HALEY ALDRICH

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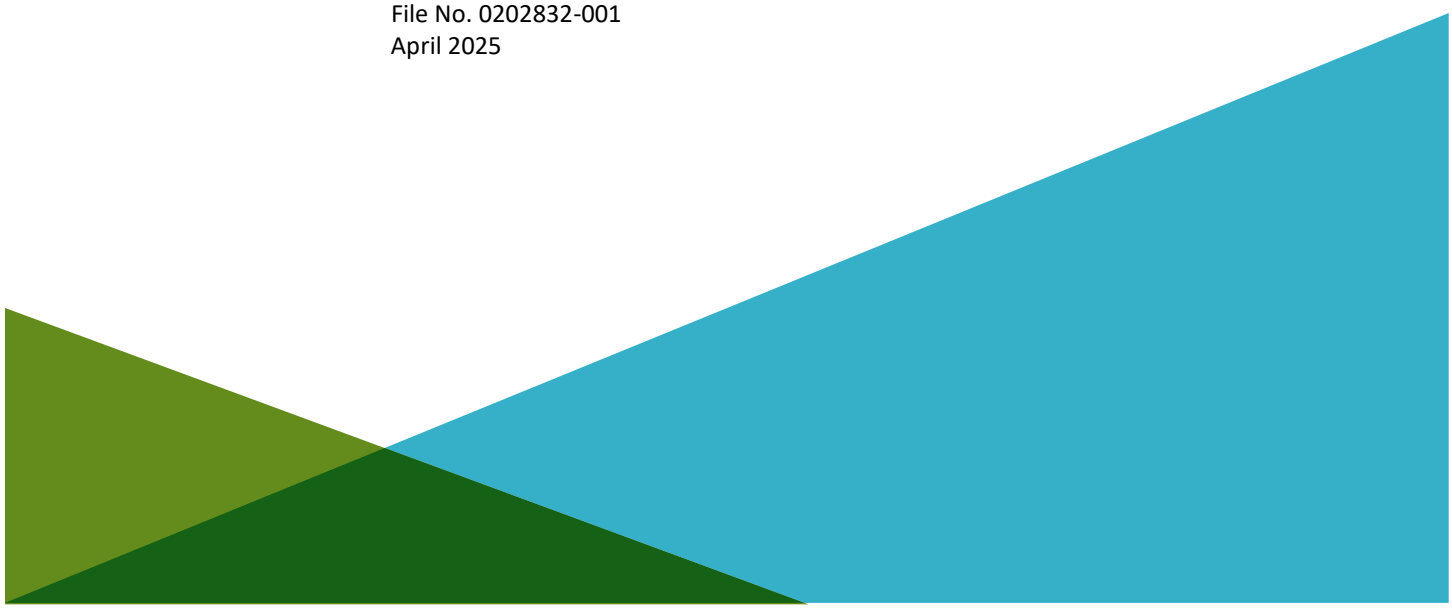
COPPER BACKGROUND STUDY WORK PLAN FOR
FORMER KOSMOS MILL
KOSMOS FLATS
MORTON, WASHINGTON

by
Haley & Aldrich, Inc.
Seattle, Washington

for
Tacoma Public Utilities - Tacoma Power
Tacoma, Washington

File No. 0202832-001
April 2025



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SIGNATURE PAGE FOR

COPPER BACKGROUND STUDY WORK PLAN FOR
FORMER KOSMOS MILL
KOSMOS FLATS
MORTON, WASHINGTON

PREPARED FOR
TACOMA PUBLIC UTILITIES - TACOMA POWER
TACOMA, WASHINGTON

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1. Introduction

On behalf of The City of Tacoma, Power Division (Tacoma Power), Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this work plan to conduct a background study for copper concentrations in the area at and around the former Kosmos Mill (Site). The Site (tax parcel number 030775001000) is located approximately 7.3 miles southeast of Morton, Washington and is accessible off State Route 12 via Kosmos Road, followed by Champion Haul Road (Figure 1).

A seep of petroleum hydrocarbons was discovered along the bank of Rainey Creek near the Site (Figure 2). The Site currently includes parts of the former Kosmos Lumber Mill and the bank of Rainey Creek, shown within the area of potential effect (APE) in Figure 2.

1.1 INITIAL SITE INVESTIGATION AND REMEDIAL INVESTIGATION

An initial Site investigation, emergency independent remedial action (IRA), and a remedial investigation (RI) were conducted between 2019 and 2022. Results of soil and groundwater sampling conducted in the upland area at the Site during the 2019 initial Site investigation and 2022-2023 RI indicated the presence of total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and metals in soil at concentrations above proposed cleanup levels (CULs), primarily in near-surface soils. More details on the results of sampling conducted at the Site can be found in the Draft Former Kosmos Mill RI Report (Draft RI Report; Haley & Aldrich, 2024).

Most of the soil metal concentrations from Site samples collected as part of the 2022 and 2023 RI were generally detected at concentrations similar to the natural background levels established in the Washington State Department of Ecology's (Ecology's) 1994 metals background study (Ecology, 1994) and similar to concentrations observed in environmental investigations conducted at nearby properties. However, approximately 49 out of over 100 soil samples had copper concentrations at various depths to 50 feet below ground surface (bgs) greater than natural levels for Group "W" in Ecology's 1994 natural background study. The Group "W" subset consisted of 15 soil samples collected from five counties (Whatcom, Skagit, Grays Harbor, Lewis, and Pacific Counties). The closest Group "W" soil sample was approximately 40 miles from the Site. Concentrations for metals compared to the initial preliminary cleanup levels are shown in Figure 3 and include arsenic, cadmium, copper, lead, mercury, and zinc.

Arsenic, cadmium, mercury, and nickel were not retained as contaminants of concern (COCs) in soil because the detected concentrations do not pose a significant risk at the Site. Arsenic, cadmium, lead, mercury, and nickel were detected at concentrations exceeding their respective applicable MTCA Method B screening levels in less than 10 percent of the samples analyzed, and the maximum detected concentrations of each chemical were less than two times the applicable Method B screening levels. Metal concentrations generally did not exceed the proposed cleanup levels in groundwater during the RI, indicating that the soil-to-groundwater pathway is not complete for metals. Furthermore, the elevated metal concentrations are suspected to be attributed to the naturally occurring metals in soil. Copper was the only metal to be above Group "W" natural background levels in more than ten percent of the sample set. The other metals were below ten percent of their sample set and were generally co-located with petroleum exceedances. Ecology requested that a background study of select metals in soil be performed in the area around the Site to provide further lines of evidence that the elevated metal concentrations can be attributed to natural background levels (Ecology, 2025); therefore, copper will be the focus of this background study.

1.2 PURPOSE AND OBJECTIVES

The purpose of this work plan is to document the scope, technical approach, and implementation details for completing the copper background study. The purpose of the background study is to generate data of sufficient quality to supplement the data collected during the RI to determine the Site-specific background concentrations for copper.

2. Background and Physical Setting

The background and physical setting information summarized below are based on Site visits and review of prior environmental data and documents.

Historically, the Site was established as a lumber mill in 1904. The former mill included railroad lines/tracks, several buildings, and a log pond (Figure 2b). There are no known historical copper uses at the Site. The City of Tacoma purchased the former Kosmos townsite and lumber mill in the 1960s and the inhabitants were relocated. The land was acquired to create the Riffe Lake reservoir for recreational use and power generation. The lumber mill facility was abandoned and demolished prior to the 1968 completion of Mossyrock Dam. Riffe Lake is currently a component of the Cowlitz River Hydroelectric Project operated by Tacoma Power. Additional Site background and description information are provided in the Draft RI Report.

2.1 SITE DESCRIPTION

Tacoma Power's property (Property) is located in Rainey Valley, within the Riffe Lake reservoir, in an area referred to as Kosmos Flats, and was purchased by the City of Tacoma in the 1960s. Rainey Creek bounds the Property to the north and west, Champion Haul Road to the east, and Riffe Lake to the south.

The Site is located within the Property with Rainey Creek to the west, the former log pond area to the south, an old mill road and the former stockpile area from the emergency IRA to the east, and the north bank of the ravine and old mill road to the north (Figure 2). The Site topography generally slopes to the south toward Riffe Lake, but the local topography gradually slopes to the northwest, toward Rainey Creek in the area near the identified petroleum seeps which were covered by a protective cap under the emergency IRA in 2019 (and described in the Draft RI Report).

The Kosmos Flats was formerly the location of the Kosmos lumber mill. The building foundation, railroad rails, metal, and concrete debris from the former mill can be seen in the upland area. The former mill location is on the east bank, above an outside bend of Rainey Creek channel. Other Site features include a surface water conveyance ditch and a former log pond dike.

2.2 PHYSICAL SETTING

The Site geology and hydrogeology is based on explorations and wells completed by Haley & Aldrich[1] in 2019 and 2022 and historical investigation activities completed by AIRO Environmental Services (1993).

2.2.1 Geology

The Site is located along Rainey Creek in the Cowlitz River watershed. During the late Pleistocene, the Cowlitz glacier extended from its source on Mount Rainier roughly to the town of Salkum, Washington, west of the Site. During this epoch, the Cowlitz glacier advanced and retreated on at least four distinct occurrences. These glaciations produced three distinct outwash deposits. The earliest deposit was the Wingate Hill outwash, followed by the Hayden Creek drift and most recently the Evans Creek outwash.

[1] This work was begun by Hart Crowser, who has since been acquired by Haley & Aldrich; Haley & Aldrich continues the project.

In the Rainey Creek valley, glacial deposits are represented as the Hayden Creek drift. The Hayden Creek drift is dominantly composed of outwash deposits expressed as poorly graded gravel deposits and localized till deposits. It is also common to find loess deposits up to 3 feet thick in the Hayden Creek formation. The entire Hayden Creek formation is heavily oxidized to depths up to 30 feet.

Soil from borings and test pits conducted by Hart Crowser during the initial Site investigation are generally consistent with expected outwash deposits of the Hayden Creek formation. Soil in the upland area generally consisted of sandy silts to silty sands with gravel in the upper 5 to 15 feet and silty gravel with sand and some cobbles to poorly graded coarse sand below 15 feet. Additionally, localized fine-grained organic deposits of silt and clay were found in low-lying vegetated areas in the upper 5 feet in explorations TP-7, TP-10, and TP-12 during the 2019 Site investigation. Fill was generally encountered between approximately 10 and 35 feet bgs. Fill contains concrete, wood, and metal debris up to depths of 28 feet bgs in several explorations. The outwash deposits were encountered below the fill. Till-like material was only observed in the bank samples taken on the west side of the Rainey Creek, opposite of the Site. Based on observations during the emergency IRA construction and from a soil sample collected from the exposed creek bed of Rainey Creek, the creek bed material generally consists of gray clayey sand with gravel and cobbles.

