyrene	0.140	**0.04**	1	0.04
total benzofluoranthenes	TEQ	**0.11**	0.1	0.011
chrysene	TEQ	**0.073**	0.01	0.00073
dibenzo[a,h]anthracene	TEQ	**0.017**	0.1	0.0017
indeno[1,2,3-cd]pyrene	TEQ	**0.055**	0.1	0.0055
Total TEQ	0.140			**0.062**

Soil Pile: SP-M

Renamed SP-R

Soil Pile: SP-N Volume: 100 CY

Sample Name	Preliminary Cleanup Levels	SP-N-1			SP-E5-C		
Sample Depth		0.5 to 1 ft bgs			0.5 to 1 ft bgs		
Sample Date		3/27/2012			6/2/2009		
		Value	TEF	TEQ	Value	TEF	TEQ
cPAHs in soil (mg/Kg)							
benzo[a]anthracene	TEQ	**0.14**	0.1	0.014	**0.1**	0.1	0.01
benzo[a]pyrene	0.140	**0.051**	1	0.051	**0.038**	1	0.038
total benzofluoranthenes	TEQ	**0.21**	0.1	0.021	**0.142**	0.1	0.0142
chrysene	TEQ	**0.38**	0.01	0.0038	**0.13**	0.01	0.0013
dibenzo[a,h]anthracene	TEQ	**0.012**	0.1	0.0012	**0.012**	0.1	0.0012
indeno[1,2,3-cd]pyrene	TEQ	**0.033**	0.1	0.0033	**0.023**	0.1	0.0023
Total TEQ	0.140			**0.094**			**0.067**

Soil Pile: SP-O Volume: 2,610 CY

Sample Name	Preliminary Cleanup Levels	SP-O-1			SP-O-2*			SP-O-3			SP-O-4*			SP-O-5			SP-O-6			SP-O-7			SP-O-8			SP-O-9*			SP-O-10			SP-E4-C		
Sample Depth		0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs		
Sample Date		3/27/2012			3/27/2012			3/27/2012			3/27/2012			3/27/2012			3/27/2012			3/27/2012			3/27/2012			3/27/2012			3/27/2012			6/2/2009		
		Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ
cPAHs in soil (mg/Kg)																																	
benzo[a]anthracene	TEQ	**0.15**	0.1	**0.015**	**0.45**	0.1	**0.045**	**0.17**	0.1	**0.017**	**0.3**	0.1	**0.03**	**0.16**	0.1	**0.016**	**0.1**	0.1	**0.01**	0.033	0.1	**0.0033**	**0.13**	0.1	**0.013**	**0.34**	0.1	**0.034**	**0.18**	0.1	**0.018**	**0.15**	0.1	**0.015**
benzo[a]pyrene	0.140	**0.1**	1	**0.1**	**0.77**	1	**0.77**	**0.16**	1	**0.16**	**0.18**	1	**0.18**	**0.13**	1	**0.13**	0.086	1	**0.086**	0.04	1	**0.04**	**0.082**	1	**0.082**	**0.14**	1	**0.14**	**0.12**	1	**0.12**	**0.08**	1	**0.08**
total benzofluoranthenes	TEQ	**0.44**	0.1	**0.044**	**1.2**	0.1	**0.12**	**0.43**	0.1	**0.043**	**0.79**	0.1	**0.079**	**0.85**	0.1	0.085	0.31	0.1	**0.031**	0.087	0.1	**0.0087**	**0.25**	0.1	**0.025**	**0.65**	0.1	**0.065**	**0.55**	0.1	**0.055**	**0.305**	0.1	**0.0305**
chrysene	TEQ	**0.29**	0.01	**0.0029**	**0.68**	0.01	**0.0068**	**0.36**	0.01	**0.0036**	**0.83**	0.01	**0.0083**	**0.48**	0.01	0.0048	0.21	0.01	**0.0021**	0.043	0.01	**0.00043**	**0.23**	0.01	**0.0023**	**0.73**	0.01	**0.0073**	**0.45**	0.01	**0.0045**	**0.24**	0.01	**0.0024**
dibenzo[a,h]anthracene	TEQ	**0.027**	0.1	**0.0027**	**0.14**	0.1	**0.014**	**0.027**	0.1	**0.0027**	**0.035**	0.1	**0.0035**	**0.039**	0.1	0.0039	**0.019**	0.1	**0.0019**	0.0061	0.1	**0.00061**	**0.017**	0.1	**0.0017**	**0.03**	0.1	**0.003**	**0.028**	0.1	**0.0028**	**0.019**	0.1	**0.0019**
indeno[1,2,3-cd]pyrene	TEQ	**0.072**	0.1	**0.0072**	**0.48**	0.1	**0.048**	**0.076**	0.1	**0.0076**	**0.086**	0.1	**0.0086**	**0.1**	0.1	**0.01**	**0.054**	0.1	**0.0054**	0.019	0.1	**0.0019**	**0.052**	0.1	**0.0052**	**0.083**	0.1	**0.0083**	**0.072**	0.1	**0.0072**	**0.037**	0.1	**0.0037**
Total TEQ	0.140			**0.172**			**1.004**			**0.234**			**0.309**			**0.250**			**0.136**			**0.055**			**0.129**			**0.258**			**0.208**			**0.134**

