HALEY ALDRICH

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REPORT ON

SAMPLING AND ANALYSIS PLAN/QUALITY ASSURANCE PROJECT PLAN
CUSTOM PLYWOOD SITE
ANACORTES, WASHINGTON

by
Haley & Aldrich, Inc.
Seattle, Washington

for
Washington State Department of Ecology, Toxics Cleanup Program
Lacey, Washington

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HALEY & ALDRICH, INC.
3131 ELLIOTT AVENUE
SUITE 600
SEATTLE, WA 98121
206.324.9530

SIGNATURE PAGE FOR

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ANACORTES, WASHINGTON

PREPARED FOR

WASHINGTON STATE DEPARTMENT OF ECOLOGY, TOXICS CLEANUP PROGRAM
LACEY, WASHINGTON

PREPARED BY:

Andrew Nakahara, P.E.
Environmental Engineer
Haley & Aldrich, Inc.

REVIEWED AND APPROVED BY:

Andrew Kaparos, P.E.
Program Manager, Environmental Engineer
Haley & Aldrich, Inc.

Mike Ehlebracht, L.H.G
Principal, Geochemist
Haley & Aldrich, Inc.

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1. Project Description

Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this Sampling Analysis Plan and Quality Assurance Project Plan consistent with the requirements of Washington Administrative Code (WAC) 173-340-820 for the Washington State Department of Ecology (Ecology). This document presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with the Custom Plywood Site (Site) located Anacortes, Washington (Facility Site ID number 17222251; Cleanup Site ID number 4533; Figure 1).

1.1 PURPOSE AND OBJECTIVE

The purpose of this groundwater monitoring is to generate data of sufficient quality characterize the nature and extent of potential environmental impacts on the Site as part of compliance monitoring recommendations and the Periodic Review process described in Final Cleanup Action Plan For Phase I Upland Remediation (September 2011).

It has been several years since any groundwater monitoring has been performed. The objective of the compliance monitoring is to identify the contaminants of concern (COCs) at the Site. The potential COCs appear to include diesel- and/or heavy oil-range total petroleum hydrocarbons (TPH-D and TPH-O, respectively), carcinogenic polycyclic aromatic hydrocarbons (cPAHs), and heavy metals (arsenic, copper, nickel, and zinc).

2. Project Background

2.1 SITE LOCATION AND HISTORY

The Site is one of several Anacortes-area bay-wide priority sites for Fidalgo/Padilla Bays being addressed by the Toxics Cleanup Program under the Puget Sound Initiative. The Site includes property owned by GBH Investments, LLC., covering approximately 6.6 acres of upland and 34 acres of intertidal and subtidal areas.

Custom Plywood operated as a lumber and planing mill beginning in about 1900 until it burned down sometime between 1925 and 1937. Through the years, the property changed hands several times and was rebuilt and expanded until Custom Plywood became the operating entity sometime before 1991. The facility was used as a sawmill and plywood manufacturing plant until most of the wooden structures in the main plant area were consumed in a fire on 28 November 1992. Milling activities produced wood waste and chemical contaminants that affected Site soil, sediment, and groundwater.

2.2 PREVIOUS AND ONGOING CLEANUP ACTIONS

Past limited interim remedial actions were conducted under WAC 173-340-515 (Independent Remedial Actions) on the upland portion of the Site beginning in 1998. To date, three interim remedial actions have been completed at the Site. Phase I (completed in fall 2011) consisted of upland remediation. Phase II (completed in fall 2013) consisted of intertidal and limited subtidal removal actions, and shoreline restoration. Phase III (currently underway) has consisted of subtidal sediment capping and

dredging, eelgrass transplanting and monitoring, and reporting. A Cleanup Action Plan, Engineering Design Report, and Construction Completion Report were prepared for each of the previous interim actions.