2.3 CULTURAL AND NATURAL RESOURCES

The former Kosmos Town and Mill Site has been identified, evaluated, and concurred upon by the Department of Archaeology and Historic Preservation as being “not eligible” for the National Register of Historic Places. However, remnants of historic features may still be found during the investigation that require further documentation. Prehistoric artifacts or sites are not anticipated to be impacted. Areas associated with the Kosmos Archaeological District, which is in the vicinity, have been avoided for this study. Testing locations were previously vetted by Tacoma’s archaeologist to ensure testing areas are outside of any recorded cultural resource sites, and the proposed areas are all within previously surveyed areas where findings were negative.

3. Nature and Extent of Metal-Exceedances

Over a hundred samples were analyzed for metals at the Site. This section describes the apparent extent of metal-exceedance media discovered at the Site.

3.1 SOIL

3.1.1 Arsenic

Arsenic was detected above the PCUL for the protection of the vadose zone and potable groundwater concentration and the Ecology-derived natural background concentration of 7.3 and 8.47 milligrams per kilogram (mg/kg), respectively, in one sample collected from 2.5 to 5 feet bgs at TP-47.

3.1.2 Cadmium

Cadmium was detected above the PCUL for the protection of the vadose zone and potable groundwater concentration and the Ecology-derived natural background concentration of 0.77 and 0.1 mg/kg, respectively, in two samples collected from the upper 2.5 feet in TP-12 (collected during the initial Site investigation in 2019) and 5 to 7.5 feet bgs at TP-43.

3.1.3 Copper

Copper concentrations were detected above the PCUL for the protection of the vadose zone and potable groundwater of 36 mg/kg in 88 samples and exceeded the natural background concentration of 52.9 mg/kg in 49 samples. However, the copper concentrations reported would not pose significant risk at the Site because of the following lines of evidence:

- Dissolved copper was not detected in groundwater collected from monitoring wells at concentrations above laboratory reporting limits, indicating that the soil-to-groundwater pathway is non- or only partially complete for this constituent.
- The next most restrictive soil screening level for copper is for the protection of ecological receptors, and the maximum detected concentration does not exceed that level.
- A desktop review of nearby sites was conducted and elevated concentrations of copper were also observed in soil at one site. Copper was detected at Stericycle Morton (Stericycle), facility site ID 3895813, located 6 miles northwest of the Site, in seven soil samples with copper concentrations between 58.2 to 76.6 mg/kg from depths ranging between 5 and 27.5 feet bgs.

Based on these lines of evidence and that there are no known historical copper uses at the Site and copper concentrations in soil at the Site are similar to a neighboring site and naturally occurring background levels in western Washington, copper exceedances are likely natural and not considered a Site COC.

3.1.4 Lead

Lead was detected above the PCUL for the protection of the vadose zone and potable groundwater of 24 mg/kg in eight samples, and the Ecology-derived natural background concentration of 10.9 mg/kg in twelve samples. The samples were generally observed in the upper 5 to 10 feet in the drainage ravine

area, around the former site ‘A’, and to the west of the former site ‘A’. The majority of these samples also contained petroleum concentrations above PCULs.

3.1.5 Mercury

Mercury was detected above the PCUL for the protection of the vadose zone and potable groundwater and exceeding the natural background concentration of 0.07 and 0.13 mg/kg, respectively, in two locations from 2.5 to 5 feet bgs at MW-2D and TP-22. It should be noted that some of the reporting limits for mercury were higher than the PCUL and natural background concentration, and the corresponding sample was not detected at or above these higher reporting limits.

3.1.6 Nickel

Nickel was detected above the PCUL for the protection of the vadose zone and potable groundwater and the Ecology-derived natural background concentration of 48 and 54.2 mg/kg, respectively, in one sample collected from 2.5 to 5 feet bgs at TP-22.

3.1.7 Zinc

Zinc was detected above the PCUL for the protection of the vadose zone and potable groundwater and the Ecology-derived natural background concentration of 86 and 85.6 mg/kg, respectively, in seven samples and were generally observed in the upper 5 to 10 feet in the drainage ravine area, around the former site ‘A’, and to the west of the former site ‘A’. Majority of these samples also contained petroleum concentrations above PCULs.

3.2 GROUNDWATER

During the 2019 initial Site investigation, arsenic and lead was detected above PCUL for potable water screening level in two grab groundwater samples at B-4 and B-6, and barium, cadmium, and chromium were detected above PCUL for potable water screening level in one grab groundwater sample at B-4. However, this was likely due to the high turbidity and total suspended solids (TSS) observed in the samples. Total and/or dissolved metals were analyzed for the monitoring well and grab groundwater samples collected during the 2022 RI activities. Some total metals were detected with concentrations above applicable PCUL for potable water; however, the dissolved metal detected concentrations were below the applicable PCULs, except for one grab groundwater sample at B-11 where the dissolved copper, lead, and mercury were above PCULs. This indicates that there is a difference in sample quality between grab groundwater and monitoring wells samples and that turbidity and TSS could influence total metal detections since the dissolved metals were lower and below applicable PCULs.

3.3 FOR FURTHER TESTING

The elevated copper concentrations in soil do not appear to be tied with the presence of organic contaminants. Arsenic, cadmium, lead, mercury, nickel, and zinc were detected at concentrations above their respective applicable screening levels in at least one sample. However, the total number of exceedances constituted less than 10 percent of the total number of samples and, except for lead and zinc, the highest exceedances were less than two times their respective screening levels indicating that these constituents do not pose a significant risk. The samples that have lead and zinc concentrations that are more than two times their screening levels also contain petroleum concentrations that are above the respective screening levels and will likely be addressed during the selected cleanup activities.

Barium and chromium were not detected at concentrations greater than the Ecology-derived natural background concentration.

Copper will be the primary focus of this background study as per Ecology's request for a natural background study (Ecology, 2025) to provide additional data to determine if the elevated copper concentrations are due to naturally occurring copper in soil in the region.

4. Background Study Activities

The field investigations will be conducted in general accordance with the methods and protocol described in the sampling analysis plan and quality assurance project plan (SAP/QAPP; Appendix A).

The copper background study activities will be performed to determine Site-specific natural copper background concentrations. Activities will include collecting soil samples for chemical analysis using hand tools and collecting global positioning system (GPS) coordinates at sample locations.

4.1 PREPARATORY ACTIVITIES

Prior to field work, several preparatory activities will be performed, as follows.

Sampling Analysis Plan and Quality Assurance Project Plan. Haley & Aldrich has prepared a SAP/QAPP for the background study activities. The SAP/QAPP was prepared in general accordance with the requirements of Washington Administrative Code (WAC) 173-340-820 for Tacoma Power. This document presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with the former Kosmos Mill Site (Site) characterization data collection activities to be conducted as part of the background study. Appendix A includes a copy of the SAP/QAPP.

Site-Specific Health and Safety Plan. Haley & Aldrich has prepared a site-specific health and safety plan (HASP) for the proposed background study activities. The HASP was prepared in general accordance with the Occupational Safety and Health Act and WAC 173-340-810. Haley & Aldrich personnel will have a copy of the HASP for their use during the field activities. Appendix B includes a copy of the HASP.

4.2 FIELD ACTIVITIES

The SAP/QAPP in Appendix A will guide environmental field sampling and laboratory analytical methods and procedures.

4.2.1 Soil Sample Collection

Haley & Aldrich staff will collect up to 16 incremental soil samples, including one duplicate sample, from up to 15 sample locations (Figure 4). Sample locations will be located in the field within approximately 1-acre areas. Sampling is assumed to begin at approximately 12 inches bgs, but if the soil appears to be disturbed or have large quantities of plant material (i.e. plant litter/duff), the starting sampling depth interval may change. Samples will be collected up to 5 feet bgs. Further details about sample collection are described in the SAP/QAPP (Appendix A). Soil samples will be collected from each location using a decontaminated hand auger or other hand tools.

Soil cuttings will be collected continuously from each sample location for description by Haley & Aldrich field staff. The soil will also be field screened for presence of anthropogenic fill (e.g., bricks, metal debris), sheen, and odors.

4.2.1.1 *Sample Exclusion Criteria*

Soil sample locations will be selected from the least-disturbed parts of the 1-acre sample area. Sampling locations within the sample area will be selected to represent a consistent set of depositional and land use conditions at each sampling location. The following areas were excluded when selecting sampling points:

- **Disturbed areas** (e.g., construction or farming activities, areas around concrete pads and foundations, areas around telephone poles, landscaped areas, camping areas, and areas of animal burrowing activity)
- **Areas composed primarily of rocks or gravel**, with no significant fine-grained soil content
- **Areas near wooden structures**, where the wood may have been treated
- **Areas near painted structures**
- **High-traffic areas** (e.g., roads, parking lots, sidewalks, and hiking trails)
- **Hummocks, paths used by animals or humans**, and other areas disturbed by tree fall or animal digging
- **Burn pits, fire pits, other incineration sources**, and areas adjacent to wood-burning fireplaces or chimneys
- **Areas of steep slopes or floodplains** with significant erosion or deposition
- **Forested areas dominated by immature trees**, areas that were recently reforested, and areas where there is evidence of recent fires
- **Transitional area between forested and undeveloped properties,** where dumping is more likely to occur

4.2.1.2 *Laboratory Analysis and Quality Assurance and Quality Control*

Laboratory analysis will be completed consistent with the protocols described in the SAP/QAPP (Appendix A). The SAP/QAPP was designed to guide aspects of laboratory and field analytical quality procedures and QA/QC requirements for analytical sampling and analysis.

Soil samples collected by Haley & Aldrich will be submitted under standard chain-of-custody procedures and will be analyzed as described in the SAP/QAPP.

4.2.1.3 *Cultural Resource Oversight*

If sample locations need to be altered outside of areas that have been culturally cleared, an experienced archaeological monitor will be present during the sample collection to assess and document the presence of any culturally significant resources. The monitor and crew will also utilize Tacoma Power's Unanticipated Discovery Plan (UDP) and Inadvertent Discovery Plan (IDP), in the event cultural materials or human remains are discovered during the testing. The UDP and IDP are provided in Appendix B.