Soil Pile: SP-P Volume: 10 CY

Sample Name	Preliminary Cleanup Levels	SP-M5-C		
Sample Depth		0.5 to 1 ft bgs		
Sample Date		6/2/2009		
		Value	TEF	TEQ
cPAHs in soil (mg/Kg)				
benzo[a]anthracene	TEQ	**0.011**	0.1	0.0011
benzo[a]pyrene	0.140	**0.006**	1	0.006
total benzofluoranthenes	TEQ	**0.025**	0.1	0.0025
chrysene	TEQ	**0.022**	0.01	0.00022
dibenzo[a,h]anthracene	TEQ	**0.001**	0.1	0.0001
indeno[1,2,3-cd]pyrene	TEQ	**0.003**	0.1	0.0003
Total TEQ	0.140			**0.010**

Soil Pile: SP-Q Volume: 1,200 CY

Sample Name	Preliminary Cleanup Levels	SP-E1-1			SP-E1-2			SP-E1-5			SP-E1-6			SP-E1-7*			SP-E1-8			SP-E1-9*			SP-E1-10			SP-E1-11			SP-E1-12			SP-E1-C		
Sample Depth		0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs		
Sample Date		12/21/2011			12/21/2011			12/21/2011			12/21/2011			12/21/2011			12/21/2011			12/21/2011			12/21/2011			12/21/2011			12/21/2011			6/2/2009		
		Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ
cPAHs in soil (mg/Kg)																																	
benzo[a]anthracene	TEQ	**0.16**	0.1	**0.016**	**0.12**	0.1	**0.012**	**0.0048**	0.1	**0.00048**	**0.3**	0.1	**0.03**	**0.45**	0.1	**0.045**	**0.14**	0.1	**0.014**	**0.48**	0.1	**0.048**	**0.097**	0.1	**0.0097**	**0.18**	0.1	**0.018**	**0.11**	0.1	**0.011**	**0.75**	0.1	**0.075**
benzo[a]pyrene	0.140	**0.054**	1	**0.054**	**0.042**	1	**0.042**	<0.0047	1	0.00235	**0.14**	1	**0.14**	**0.09**	1	**0.09**	**0.08**	1	**0.08**	**0.15**	1	**0.15**	**0.054**	1	**0.054**	**0.11**	1	**0.11**	**0.1**	1	**0.1**	**0.15**	1	**0.15**
total benzofluoranthenes	TEQ	**0.36**	0.1	**0.036**	**0.27**	0.1	**0.027**	**0.013**	0.1	**0.0013**	**0.77**	0.1	**0.077**	**0.58**	0.1	**0.058**	**0.51**	0.1	**0.051**	**0.82**	0.1	**0.082**	**0.28**	0.1	**0.028**	**0.6**	0.1	**0.06**	**0.29**	0.1	**0.029**	**0.71**	0.1	**0.071**
chrysene	TEQ	**0.31**	0.01	**0.0031**	**0.21**	0.01	**0.0021**	**0.0083**	0.01	**0.000083**	**0.59**	0.01	**0.0059**	**0.67**	0.01	**0.0067**	**0.31**	0.01	**0.0031**	**0.75**	0.01	**0.0075**	**0.21**	0.01	**0.0021**	**0.42**	0.01	**0.0042**	**0.21**	0.01	**0.0021**	**0.82**	0.01	**0.0082**
dibenzo[a,h]anthracene	TEQ	**0.02**	0.1	**0.002**	**0.015**	0.1	**0.0015**	<0.0047	0.1	0.000235	**0.039**	0.1	**0.0039**	**0.03**	0.1	**0.003**	**0.028**	0.1	**0.0028**	**0.049**	0.1	**0.0049**	**0.014**	0.1	**0.0014**	**0.028**	0.1	**0.0028**	**0.02**	0.1	**0.002**	**0.032**	0.1	**0.0032**
indeno[1,2,3-cd]pyrene	TEQ	**0.05**	0.1	**0.005**	**0.034**	0.1	**0.0034**	<0.0047	0.1	0.000235	**0.11**	0.1	**0.011**	**0.069**	0.1	**0.0069**	**0.067**	0.1	**0.0067**	**0.11**	0.1	**0.011**	**0.035**	0.1	**0.0035**	**0.08**	0.1	**0.008**	**0.055**	0.1	**0.0055**	**0.065**	0.1	**0.0065**
Total TEQ	0.140			**0.116**			**0.088**			**0.005**			**0.268**			**0.210**			**0.158**			**0.303**			**0.099**			**0.203**			**0.150**			**0.314**

Table 1 - Soil Stockpile Analytical Summary Table
cPAHs
Bay Wood Products Site, Port of Everett, Everett, WA

Soil Pile: SP-Q (Continued)