3. Scope of Services

This scope of services includes two groundwater monitoring events, ideally conducted approximately six months apart to evaluate groundwater conditions during seasonal high and low water levels. There are six existing monitoring wells that will be sampled (MW-1 through MW-6; Figure 2). The proposed monitoring activities include collecting up to 14 groundwater samples (total) over two monitoring events. Samples will be analyzed on a standard turnaround time by OnSite Environmental, Inc. (OnSite) of Redmond, Washington, for the analytes listed in Section 4.2.4.

4. Sampling Analysis Plan

4.1 MONITORING WELL DEVELOPMENT AND SAMPLING

4.1.1 Site Access

It is assumed that Haley & Aldrich staff will be able to access and park a vehicle within the boat storage yard property adjacent to the Site. Ecology will help Haley & Aldrich coordinate the access with the property owner.

4.1.2 Measurement of Groundwater Levels

Prior to development, and once again after development but before sampling, groundwater levels in the wells will be measured to the nearest 0.01 foot using an electronic water-level probe. The wells will be opened and allowed to equilibrate for up to a half hour before measurements are taken.

4.1.3 Development

Monitoring wells will be developed at least 12 hours prior to sampling. The depth to water and depth to sediment in each well will be measured using an electronic water-level probe before starting well development. Wells will be developed by surging groundwater with a stainless-steel or disposal polyethylene bailer and pumping with a submersible pump until either: (a) water from the wells becomes visibly clear; (b) turbidity measurements stabilize to within 10 percent for three successive casing volumes; (c) a minimum of 10 well volumes are purged; or (d) the well bails dry.

Observations and development activities will be documented in field notes and forms. Observations will include, but are not limited to, groundwater levels, development water characteristics (e.g., color, turbidity, sheens), and development purge volumes.

4.1.4 Purging

After groundwater levels are measured, each well will be purged at a low flow rate using a peristaltic or submersible pump fitted with clean, disposable tubing. The tubing inlet will be placed approximately at the middle of the well screen. Tubing will be used one time and disposed of as described in Section 4.3.1. To assess the effectiveness of purging, pH, electrical conductivity, temperature, dissolved oxygen, and oxidation-reduction potential will be measured by means of a flow-through cell. Results of these measurements will be included in the field notes. Purging will be considered complete when three casing volumes of water have been removed, the well purges dry, or field parameters stabilize to within 10 percent for three consecutive readings (whichever is less). If the well is purged dry, it will be allowed to recover before sampling is performed. Purge water will be handled in accordance with Section 4.4.

4.1.5 Sampling

After purging of a well is complete, a groundwater sample will be collected using the same equipment used for purging and low-flow groundwater sampling techniques. The laboratory-supplied sample bottles will be filled directly from the polyethylene tubing. Samples analyzed for dissolved metals will be filtered in the field using 0.45-micron filters. One duplicate groundwater sample will be collected during each sampling event and labeled GW-mmddyy. The location of the duplicate will be noted.

Groundwater samples from monitoring wells will be analyzed for TPH-D (by Method NWTPH-Dx), TPH-O (by Method NWTPH-Dx), cPAHs (by U.S. Environmental Protection Agency [EPA] Method 8270E/SIM), and total and dissolved metals (arsenic, copper, nickel, and zinc; by EPA Method 200.7/200.8).

4.1.6 Documentation

Observations made during groundwater sampling activities will be documented in field notes. Observations will include, but are not limited to, groundwater levels, purge water characteristics (e.g., color, turbidity, sheens), purge volumes, field parameter measurements, and sampling time.

4.2 SAMPLE MANAGEMENT

4.2.1 Containers

Clean sample containers will be provided by the analytical laboratory ready for sample collection, including preservative, if required. Specific container requirements for samples that will undergo multiple analyses will be discussed with the analytical laboratory prior to sample collection.

4.2.2 Labeling Requirements

A sample label will be affixed to each container before sample collection. All containers will be marked with the project number, a sample number, date and time of collection, sampler's initials, and preservation type. Each sample will have a unique identification number that will be referenced by entry into notes. Samples will be labeled according to the well name (MW1-). The duplicate sample will be labeled as noted above in Section 4.1.5.