4.3 DECONTAMINATION

To prevent cross contamination between sampling locations, clean, dedicated sampling equipment (e.g., disposable gloves) will be used, when possible, at each sampling location and discarded after use. Nitrile

gloves (or equivalent) will be worn during decontamination. A trash bag will be provided for waste (paper towels, used nitrile gloves, and other disposal waste).

Reusable equipment will be cleaned as follows: Remove excess soil and debris using paper towels or by dry brushing. Rinse with potable water. Wash with a spray bottle containing Liquinox™ (or equivalent non-phosphate detergent) and water; clean with a stiff-bristle brush until all evidence of stormwater solids or other material has been removed. Rinse with tap water, removing all soap from the previous step. Rinse with deionized or distilled water. Place the equipment on a piece of plastic to air dry.

4.4 IDW MANAGEMENT

Incidental trash generated during this investigation (including discarded nitrile gloves, aluminum foil, paper towels, and disposable equipment) will be placed in plastic trash bags and disposed of as solid waste. Excess soil collected during sampling will be used as backfill at the location(s) at which it was collected.

4.5 REPORTING

Upon completion of field work, the data collected will be statistically analyzed to determine background concentrations of select metals in the area around the Site. The data field work and data analysis, including the statistical analysis, will be used to supplement and finalize the RI report. Documentation of the fieldwork, data validation, and QA/QC will be provided, along with an evaluation of the analytical results, and recommendations for further assessment, if applicable.

4.5.1 Statistical Evaluation

Ecology's Environmental Information Management (EIM) Data Analysis Tool (EDAT) will be used to calculate natural background values for copper. Statistical evaluation of background values will be conducted in accordance with WAC 173-340-709 and Washington Department of Ecology's *Statistical Guidance for Ecology Site Managers,* dated August 1992.

References

1. AIRO Environmental Services Inc., 1993. Site Assessment Report, Former Kosmos Mill Site, Glenoma, Washington. Prepared for Tacoma Public Utilities. 31 March.

2. Haley & Aldrich, Inc., 2024. Public Review Draft Report on the Former Kosmos Mill Remedial Investigation, Kosmos Mill Oil Cleanup, Kosmos Flats Area. Prepared for Tacoma Public Utilities. 21 August.

3. Washington State Department of Ecology, 1992. Statistical Guidance for Ecology Site Managers, ECY 92-54. Washington State Department of Ecology Toxics Cleanup Program. 1 August.

4. Washington State Department of Ecology, 1994. Natural Background Soil Metals Concentrations in Washington State, ECY 93-115. Washington State Department of Ecology Toxics Cleanup Program. October.

5. Washington State Department of Ecology, 2025. Request for Natural Background Study, Kosmos Flats Area, Morton, Washington. Washington State Department of Ecology Toxics Cleanup Program. 23 January.

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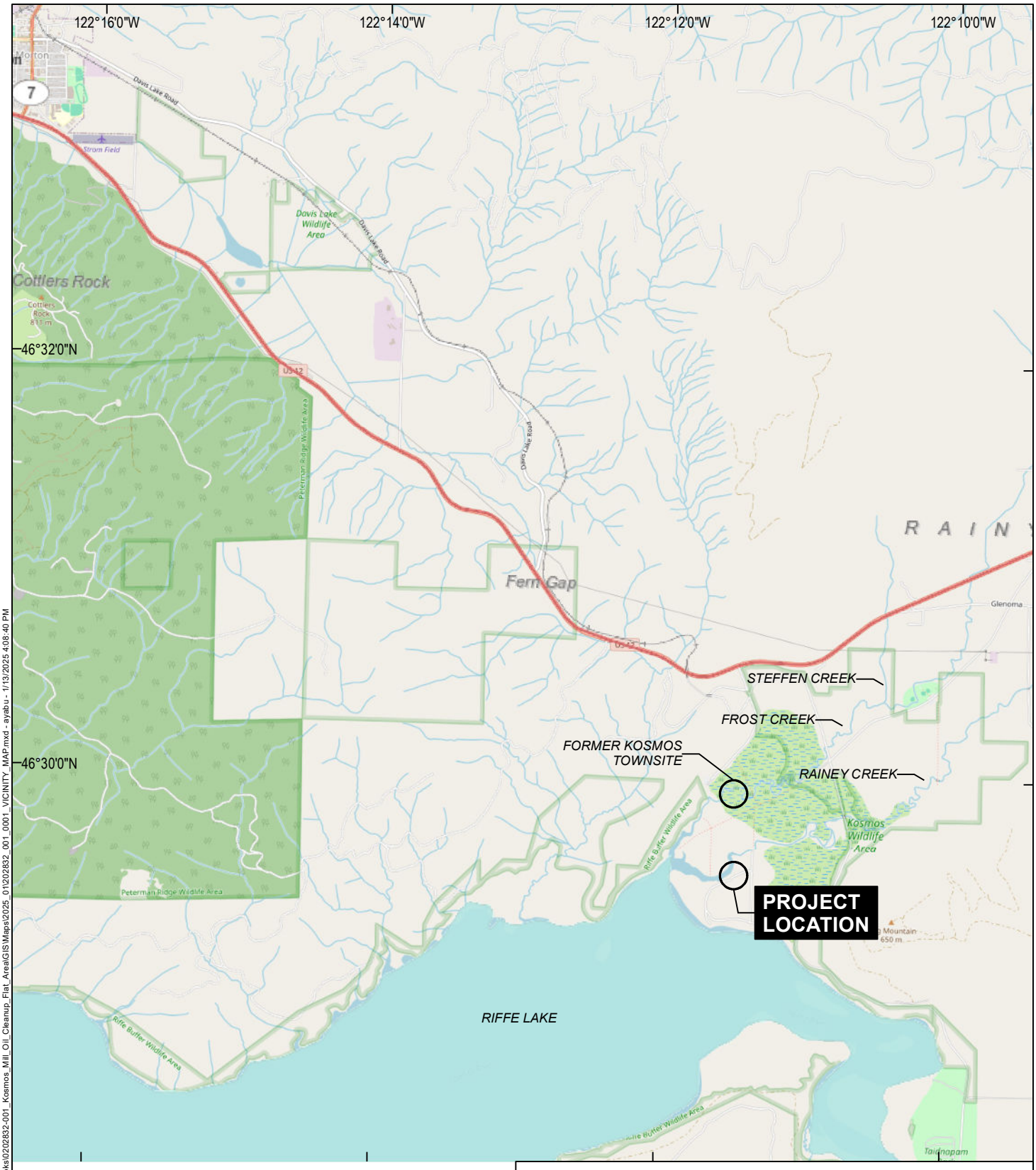
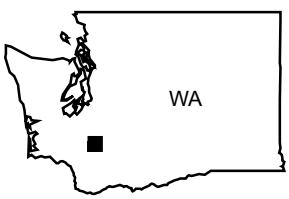
FIGURES





MAP SOURCE: OPEN STREET MAP
SITE COORDINATES: 46°29'47"N, 122°11'20"W

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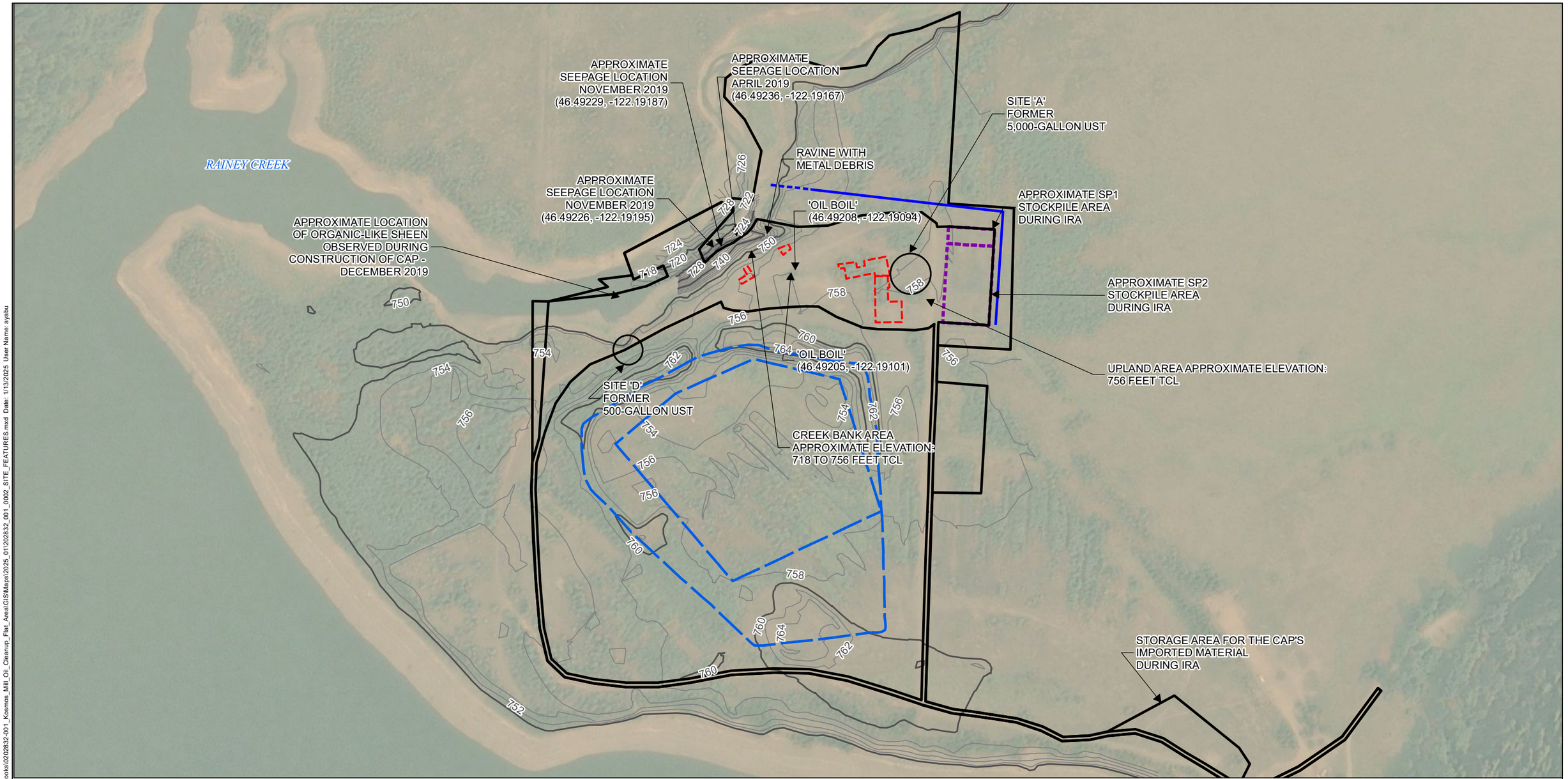
KOSMOS MILL
MORTON, WASHINGTON