Sample Name	Preliminary Cleanup Levels	SP-E2-C			SP-E3-C		
Sample Depth		0.5 to 1 ft bgs			0.5 to 1 ft bgs		
Sample Date		6/2/2009			6/2/2009		
		Value	TEF	TEQ	Value	TEF	TEQ
cPAHs in soil (mg/Kg)							
benzo[a]anthracene	TEQ	**0.072**	0.1	**0.0072**	**0.051**	0.1	**0.0051**
benzo[a]pyrene	0.140	**0.04**	1	**0.04**	**0.026**	1	**0.026**
total benzofluoranthenes	TEQ	**0.134**	0.1	**0.0134**	**0.105**	0.1	**0.0105**
chrysene	TEQ	**0.15**	0.01	**0.0015**	**0.089**	0.01	**0.00089**
dibenzo[a,h]anthracene	TEQ	**0.012**	0.1	**0.0012**	**0.01**	0.1	**0.001**
indeno[1,2,3-cd]pyrene	TEQ	**0.026**	0.1	**0.0026**	**0.022**	0.1	**0.0022**
Total TEQ	0.140			**0.066**			**0.046**

Soil Pile: SP-R Volume: 710 CY

Sample Name	Preliminary Cleanup Levels	SP-R-1			SP-R-2			SP-R-3			SP-M4-C		
Sample Depth		0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs			0.5 to 1 ft bgs		
Sample Date		3/27/2012			3/27/2012			3/27/2012			6/2/2009		
		Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ	Value	TEF	TEQ
cPAHs in soil (mg/Kg)													
benzo[a]anthracene	TEQ	**0.075**	0.1	0.0075	**0.15**	0.1	0.015	**0.048**	0.1	0.0048	**0.05**	0.1	**0.005**
benzo[a]pyrene	0.140	**0.048**	1	0.048	**0.1**	1	0.1	**0.057**	1	0.057	**0.032**	1	**0.032**
total benzofluoranthenes	TEQ	**0.18**	0.1	0.018	**0.39**	0.1	0.039	**0.19**	0.1	0.019	**0.094**	0.1	**0.0094**
chrysene	TEQ	**0.12**	0.01	0.0012	**0.33**	0.01	0.0033	**0.11**	0.01	0.0011	**0.06**	0.01	**0.0006**
dibenzo[a,h]anthracene	TEQ	**0.0085**	0.1	0.00085	**0.022**	0.1	0.0022	**0.01**	0.1	0.001	**0.006**	0.1	**0.0006**
indeno[1,2,3-cd]pyrene	TEQ	**0.028**	0.1	0.0028	**0.057**	0.1	0.0057	**0.027**	0.1	0.0027	**0.011**	0.1	**0.0011**
Total TEQ	0.140			**0.078**			**0.165**			**0.086**			**0.049**

Notes:

Data presented in milligrams per kilogram (mg/Kg)

Shading indicates detected concentration greater than PCL

BOLD indicates detected above laboratory detection limit

Value - Concentrations identified by analytical laboratory

TEF - Toxicity Equivalency Factor (TEF) as presented in Ecology memo: Evaluating the Toxicity and Assessing the Carcinogenic Risk of Environmental Mixtures Using Toxicity Equivalency Factors

TEQ - TEQ for individual congeners

<0.058 indicates detected below the detection limit of 0.058 mg/kg

A - Volume estimate provided by GeoEngineers to Port of Everett on January 30, 2012, based on January 25, 2012 site visit.

B - Carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270 SIM

* Dilution required to obtain an accurate quantification of the analyte.

Table 2 -Geoprobe Boring Analytical Summary Table
PCBs and TPH-Dx
Bay Wood Products Site, Port of Everett, Everett, WA

Sample Name	PB-3CR-3.5-4.0	PB-3CR-5.5-6.0	PB-5AR-3.75-4.75	Preliminary Cleanup Level
Sample Depth (ft)	3.5 - 4.0	5.5 - 6.0	3.75 - 4.75	
Sample Date	12/21/2011	12/21/2011	12/21/2011	
Polychlorinated Biphenyls (PCBs) [A] (mg/Kg)				
aroclor 1016	<0.0095	<0.0096	<0.0096	--
aroclor 1221	<0.0095	<0.0096	<0.0096	--
aroclor 1232	<0.0095	<0.0096	<0.0096	--
aroclor 1242	<0.0095	<0.0096	<0.0096	--
aroclor 1248	<0.0095	<0.0096	<0.0096	--
aroclor 1254	<0.0095	<0.0096	<0.0096	--
aroclor 1260	<0.0095	<0.0096	<0.0096	--
Total PCBs	ND	ND	ND	0.0005[B]
Total Petroleum Hydrocarbons (TPH) [C] mg/Kg				
Diesel Range Organics	**16**	**690**	23	460
Heavy Oil Range Organics	**60**	**550**	27	460

Notes:

Data presented in milligrams per kilogram (mg/Kg)

Shading indicates detected concentration greater than Preliminary Cleanup Level

BOLD indicates detected above laboratory detection limit

<0.0095 indicates detected below the detection limit of 0.058 mg/kg

A - PCBs per EPA Method 8082

B - PCB value is a total value for all PCBs

C - Total Petroleum Hydrocarbons Diesel and Residual Range per NWTPH-Dx Method