4.2.3 Chain of Custody Procedures

Chain of custody forms will be used to document the collection, custody, and transfer of samples from their initial collection location to the laboratory. Each sample will be entered on the custody form immediately after it is collected.

Sample custody procedures will be followed to provide a record that can accompany a sample as it passes from collection through analysis. A sample is considered to be in custody if it meets at least one of the following conditions:

- It is in someone's physical possession or view;
- It is secured to prevent tampering (i.e., custody seals); and/or
- It is locked or secured in an area restricted to authorized personnel.

A chain of custody form will be completed in the field as samples are packaged. At a minimum, the information on the custody form will include the sample number, date and time of sample collection, sampler, analysis, and number of containers. A copy of the custody form will be placed in the cooler with its respective samples before the container is sealed for delivery to the laboratory. Another copy will be retained and placed in the project files after review by the project manager. Custody seals will be placed on each cooler containing samples so the package cannot be opened without breaking the seals.

After sample containers have been filled, they will be stored in a cooler cooled with ice or blue ice to approximately 4 degrees Celsius. The coolers will be transferred to the analytical laboratory for chemical analyses. Chain of custody procedures will be maintained and documented at all times, from commencement in the field until delivery of the samples to the analytical laboratory, as discussed previously. Specific procedures are:

- Individual sample containers will be packed to prevent breakage;
- Custody forms will be enclosed in a plastic bag and taped to the inside lid of the cooler;
- Signed and dated custody seals will be placed on all coolers before shipping;
- Samples will be hand-delivered to the analytical laboratory by Haley & Aldrich personnel or courier;
- When sample possession is transferred to the laboratory, the custody form will be signed by the persons transferring custody of the coolers; and
- Upon receipt of samples at the laboratory, the shipping container custody seal will be broken, and the sample-receiving custodian will compare samples with information on the chain of custody form and record the condition of the samples received.

4.2.4 Laboratory Analyses and Turnaround Time

Groundwater samples will be analyzed by OnSite (a Washington-State-accredited laboratory) for TPH-D, TPH-O, cPAHs, and total and dissolved metals (arsenic, copper, nickel, and zinc) on a standard turnaround time.

4.3 DECONTAMINATION PROCEDURES

4.3.1 Sampling Equipment Decontamination

To prevent cross-contamination between sampling events, clean dedicated sampling equipment (e.g., disposable gloves, groundwater sampling tubing) will be used for each sample location and discarded after use. Cleaning of non-disposable items, such as the water level indicator, will consist of washing in a detergent (Liquinox®) solution, rinsing with tap water, followed with a deionized water rinse. Decontamination water will be collected and handled as investigation-derived waste (IDW) as discussed in the following section.

The IDW will be contained and transferred to drums stored on the Site as discussed in the following section.

4.4 IDW MANAGEMENT

IDW will be generated during decontamination procedures, well development, and purging and sampling during groundwater monitoring events. The handling and disposal of specific types of IDW are discussed below. Copies of all disposal documentation (e.g., manifests, weight tickets) for IDW will be provided in the final memorandum.

IDW will be placed in labeled, 55-gallon steel drums to be temporarily stored on the property in a secure area on Site. Associated samples collected during the monitoring events will be used to profile the water IDW for disposal. As a contingency, however, IDW samples will be collected from the drummed water and only analyzed if requested by the receiving facility. After both sampling rounds have been completed, and upon receipt of the chemical analyses, the IDW will be appropriately disposed of at a permitted disposal or treatment facility.

Disposable sampling equipment (e.g., sample tubing) and personal protective equipment (e.g., nitrile gloves) will be placed in plastic bags after use and disposed of as solid waste.