VICINITY MAP

APPROXIMATE SCALE: 1 IN = 4000 FT
JANUARY 2025

FIGURE 1

GIS: \\haleyaldrich.com\share\sea_projects\Notebooks\0202832-001_Kosmos_Mill_Oil_Cleanup_Flat_Area\GIS\Maps\2025_01\202832_001_0001_VICINITY_MAP.mxd - ayabu - 1/13/2025 4:08:40 PM



LEGEND

- SURFACE WATER DIVERSION TRENCH
- 2019-2020 AREA OF POTENTIAL EFFECT
- APPROXIMATE FORMER STOCKPILE AREA
- APPROXIMATE LOCATION OF FORMER LOG POND
- OLD/ABANDONED BUILDING CONCRETE SLAB

NOTES:

1. ELEVATION CONTOURS, AERIAL PHOTOGRAPH, AND SITE FEATURES/LOCATIONS PROVIDED BY THE CITY OF TACOMA PUBLIC UTILITIES (TPU).
2. CONTOURS DERIVED FROM AERIAL 'FLYOVER' DONE APRIL 1998 WHEN RESERVOIR WAS AT ELEVATION 746.7 FEET TACOMA CITY LIGHT (TCL) DATUM. CONTOUR INTERVAL IS 2 FEET.
3. FEATURE LOCATIONS ARE APPROXIMATE.
4. THE EMERGENCY INTERIM REMEDIAL ACTION (IRA) BEGAN IN NOVEMBER 2019 AND WAS COMPLETED IN FEBRUARY 2020.
5. UST = UNDERGROUND STORAGE TANK.
6. AERIAL IMAGE SOURCE: ESRI

N

0 300 600

SCALE IN FEET

HALEY ALDRICH

KOSMOS MILL
MORTON, WASHINGTON

SITE FEATURES

JANUARY 2025

FIGURE 2

TP-43	5 - 7.5 (ft)	7.5 - 10 (ft)	12 - 14 (ft)
Cu	74.6	50.6/45	38.3
Pb	83.4	42.3 J/5.71 J	15.5
Zn	1120 J	597 J/62.9 J	85.3
Cd	1.35	<1/<1	<1

B-11	4 - 6 (ft)	12.5 - 15 (ft)	32.5 - 35 (ft)	47.5 - 50 (ft)
Cu	61.6 J-/48.8 J-	44.3 J-	32.5 J-	30.1 J-

B-16	2 - 4 (ft)	6 - 7 (ft)	12.5 - 15 (ft)	22.5 - 25 (ft)	47.5 - 50 (ft)
Cu	64.1 J-	56.1 J-	45.4 J-	41.2 J-	34.5 J-

TP-47	2.5 - 5 (ft)	7.5 - 10 (ft)
Cu	76	30.5
As	11.1 J	23.8 J

TP-32	2 - 2.5 (ft)
Cu	72.1

TP-42	2.5 - 3.5 (ft)
Pb	50.3
Zn	111

TP-48	2.5 - 5 (ft)	12.5 - 15 (ft)
Cu	85.1/56.7	34.6

MW-3S	3 - 3.8 (ft)	7 - 7.8 (ft)	12 - 12.8 (ft)
Cu	69	47.2/50.7	40.9

TP-45	5 - 6 (ft)
Cu	53.5

MW-3D	2.5 - 5 (ft)	7.5 - 10 (ft)	22.5 - 25 (ft)
Cu	69.7	52.5	49

B-17	2 - 4 (ft)	12.5 - 15 (ft)	22.5 - 25 (ft)	37.5 - 40 (ft)
Cu	56.8 J-/48.3 J-	51.9 J-	48.6 J-	48.4 J-

TP-36	0 - 3.5 (ft)
Cu	67.9
Zn	262

TP-36B	4 - 5 (ft)
Cu	85.9

TP-34	1.5 - 2.5 (ft)
Pb	68.8
Zn	106

TP-51	2.5 - 5 (ft)
Cu	34/55.3

B-12	2.5 - 5 (ft)	5 - 7.5 (ft)	12.5 - 15 (ft)	17.5 - 20 (ft)	47.5 - 50 (ft)
Cu	88.5	40.9	41.3	27.2	41.4

B-13	1 - 3 (ft)	10 - 11 (ft)	17.5 - 20 (ft)	47.5 - 50 (ft)
Cu	64 J-	37.9 J-	55.6 J-	30.2 J-
Pb	24.5	2.36	3.12	2.51

B-14	2 - 4 (ft)	10 - 11 (ft)	18 - 19 (ft)	37.5 - 40 (ft)
Cu	71.2 J-	53.6 J-	48.6 J-	41.9 J-

TP-28	2.5 - 5 (ft)
Cu	56.6

TP-25	2.5 - 5 (ft)
Cu	54.5

TP-29	5 - 6 (ft)
Cu	84.1

TP-24	0 - 2.5 (ft)
Cu	116 J/56.2 J
Pb	157 J/21.5 J
Zn	218/132

TP-59	4.5 - 5.5 (ft)	15 - 17 (ft)
Cu	87.8	40.5

TP-22	2.5 - 5 (ft)
Cu	71.6
Hg	0.25
Ni	59.5

TP-27	5 - 6 (ft)
Cu	69.6

MW-1D	7.5 - 10 (ft)	17.5 - 20 (ft)
Cu	58.5	49.1

TP-60	2.5 - 5 (ft)
Cu	76.5

TP-61	2.5 - 5 (ft)
Cu	77.6

MW-2D	2.5 - 5 (ft)	7.5 - 10 (ft)	17.5 - 20 (ft)
Cu	89.5/83.4	109	61.8
Hg	0.17/0.17	< 0.1	< 0.1
Zn	58.9/54.1	96.5	46.4

B-15	2.5 - 5 (ft)	12.5 - 15 (ft)	17.5 - 20 (ft)	22.5 - 25 (ft)	37.5 - 40 (ft)
Cu	37.1	58.8	55.9	58.8	53.3

SS-1, SS-2, SS-4, SS-5, SS-6, SS-7, SS-7-R, SS-8, SS-9, SS-10, SS-11, SS-12, SS-7A, SW-1, SW-2, SW-3, TP-37, SH5-22, SH4-22, TP-38, TP-39, TP-31, TP-32, TP-33, TP-34, TP-35, TP-36, TP-36B, TP-54, TP-40, TP-41, TP-43, TP-16, TP-46, TP-47, TP-58, TP-42, TP-44, TP-48, TP-45, TP-49, TP-55, TP-56, B-11, B-16, B-17, MW-3S, MW-3D, TP-52, TP-53, TP-50, TP-17, TP-21, B-14, TP-59, TP-22, TP-24, MW-4S, MW-4D, MW-2S, MW-2D, MW-1S, MW-1D, TP-51, TP-18, TP-60, TP-57, B-12, TP-19, TP-20, TP-61, B-15, TP-23, B-13, TP-26, TP-25, TP-27, TP-29, TP-28, TP-30

LEGEND

- MONITORING WELL (2022)
- BORING WITH GROUNDWATER SAMPLE (2022)
- TEST PIT (2022)
- SEDIMENT SAMPLE (2022)
- WATER SAMPLE (2022)
- SONIC BORING (2019)
- SOIL SAMPLE (2019)
- TEST PIT (2019)
- GROUNDWATER SAMPLE (2019)
- CURRENT RESERVOIR'S FULL-POOL OPERATING ELEVATION, 749 FEET TCL
- PIPE ENCOUNTERED, LEFT IN PLACE
- PIPE ENCOUNTERED, REMOVED
- TOPOGRAPHIC ELEVATION CONTOUR, 2-FT INTERVAL
- GPR AREA
- VISUAL INSPECTION AREA
- AREA OF PROTECTIVE CAP
- EXTENT OF IRA EXCAVATION
- FORMER STOCKPILE AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. BLUE SHADING INDICATES CONCENTRATIONS THAT EXCEED ONE OR MORE OF THE FOLLOWING CRITERIA AND EXCEEDS NATURAL BACKGROUND LEVELS FOR METALS (REFER TO TABLE 4 IN THE 2024 DRAFT REMEDIAL INVESTIGATION REPORT FOR CRITERIA EXCEEDANCES).
   - SMS LOWER TIER FRESHWATER BENTHIC SCO
   - MOST STRINGENT SOIL PCUL VADOSE ZONE PORTABLE GWSL #s 1-4, 8-10
   - MTCA ECOLOGICAL INDICATOR SOIL CONCENTRATIONS FOR PROTECTION OF WILDLIFE
3. DEFINITIONS:
   < = NOT DETECTED, VALUE IS THE LABORATORY REPORTING LIMIT
   J = VALUE IS AN ESTIMATE
   J- = VALUE IS AN ESTIMATE, BIASED LOW
   Cu = COPPER
   Hg = MERCURY
   Pb = LEAD
   Zn = ZINC
4. CHEM BOXES ARE ONLY DISPLAYED AT LOCATIONS WITH METAL EXCEEDANCES.
5. CONCENTRATIONS IN mg/kg (MILLIGRAMS PER KILOGRAM)
6. GREEN SYMBOLS INDICATES METALS ARE BELOW CRITERIA. ORANGE SYMBOLS INDICATES METALS ARE ABOVE BACKGROUND AND CRITERIA.
7. UST = UNDERGROUND STORAGE TANK
8. IRA = INDEPENDENT REMEDIAL ACTION.
9. GPR = GROUND PENETRATION RADAR
10. TOPOGRAPHIC ELEVATION CONTOURS AND SITE FEATURES DATA SOURCE: TPU
11. TOPOGRAPHIC ELEVATION CONTOUR DATUM: TACOMA CITY LIGHT (TCL) DATUM
12. AERIAL IMAGERY SOURCE: ESRI, 25 JUNE 2020