5. QA/QC

The laboratory reports will be reviewed by a Haley & Aldrich technical specialist to ensure conformance with project standards, provide additional data qualifications as appropriate, and verify that the data are acceptable for the purposes of the project. This includes reviewing holding times, reporting limits, method blanks, surrogate recoveries, laboratory duplicate relative percent differences (RPDs), spike blank/spike blank duplicate recoveries, and matrix spike/matrix spike duplicate (MS/MSD) recoveries.

5.1 DATA QUALITY INDICATORS

The overall QA objectives for field sampling, field measurements, and laboratory analysis are to produce data of known and appropriate quality. The procedures and QC checks specified herein will be used so that known and acceptable levels of accuracy and precision are maintained for each data set. This section defines the objectives for accuracy and precision for laboratory data. These goals are primarily expressed in terms of acceptance criteria for the QC checks performed.

5.1.1 Precision

Precision is the degree of reproducibility or agreement between independent or repeated measurements. Analytical variability will be expressed as the RPD between laboratory duplicates and between MS and MSD analyses. RPD will be used to measure precision for this investigation and is defined as follows:

$$RPD = \frac{(D_1 - D_2)}{(D_1 + D_2)/2} \times 100$$

where:

D_1 = sample value
D_2 = duplicate sample value

5.1.2 Accuracy

Accuracy is the agreement between a measured value and its true or accepted value. While it is not possible to determine absolute accuracy for environmental samples, analysis of standards and spiked samples provides an indirect assessment of accuracy.

Laboratory accuracy will be assessed as the percent recovery of MSs, MSDs, surrogate spiked compounds (for organic analyses), and laboratory control samples. Accuracy will be defined as the percentage recovery compared with the true or accepted value and is defined as follows:

$$\%\ Recovery = \frac{(SSR - SR)}{SA} \times 100$$

where:

SSR = spiked sample result
SR = sample results (not applicable for surrogate recovery)
SA = amount of spike added

5.1.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. The sampling program will be designed carefully to see that sample locations are selected properly, sufficient numbers of samples are collected to accurately reflect conditions at the Site, and samples are representative of sample locations. A sufficient sample volume will be collected at each sampling point to minimize bias or errors associated with sample particle size and heterogeneity.

5.1.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. So that results are comparable, samples will be analyzed using standard EPA methods and protocols as described in Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods (EPA, 1986). Data will also be reviewed to verify that precision and accuracy criteria have been achieved and, if not, that data have been appropriately qualified.

Field personnel will collect samples in a consistent manner at all sampling locations so that all data collected as part of this study are comparable. Comparability is attained by careful adherence to standardized sampling and analytical procedures, based on rigorous documentation of sample locations (including depth, time, and date).

5.1.5 Completeness

Completeness is the percentage of measurements made that are judged to be valid. Completeness will be calculated separately for each analytical group (e.g., TPHs and volatile organic compounds). For results to be considered complete, all QC check analyses required to verify precision and accuracy must have been performed. Data qualified as estimated during the validation process will be considered complete. Results that are rejected during the validation review or samples for which no analytical results were obtained will be considered non-valid measurements. Completeness will be calculated for each analysis using the following equation:

$$Completeness = \frac{valid\ data\ points\ obtained}{total\ data\ points\ planned} \times 100$$

The target goal for completeness is a minimum of 95 percent. Completeness will be monitored on an on-going basis so that archived sample extracts can be reanalyzed, if required, without remobilization.

5.2 DATA QA REVIEW

Haley & Aldrich will independently review the quality of the chemical analytical results provided by the laboratory. The data quality report will assess the adequacy of the reported detection limits in achieving the project screening levels; the precision and accuracy of the data; and the usability of the analytical data for project objectives. Exceedances of analytical control limits will be summarized and evaluated.

A data evaluation review will be performed on all results using QC summary sheet results provided by the laboratory for each report. Data evaluation reviews are based on the QC requirements previously described and follow the format of the EPA National Functional Guidelines for Organic Superfund Methods Data Review (EPA, 2020), modified to include specific criteria of individual analytical methods. The laboratory will be contacted to obtain raw data (instrument tuning, calibrations, instrument printouts, bench sheets, and laboratory worksheets) if any problems or discrepancies are discovered during the routine evaluation.