N

0 80 160

SCALE IN FEET

HALEY ALDRICH

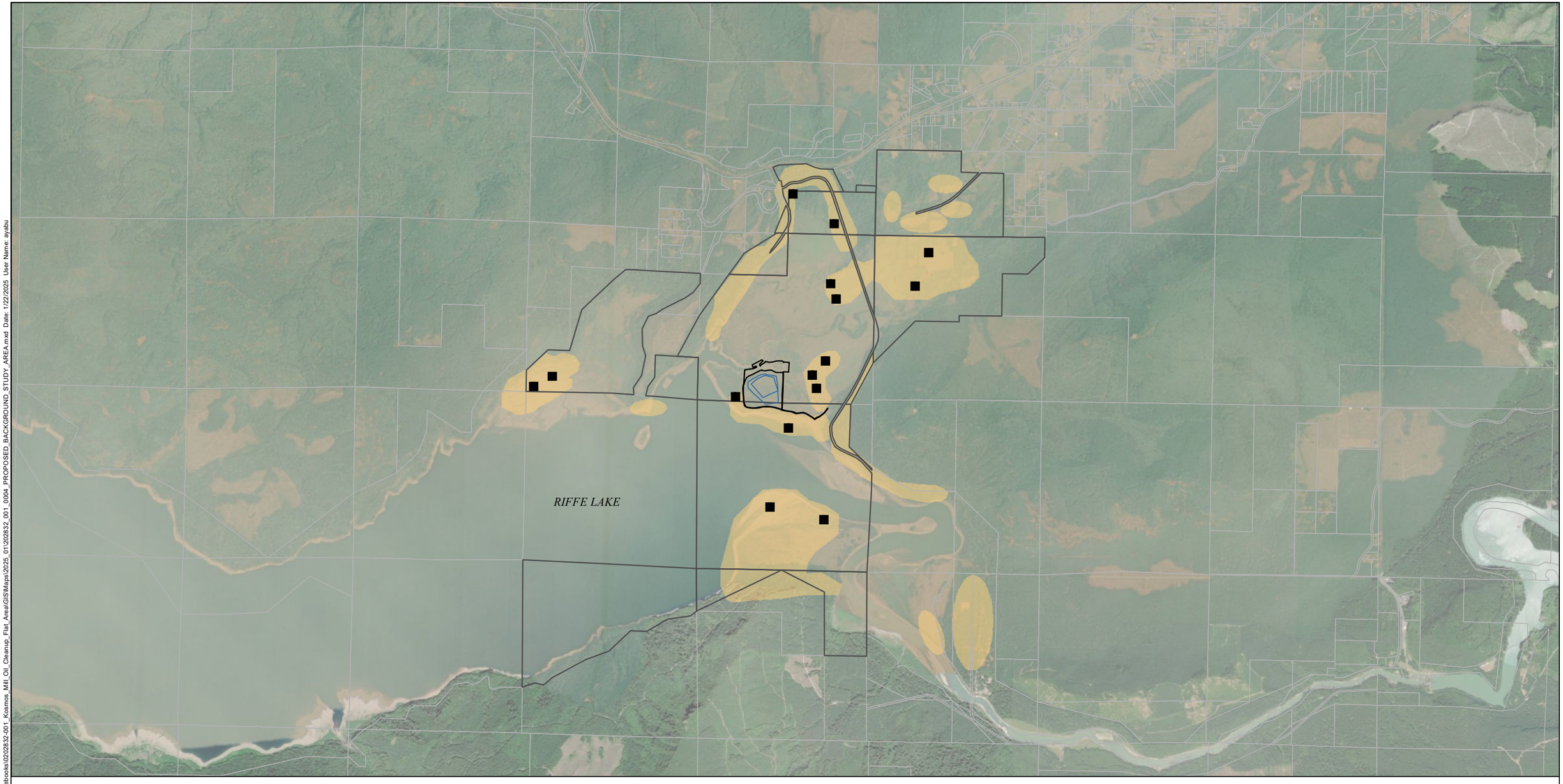
KOSMOS MILL
MORTON, WASHINGTON

METALS DETECTIONS GREATER THAN PRELIMINARY CLEANUP LEVELS IN SOIL

APRIL 2025

FIGURE 3

GIS: \\haleyaldrich.com\share\sea_projects\Notebooks\0202832-001_Kosmos_Mill_Oil_Cleanup_Flat_Area\GIS\Maps\2025_04\202832_001_0003_METALS_IN_SOIL.mxd - msdhweitzer - 4/17/2025 7:04:52 PM



LEGEND

- PROPOSED BACKGROUND STUDY SAMPLE AREA, APPROXIMATELY 1 ACRE
- APPROXIMATE LOCATION OF FORMER LOG POND
- 2019-2020 AREA OF POTENTIAL EFFECT
- CULTURALLY CLEARED
- CITY OF TACOMA PARCEL BONDARY
- PARCEL BOUNDARY

NOTES:

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. AERIAL IMAGE SOURCE: ESRI
3. PARCEL DATA SOURCE: LEWIS COUNTY

N

0 3,000 6,000

SCALE IN FEET

HALEY ALDRICH

KOSMOS MILL
MORTON, WASHINGTON

PROPOSED BACKGROUND STUDY AREA

JANUARY 2025

FIGURE 4

Document Path: \\haleyaldrich.com\share\sea_projects\Notebooks\022832-001_Kosmos_Mill_Oil_Cleanup_Flat_Area\GIS\Maps\2025_01\202832_001_0004_PROPOSED_BACKGROUND_STUDY_AREA.mxd Date: 1/22/2025 User Name: ayabu

APPENDIX A
SAP/QAPP

APPENDIX A

Sampling Analysis Plan and Quality Assurance Project Plan

1. Project Description

Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this Sampling and Analysis Plan and Quality Assurance Project Plan (SAP/QAPP) consistent with the requirements of Washington Administrative Code (WAC) 173-340-820 for The City of Tacoma, Power Division (Tacoma Power). This document presents the organization, objectives, planned activities, and specific quality assurance/quality control procedures associated with the former Kosmos Mill Site (Site) characterization data collection activities to be conducted as part of the background study. This data collection effort is being performed as part of the Tacoma Power remedial investigation process to determine the natural background concentrations for select metals for the Site. The goal of the sampling is to generate data of sufficient quality to supplement the data collected during the RI to distinguish site-related concentrations of metals from non-site related concentrations of hazardous substances. The project goals and objectives are presented in the main text of the RI Work Plan.

This SAP/QAPP provides guidance to field personnel involved in the data collection field activities to ensure that data quality is maintained. Any future changes to the data collection effort (such as changes in sample locations, sampling frequency, and/or chemical analyses) will be done during background study, discussed with Tacoma Power, and documented in the RI report.

Specific protocols for sampling, sample handling and storage, chain-of-custody, and laboratory and field analyses are described in this SAP/QAPP. Appendix B of the RI Work Plan presents the project-specific Health and Safety Plan (HASP). A copy of the SAP/QAPP and the HASP will be available in the field when completing the data collection activities.

2. Field Sampling Procedures

2.1 SITE ACCESS

Tacoma Power has granted access to Haley & Aldrich to conduct environmental investigation activities. Haley & Aldrich will coordinate activities directly with Tacoma Power and will notify the project manager before beginning work at the Site.

2.2 SOIL SAMPLING

Sixteen soil samples, including one duplicate, will be collected using hand tools (e.g., stainless-steel hand augers and shovels) up to a depth of 5 feet bgs. Sample locations will be selected within the sample 1-acre areas shown on Figure 4. If underground obstacles such as concrete slabs, large cobbles or boulders, or evidence of the exclusion criteria described in the main body of the work plan are encountered, the sample locations will be relocated as needed to collect the sample. Ecology will be notified for any modifications of the locations outside of the sample areas.

2.2.1 Soil Screening

Soil obtained from explorations will be field screened for environmental impacts. Visual and olfactory observations will be noted and may also be used to select samples for analysis. The effectiveness of field screening methods varies with temperature, moisture content, organic content, soil type, and age of the constituents. For soil with relatively higher petroleum concentrations, there will likely be observable indicators of environmental impacts. Soil may be stained or discolored so that it is visibly noticeable compared to typical soil colors. Sheens may also cause the soil to have a shiny or glossy appearance. Odors may also be present ranging from very faint to strong and from sweet smelling to pungent. Odors are usually detected inadvertently during field activities and are usually noticeably different than typical odors in air.

2.2.2 Soil Sampling

Soil samples will be collected from each sample location using incremental sampling methodology (ISM). ISM sampling is a favorable composite sampling and processing methodology because it reduces data variability and provides a statistically sound mean concentration of contaminants in the sampled soil volume.

Soil samples will be collected from soil material collected between 1 and 5 feet bgs (or until refusal) using a hand auger and/or hand tools. Samples will be composed of 30 sub-samples collected at randomized depths generated in the field as a function of total depth to reduce the potential for sampling bias (ITRC, 2020). Sampling intervals within the explorations may be modified in the field (based on field observations) if needed to delineate the vertical extent of soil horizons. Soil samples will be collected for classification, field screening, laboratory processing, and chemical analysis, as described below.

Soil-sampling equipment will be decontaminated before it is used at each sampling location. Where disposable (one-time use) equipment is used, it will be properly discarded after use at one sample, and a new piece will be used for the next sample. Soil samples will be obtained by hand, using a new, uncontaminated glove; or with a decontaminated stainless-steel spoon, trowel, or knife. Soil samples will be homogenized in a stainless-steel bowl before being placed in an unpreserved glass jar for analysis metals. Laboratory methods are provided in Section 4.0.

During sampling, a description of soil conditions and visual and olfactory observations will be recorded on boring logs by a geologist or hydrogeologist licensed in the State of Washington, or by a person working under the direct supervision of a Washington-State-licensed geologist or hydrogeologist in accordance with ASTM International (ASTM) Method D2488. Soil samples will be labeled according to the boring number and the order the sample was collected (e.g., BSS-1). The duplicate soil sample will be labeled according to the duplicate number (e.g., BS-FD-1).

Sample containers will be packed in iced shipping containers (coolers) with chain-of-custody documentation and delivered or shipped to the laboratory. One duplicate soil sample will be collected from one of the sample locations.

2.3 DECONTAMINATION PROCEDURES

To prevent cross contamination between sampling locations, clean, dedicated sampling equipment (e.g., disposable gloves) will be used when possible at each sampling location and discarded after use. Nitrile gloves (or equivalent) will be worn during decontamination. A trash bag will be provided for waste (paper towels, used nitrile gloves, and other disposal waste).

Reusable equipment will be cleaned as follows: Remove excess soil and debris using paper towels or by dry brushing. Rinse with potable water. Wash with a spray bottle containing Liquinox™ (or equivalent non-phosphate detergent) and water; clean with a stiff-bristle brush until all evidence of stormwater solids or other material has been removed. Rinse with tap water, removing all soap from the previous step. Rinse with deionized or distilled water. Place the equipment on a piece of plastic to air dry.

2.4 IDW MANAGEMENT

Material from the sample locations will be placed back into the holes once sampling is completed. Disposable sampling equipment (e.g., sample tubing) and PPE will be placed in plastic bags after use and disposed of as solid waste.

3. Sample Handling Procedures

3.1 SAMPLE PRESERVATION AND HOLDING TIMES

Samples will be preserved according to the requirements of the specific analytical methods to be employed, and all samples will be extracted and analyzed within method-specified holding times.

3.2 CHAIN-OF-CUSTODY AND SHIPPING PROCEDURES

3.2.1 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 or package containing samples so the package cannot be opened without breaking the seals.

3.2.2 Sample Shipping/Delivery Procedures

After sample containers have been filled, they will be packed with ice in secured bags in coolers. The coolers will be transferred to an Ecology-accredited laboratory (Friedman & Bruya Environmental Labs) for chemical analysis. Chain-of-custody procedures will commence in the field and will track delivery of the sample to the analytical laboratory. 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 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. Laboratory Analyses

Soil samples will be prepped using ISM procedures and analyzed for copper using U.S. Environmental Protection Agency (EPA) Methods 6020B. ISM laboratory processing procedures include air drying, particle size selection (sieving), potentially particle size reduction, and subsampling. Additional information on selected laboratory processing can be found at the end of this appendix.

5. Quality Assurance and Quality Control

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, laboratory duplicate relative percent differences (RPDs), calibration criteria (as provided), spike blank/spike blank duplicate recoveries, and matrix spike/matrix spike duplicate (MS/MSD) recoveries.

5.1 DATA QUALITY INDICATORS

The overall quality assurance objectives for field sampling, field measurements, and laboratory analysis are to produce data of known and appropriate quality. The procedures and quality control 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 quality control 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 replicates 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, 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
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. For results to be considered complete, all quality control 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 QUALITY ASSURANCE 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, accuracy, representativeness, and completeness 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 an all results using quality control summary sheet results provided by the laboratory for each report. Data evaluation reviews are based on the quality control requirements previously described and follow the format of the EPA National Functional Guidelines for Organic Superfund Methods Data Review (EPA, 2017), 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:

- That sample numbers and analyses match the chain-of-custody request;

- Sample preservation and holding times;
- That instrument tuning, calibration, and performance criteria were achieved;
- That laboratory blanks were analyzed at the proper frequency and that no analytes were present in the blanks;
- That laboratory duplicates, MSs, and laboratory control samples were run at the proper frequency and that control limits were met; and
- That required detection limits were achieved.

Data qualifier flags, beyond any applied by the laboratory, will be added to sample results that fall outside the quality control 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 quality control criteria were slightly exceeded.

UJ The compound was analyzed for, but not detected. The associated numerical value is an estimated reporting limit because quality control criteria were not met.

T The associated numerical value is an estimated quantity because reported concentrations were less than the practical quantitation limit (lowest calibration standard).

R Data are not usable because of significant exceedance of quality control 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, and analytical methods used, and description of any problems or exceedance of quality control criteria and corrective action taken. The laboratory manager or a designee must sign the narrative;
- Copies of chain-of-custody forms 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;
- Summary of calibration results;
- Blank summary results indicating samples associated with each blank;
- MS/MSD result summaries with calculated percent recovery and relative percent differences;

- Laboratory control sample results, when applicable, with calculated percent recovery; and
- Electronically formatted data deliverable results in Ecology EIM format.

6.2 DATA EVALUATION, ANALYSIS, AND REPORTING

After the planned fieldwork, sample analysis, and data quality review, results will be compared with the appropriate screening levels. The draft RI report will be updated in accordance with Section VII.D of the Agreed Order. The report will include a map with sampling locations, figures and cross sections with areas and elevations of contamination, tabulated analytical testing data compared to PCULs, sample depth, chemical data quality review, and laboratory analytical reports. The report will include statements on any limitations on the data use that are the result of adverse QC exceedances, as identified in Section A5.2, Data Quality Assurance Review. A public review draft RI Report will be completed after incorporating comments from Ecology.

References

1. ASTM International, 2009. ASTM D2488-09a, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). American Society for Testing Materials. ASTM International, West Conshohocken, Pennsylvania.
2. U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste; Physical/Chemical Methods, SW-846, 3rd Update. Environmental Protection Agency.
3. EPA, 1992. Specifications and Guidance for Contaminant-Free Sample Containers. Environmental Protection Agency. OSWER Directive 92.0-05A.
4. EPA, 2008. US EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review. Environmental Protection Agency. EPA-540-R-08-01, June 2008.
5. Interstate Technology and Regulatory Council (ITRC), 2020. Incremental Sampling Methodology (ISM) Update ISM-2. The Interstate Technology and Regulatory Council, ISM-2 Team. Washington, D.C.
6. Standard Methods, 1989. Standard Methods for the Examination of Water and Wastewater. 17th Edition, American Water Works Association.

Sample Drying and Sieve Preparation for Multi Increment Soil Sampling

Friedman & Bruya, Inc.
Standard Operating Procedure

Revision Number 3
May 9, 2023

Approved by

Extraction Manager:

Eric Young

Quality Assurance Manager:

Stephanie Pham

Document Control
Number 3

1.0 SCOPE, APPLICATION, AND SUMMARY

1.1 This Standard Operating Procedure (SOP) is used by Friedman and Bruya, Inc. (F&BI) to prepare soil and solid samples that require sieve and/or drying prior to extraction and analysis, including sub samples collected for soil multi increment sampling.

1.2 Deviation from the procedures outlined in this SOP may sometimes be needed, due to specific project requirements, or due to laboratory circumstances. Deviations are documented using the extraction worksheet, analysis logs, and/or other documents such as the non-conformance report form.

2.0 METHOD BASIS

The following regulatory method serves as the basis for this standard operating procedure. Adherence to the minimum criteria set forth in this method is a general data quality objective of this SOP.

2.1 State of Alaska Department of Environmental Conservation, "Draft Guidance on Multi Increment Soil Sampling", March 2009.

3.0 DEFINITIONS

3.1 A list of definitions for terms used in this SOP may be found in the F&BI Quality Assurance Manual, appendix F.

4.0 SAFETY

4.1 The most important safety measure is to handle all samples and equipment in an appropriate manner to ensure a minimum of personal danger and exposure to potentially hazardous chemicals.

4.2 When samples are handled, appropriate personal protection equipment (PPE) should be used. Gloves, lab coat, and goggles are all available for use.

4.3 Glassware can break at any time, so caution needs to be used at all times when handling it. Cut resistant gloves are available for use.

4.4 MSDSs for all chemicals in the lab are available to all employees. They are located in the GC room, and all employees are strongly encouraged to read them.

4.5 Analysts are required to complete general safety training prior to performing any analysis. Details of initial and on-going safety training are provided in the F&BI Quality Assurance Manual and "Training" SOP.

4.6 If uncertain about the safety of a material or procedure or in the event that a spill or other potentially hazardous situation arises, notify your supervisor or any chemist immediately.

5.0 INTERFERENCES

5.1 Certain sample matrices may not be amenable to sieving, such as peat or tundra. Alternate sample processing measures would be required for those media.

6.0 APPARATUS AND EQUIPMENT

6.1 #10 Sieve – particle size <2mm

6.2 Drying Pans (Aluminum or Pyrex)

6.3 Stainless Steel Scoopula

6.4 Analytical Balance

6.5 4 oz. or 8 oz. Glass Jars with Lid

6.6 Steel Baking Sheet or Other Tray

6.7 Stainless Steel Bowl

7.0 REAGENTS AND CHEMICALS

7.1 Methylene Chloride, pesticide grade or better

7.2 Alconox

8.0 SAMPLE HANDLING, PRESERVATION, AND PREPARATION

8.1 Before preparing the samples, double check the sample identification on the container to that listed on the Chain of Custody. Document that the sample ID has been checked by initialing the extraction worksheet.

8.1.1 If more than one container exists for the sample, write the corresponding letter of the container used in the extraction on the extraction paperwork.

8.2 Note any unexpected sample characteristics on the extraction worksheet under "Observations" heading.

8.3 <u>Sample Moisture Determination Procedure</u>

8.3.1 The analyst will perform the following to determine if the sample will require a drying procedure. Drying should only be performed if necessary.

8.3.2 Visually inspect the sample to determine if free liquid is present. Samples containing a visible liquid layer will require drying prior to sieve

preparation.

8.3.3 For samples that do not contain free liquid but appear moist, a small amount of sample (~10.0 grams) will be tested in the sieve. The sample will require the drying procedure if sample fines do not pass through the sieve screen.

8.4 Sample Drying Procedure

8.4.1 Assign F&B sample ID to a drying pan.

8.4.2 Empty the entire contents of the sample container into the drying pan to a depth of ½ to 1 inch in thickness.

8.4.3 Place drying pan in fume hood at ambient temperature until processing.

8.4.4 Drying at elevated temperatures, i.e. "baking" is not allowed. Turning the soil can be used to facilitate the drying process.

8.4.5 Drying is acceptable for less temperature sensitive contaminants such as metals, PCBs, DRO, RRO, etc. Drying may not be appropriate for some contaminants, including volatile constituents or PAHs. If samples are processed for non-appropriate testing, the data will be estimated and qualified appropriately.

8.5 Sieve Procedure

8.5.1 Wash sieve with warm water and Alconox and allow to dry.

8.5.2 For samples requiring organic analysis, triple rinse sieve screen with methylene chloride and allow to dry.

8.5.3 Place entire contents of sampling container or drying pan into the sieve. The minimum amount of sample required for sieve preparation is 30 g.

8.5.4 Shake sieve for 2 minutes.

8.5.5 Remove sample collection tray from sieve and collect the entire contents into a labeled 4 oz. or 8 oz. glass jar.

8.5.6 When multiple sub samples are sieved, the entire contents of each sieved sub sample will be poured into a stainless steel bowl, stirred for a minimum of 30 seconds and collected for sample analysis.