The data evaluation review will verify:

- Sample numbers and analyses match the chain of custody request;
- Sample preservation and holding times;
- Instrument tuning and performance criteria were achieved;
- Laboratory blanks were analyzed at the proper frequency and that no analytes were present in the blanks;
- Laboratory duplicates, MSs, surrogate compounds, and laboratory control samples control limits were met;
- Required detection limits were achieved; and

- Data qualifier flags, beyond any applied by the laboratory, will be added to sample results that fall outside the QC acceptance criteria. Typical data qualifiers are:
  - **U** The compound was analyzed for but was not detected above the reporting limit. The associated numerical value is the sample reporting limit.
  - **J** The associated numerical value is an estimated quantity because QC criteria were slightly exceeded and/or the associated numerical value is detected below reporting limit and above the method detection limit.
  - **UJ** The compound was analyzed for, but not detected. The associated numerical value is an estimated reporting limit because QC criteria were not met.
  - **R** Data are not usable because of significant exceedance of QC criteria. The analyte may or may not be present; resampling and/or reanalysis is necessary for verification.

6. Data Analysis and Reporting

6.1 LABORATORY REPORTS

The laboratory data reports will consist of summary data packages that will include:

- A case narrative identifying the laboratory analytical batch number, matrix and number of samples included, analyses performed, analytical methods used, and description of any problems or exceedance of QC criteria and corrective action taken. The laboratory manager or a designee must sign the narrative.
- A copy of the chain of custody form for all samples included in the analytical batch.
- Tabulated sample analytical results with units, data qualifiers, percent solids, sample weight or volume, dilution factor, laboratory batch and sample number, Haley & Aldrich sample number, and dates sampled, received, extracted, and analyzed all clearly specified.
- Blank summary results indicating samples associated with each blank.
- MS/MSD result summaries with calculated percent recovery and RPDs.
- Laboratory control sample results, when applicable, with calculated percent recovery.
- Electronically formatted data deliverable results in EQuIS and Ecology Environmental Information Management database format.

6.2 DATA EVALUATION, ANALYSIS, AND REPORTING

After the planned fieldwork, a draft memorandum will be prepared summarizing the sampling procedures, field observations, and laboratory testing results. The memorandum will include a map with monitoring well locations, figures with areas and elevations of groundwater, tabulated analytical testing data compared with Washington State Model Toxics Control Act preliminary cleanup levels, sample depth, chemical data quality review, and laboratory analytical reports. The memorandum will include statements on any limitations on the data use that are the result of adverse QC exceedances, as identified in Section 5.2, Data QA Review.

References

1. U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste; Physical/Chemical Methods, SW-846, 3rd Update. Environmental Protection Agency.

2. EPA, 2020. US EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review. Environmental Protection Agency. EPA-540-R-20-005, November.

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FIGURES

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CUSTOM PLYWOOD
ANACORTES, WASHINGTON

VICINITY MAP

MAP SOURCE: ESRI
SITE COORDINATES: 48°29'40"N, 122°36'01"W

APPROXIMATE SCALE: 1 IN = 2000 FT
MAY 2022

FIGURE 1

LEGEND

- GROUNDWATER MONITORING WELL
- FENCE LINE
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 13 MAY 2023

N

0 100 200
SCALE IN FEET

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ANACORTES, WASHINGTON

GROUNDWATER MONITORING WELL LOCATIONS

DECEMBER 2023

FIGURE 2

GIS FILE PATH: \\haleyaldrich.com\share\sea_projects\Notebooks\136000_Custom_Plywood_Subtidal_Sediment_Cleanup\GIS\MXD\SI\0209325_CUSTOM_PLYWOOD_GW_MONITORING.aprx - USER: ayabu - LAST SAVED: 12/14/2023 3:59 PM