9.0 SAMPLE ANALYSIS

9.1 Wash a steel baking sheet or other tray with warm water and Alconox and allow to dry.

9.2 For samples requiring organic analysis, triple rinse the tray with methylene chloride and allow to dry.

9.3 Pour the entire contents of the sample into the tray to a depth of no more than ½ inch.

9.4 Individual aliquots of sample will be randomly scooped from a minimum of 30 distinctly different areas of the tray and added to the extraction vessel until the required sample amount is reached.

10.0 QUALITY CONTROL AND CORRECTIVE ACTIONS

General quality control procedures are outlined in the corresponding F&B analytical method SOPs. F&BI QC procedures are described in sections 12 and 13 of the QA Manual. If, following corrective actions, quality control results still fail, or if corrective actions are not possible, then affected results are reported with appropriate qualifying flags.

The minimum requirements for QC samples analyzed with each preparation batch (within 24 hours) of up to 20 samples are:
1 sample duplicate

11.0 DATA ARCHIVAL

11.1 The hardcopy of the QA paperwork is filed in the extraction room on the paperwork desk.

11.2 The extraction paperwork for each project is filed in the downstairs filing cabinets with the hardcopies of the final reports.

12.0 HAZARDOUS WASTE MANAGEMENT AND POLLUTION PREVENTION

12.1 Hazardous waste managements procedures are found in the F&BI QA Manual section 10, and the "Disposal" SOP.

12.2 Actions that can result in the reduction or elimination of chemical wastes and chemical pollutants associated with this SOP are strongly encouraged. Such actions should be discussed with the Executive Committee for approval prior to implementation.

END OF DOCUMENT

APPENDIX B
Unanticipated Discovery Plan and Inadvertent Discovery Plan

APPENDIX C
UNANTICIPATED DISCOVERY PLAN

PLAN AND PROCEDURES FOR DEALING WITH THE UNANTICIPATED DISCOVERY OF CULTURAL RESOURCES (INCLUDING HUMAN REMAINS) DURING THE RELICENSE PERIOD FOR TACOMA POWER'S COWLITZ RIVER HYDROELECTRIC PROJECT (FERC NO. 2016) IN LEWIS COUNTY, WASHINGTON

1. INTRODUCTION

The Federal Energy Regulatory Commission (FERC) relicensed the Cowlitz River Hydroelectric Project (FERC No. 2016) (Project) for a 35-year period beginning July 18, 2003. The Cultural Resource Management Plan became effective on that date.

Tacoma Power contracted for a series of cultural resource studies for the Project, including survey and test excavations. This work included the preparation of a Cultural Resource Management Plan, which includes mitigation and management measures. During the course of the studies and document preparation, Tacoma consulted with the Cowlitz Indian Tribe, the Yakama Nation, and the State Department of Archaeology and Historic Preservation.

Undiscovered archaeological materials, including human remains, could exist in the Project Area. This document describes plans for dealing with unanticipated discoveries of human remains, artifacts, or cultural resource sites during the period of the new license. This plan is intended to provide guidance to personnel of Tacoma Power and its contractors so that they can:

- Comply with applicable Federal and State laws and regulations, particularly 36 CFR 800.13 (revision of June 1999) of the regulations that implement Section 106 of the National Historic Preservation Act of 1966, as amended; Title 27 Revised Code of Washington Chapter 27.44 Indian Graves and Records and Chapter 27.53 Archaeological Sites and Resources.

- Describe to regulatory and review agencies the procedures Tacoma Power will follow to prepare for and deal with unanticipated discoveries, and

- Provide direction and guidance to project personnel as to the proper procedure to be followed should an unanticipated discovery occur.

2. PROCEDURES FOR THE FINDING OF HUMAN SKELETAL MATERIALS

Any human remains that are discovered during relicensing studies will at all times be treated with dignity and respect. The affected Indian Tribes are the Yakama Nation and the Cowlitz Indian Tribe.

A. If any employee of Tacoma Power or one of its contractors or subcontracts believes that he or she has made an unanticipated discovery of human skeletal remains, all work adjacent to the discovery shall cease. Representatives of Tacoma Power will be notified. The area of work stoppage will be adequate to provide for the security, protection, and integrity of the remains, in accordance with Washington State law.

B. Representatives of Tacoma Power will be responsible for taking appropriate steps to protect the discovery. At a minimum, the immediate area of discovery will be flagged. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site.

C. Tacoma Power will immediately call the Lewis County Sheriff's office and a cultural resource consultant qualified to identify human remains. Tacoma Power will state that the find may be a burial, that the affected Indian tribes are very concerned about burials, and that the find must be treated confidentially. The Sheriff's office may arrange for a representative of the county coroner's office to examine the discovery and will determine whether it should be treated as a crime scene or as a human burial.

D. If the remains are determined to be Native American, Tacoma Power will notify the State Office of Archaeology and Historic Preservation, the affected Indian Tribes, and the Federal Energy Regulatory Commission (FERC) as listed in Attachment A. These parties and Tacoma Power will consult to determine what treatment is appropriate for the remains.

E. If disinterment of aboriginal human remains becomes necessary, the consulting parties, which will include the State Office of Archaeology and Historic Preservation, the affected

Indian Tribes, Tacoma Power, and the FERC, will jointly determine the final custodian of the human remains.

F. Tacoma Power PUD will make a good faith effort to accommodate requests from the affected Indian Tribes that they be present during any phase of the implementation of mitigation measures related to human remains.

3. PROCEDURES FOR THE FINDING OF ARCHAEOLOGICAL DISCOVERIES

A. If any employee of Tacoma Power, its contractors, or its subcontractors believes that he or she has found a cultural resource discovery, all work adjacent to the discovery shall cease. Representatives of Tacoma Power will be notified. The area of work stoppage will be adequate to provide for the security, protection, and integrity of the remains. A cultural resource discovery could be prehistoric or historic and consist of, for example:

- An area of charcoal or charcoal -stained soil
- An arrowhead, stone tool, or stone chips
- A cluster of bones or burned rocks in association with stone tools or chips
- A cluster of tin cans or bottles, logging or agricultural equipment older than 50 years

B. If the Tacoma Power representative believes that the discovery is a cultural resource, the representative will take appropriate steps to protect the discovery site. At a minimum, the immediate area of the discovery site will be flagged. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed.

C. Tacoma Power will arrange for the discovery to be evaluated by a qualified archaeologist. The archaeologist will recommend whether the discovery is potentially eligible for listing in the National Register of Historic Places.

D. The archaeologist or archaeological technician will immediately contact the Department of Archaeology and Historic Preservation, and Tacoma Power to seek consultation regarding the National Register -eligibility of the discovery. If Tacoma Power and DAHP representatives determine that the discovery is an eligible aboriginal deposit, they and the affected Indian Tribes will consult to determine appropriate treatment of it. Treatment measures may include protection in place or data recovery such as mapping, photography, limited probing and sample collection, or other activity.

The archaeologist will implement the appropriate treatment measure(s) and provide a report on their methods and results to the consulting parties.

Attachment A – Cowlitz River Hydroelectric Project – Parties to Contact

Lewis County Sheriff's Office
911 (State that the situation is not life-threatening)

Tacoma Power's Archaeologist
Dylan Henderson 206-779-9470 (cell)

Secondary Tacoma Power Contacts
Teresa Loo 253-392-5136 (cell)
Sina Stennes 253-384-0717 (cell)

Archaeological Consultants
Cultural Resource Consultants
Margaret Berger
206-855-819-9020 (office)

State Department of Archaeology and Historic Preservation
Dr. Robert G. Whitlam, State Archaeologist
360-890-2615 (DAHP office)

Cowlitz Indian Tribe
James Gordon/Jon Shellenberger, Tribal Historic Preservation Officer, Cultural Program
360-577-6962 Tribal office

Yakama Nation
Noah Oliver, Cultural Resource Program
509-865-5121, Ext.4766
Casey Barney, Cultural Resource Program
509-865-5121, Ext. 4720

Federal Energy Regulatory Commission
David Turner Branch Chief
202-502-6091

COWLITZ INDIAN TRIBE

INADVERTENT DISCOVERY LANGUAGE

In the event any archaeological or historic materials are encountered during project activity, work in the immediate area (initially allowing for a 100' buffer; this number may vary by circumstance) must stop and the following actions taken:

1. Implement reasonable measures to protect the discovery site, including any appropriate stabilization or covering; and
2. Take reasonable steps to ensure the confidentiality of the discovery site; and,
3. Take reasonable steps to restrict access to the site of discovery.

The project proponent will notify the concerned Tribes and all appropriate county, state, and federal agencies, including the Department of Archaeology and Historic Preservation. The agencies and Tribe(s) will discuss possible measures to remove or avoid cultural material, and will reach an agreement with the project proponent regarding actions to be taken and disposition of material.

If human remains are uncovered, appropriate law enforcement agencies shall be notified first, and the above steps followed. If the remains are determined to be Native, consultation with the affected Tribes will take place in order to mitigate the final disposition of said remains.

See the Revised Code of Washington, Chapter 27.53, "Archaeological Sites and Resources," for applicable state laws and statutes. See also Washington State Executive Order 21-02, "Archaeological and Cultural Resources." Additional state and federal law(s) may also apply.

It is strongly encouraged copies of inadvertent discovery language/plan are retained on-site while project activity is underway.

Contact information:

James Gordon – Tribal Historic Preservation Officer
Cowlitz Indian Tribe
PO Box 2547
Longview, WA 98632

Cellular: 360-957-3004
jgordon@cowlitz.org

Revised 20 February 2024

APPENDIX C
HASP

HALEY & ALDRICH, INC.
SITE-SPECIFIC SAFETY PLAN

FOR

Former Kosmos Mill

Morton, Washington

Project/File No. 0202832-001

Prepared By: Andrew Nakahara	**Date: 1/17/2025**
Approvals: The following signatures constitute approval of this Health & Safety Plan.	
Field Safety Manager:	**Date:**
Project Manager: Angie Goodwin	**Date: 1/17/2025**
HASP Valid Through:	

Table of Contents

Attachments

STOP WORK AUTHORITY

In accordance with Haley & Aldrich (Haley & Aldrich) Stop Work Authority Operating Procedure (OP1035), any individual has the right to refuse to perform work that he or she believes to be unsafe without fear of retaliation. He or she also has the authority, obligation, and responsibility to stop others from working in an unsafe manner.

STOP Work Authority is the stop work policy for all personnel and subcontractors on the Site. When work has been stopped due to an unsafe condition, Haley & Aldrich site management (e.g., Project Manager [PM], Site Health & Safety Officer [SHSO], etc.) and the Haley & Aldrich Senior Project Manager (SPM) will be notified immediately.

Reasons for issuing a stop work order include, but are not limited to:

- The belief/perception that injury to personnel or accident causing significant damage to property or equipment is imminent.
- A Haley & Aldrich subcontractor is in breach of site safety requirements and/or their own site HASP.
- Identifying a substandard condition (e.g., severe weather) or activity that creates an unacceptable safety risk as determined by a qualified person.

Work will not resume until the unsafe act has been stopped OR sufficient safety precautions have been taken to remove or mitigate the risk to an acceptable degree. Stop work orders will be documented as part of an on-site stop work log, on daily field reports to include the activity/activities stopped, the duration, person stopping work, person in-charge of stopped activity/activities, and the corrective action agreed to and/or taken. Once work has been stopped, only the Haley & Aldrich SPM or SHSO can give the order to resume work. Haley & Aldrich senior management is committed to support anyone who exercises his or her “Stop Work” authority.

ISSUANCE AND COMPLIANCE

This HASP has been prepared in accordance with Occupational Safety and Health Administration (OSHA) regulations (CFR 29, Parts 1904, 1910, and 1926) if such are applicable.

The specific requirements of this HASP include precautions for hazards that exist during this project and may be revised as new information is received or as site conditions change.

- This HASP must be signed by all Haley & Aldrich personnel involved in implementation of the SOW (Section 2 of this HASP).
- This HASP, or a current signed copy, must be retained at all times when Haley & Aldrich staff are present.
- Revisions to this HASP must be outlined within the contents of the HASP. If immediate or minor changes are necessary, the Field Safety Manager (FSM), Haley & Aldrich, SHSO and/or Project Manager (PM) may use Attachment 1 (HASP Amendment Form), presented at the end of this HASP. Any revision to the HASP requires employees and subcontractors to be informed of the changes so that they understand the requirements of the change.
- Deviations from this HASP are permitted with approval from the Haley & Aldrich FSM, PM, or Senior Health & Safety Manager (SHSM). Unauthorized deviations may constitute a violation of Haley & Aldrich company procedures/policies and may result in disciplinary action.
- This HASP will be relied upon by Haley & Aldrich's subcontractors and visitors to the site. Haley & Aldrich's subcontractors must have their own HASP which will address hazards specific to their trade that is not included in this HASP. This HASP will be made available for review to Haley & Aldrich's subcontractors and other interested parties (e.g. Facility personnel and regulatory agencies) to ensure that Haley & Aldrich has properly informed our subcontractors and others of the potential hazards associated with the implementation of the SOW to the extent that Haley &Aldrich is aware.

This site-specific HASP provides only site-specific descriptions and work procedures. General safety and health compliance programs in support of this HASP (e.g., injury reporting, medical surveillance, personal protective equipment [PPE] selection, etc.) are described in detail in the Haley &Aldrich Corporate Health and Safety Program Manual and within Haley & Aldrich's Standard Operating Procedures. Both the manual and SOPs can be located on the Haley & Aldrich's Company Intranet. When appropriate, users of this HASP should always refer to these resources and incorporate to the extent possible. The manual and SOPs are available to clients and regulators upon request.

EMERGENCY EVENT PROCEDURES

1 - ASSESS THE SCENE

- **STOP WORK**
- Review the situation and ascertain if it's safe to enter the area.
- Evacuate the site if the conditions are unsafe.

2 - EVALUATE THE EMERGENCY

- **Call 911, or designated emergency number, if required.**
- **Provide first aid for the victim if qualified and safe to do so.**
  - First aid will be addressed using the onsite first aid kit. *
    - If providing first aid, remember to use proper first aid universal precautions if blood or bodily fluids are present.
- **If exposure to hazardous substance is suspected, immediately vacate the contaminated area.**
  - Remove any contaminated clothing and/or equipment.
  - Wash any affected dermal/ocular area(s) with water for at least 15 minutes.
  - Seek immediate medical assistance if any exposure symptoms are present.

**Note: Haley & Aldrich employees are not required or expected to administer first aid / CPR to any Haley & Aldrich staff member, Contractor, or Civilian personnel at any time; it is Haley & Aldrich´s position that those who do are doing so on their own behalf and not as a function of their job.*

3 - SECURE THE AREA

- **Cordon off the incident area, if possible.**
  - Notify any security personnel, if required.
  - Escort all non-essential personnel out of the area, if able.

4 - REPORT ON-SITE ACCIDENTS / INCIDENTS TO PM / SSO

- **Notify the PM and SHSO as soon as it is safe to do so.**
  - Assist PM and SHSO in completing any additional tasks, as required.

5 - INVESTIGATE / REPORT THE INCIDENT

- **Record details of the incident for input to the Gensuite.**
  - Complete any additional forms as requested by the PM and SSO.

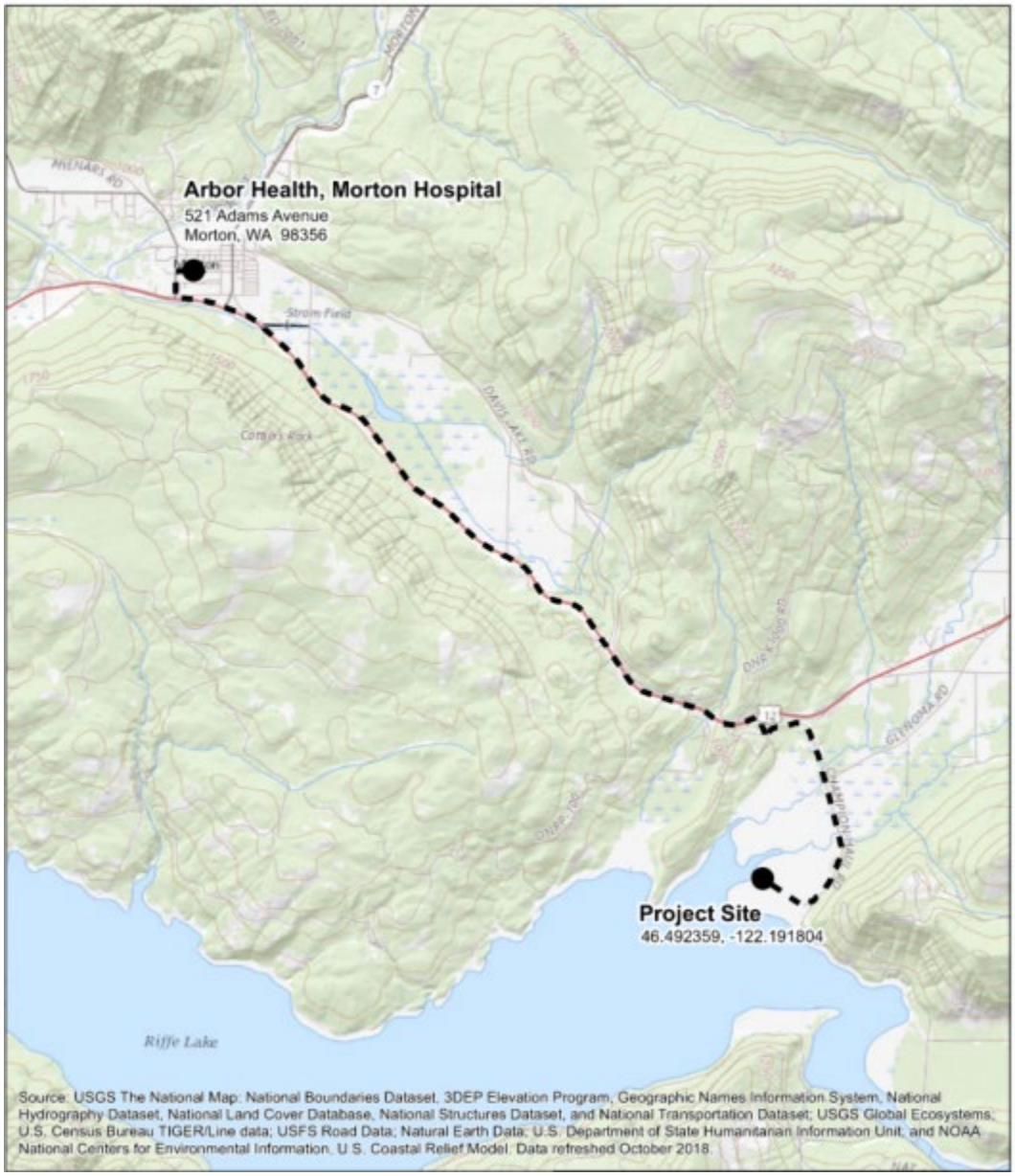
6 - TAKE CORRECTIVE ACTION

- **Implement corrective actions per the PM following root cause analysis.**
  - Complete Lessons Learned form.

PROJECT INFORMATION AND CONTACTS	
Project Name: Former Kosmos Mill	**Haley & Aldrich File No.:** 0202832-001
Location:	
Client/Site Contact: Phone Number:	Kevin Smith 253.355.6762
Haley & Aldrich Field Representative: Phone Number: Emergency Phone Number:	TBD
Haley & Aldrich Project Manager: Phone Number: Emergency Phone Number:	Angie Goodwin 206.954.2549
Field Safety Manager: Phone Number: Emergency Phone Number:	Andrew Nakahara 206.491.2274
Subcontractor Project Manager: Phone Number:	N/A
Nearest Hospital: Address: (see map on next page) Phone Number:	Arbor Health, Morton Hospital 521 Adams Avenue Morton, Washington 98356 360.496.5112
Nearest Occ. Health Clinic: http://www.talispoint.com/liberty/ext/ Address: (see map on next page) Phone Number:	Concentra Medical Center 3850 South Meridian Suite 10 Puyallup, Washington 98373 253.840.1840
Liberty Mutual Claim Policy	**WC6Z11254100033**
Emergency Response Number:	**911**
Other Local Emergency Response Number:	N/A
Other Ambulance, Fire, Police, or Environmental Emergency Resources:	

DIRECTIONS TO THE NEAREST HOSPITAL

Liberty Mutual Medical Location Directory



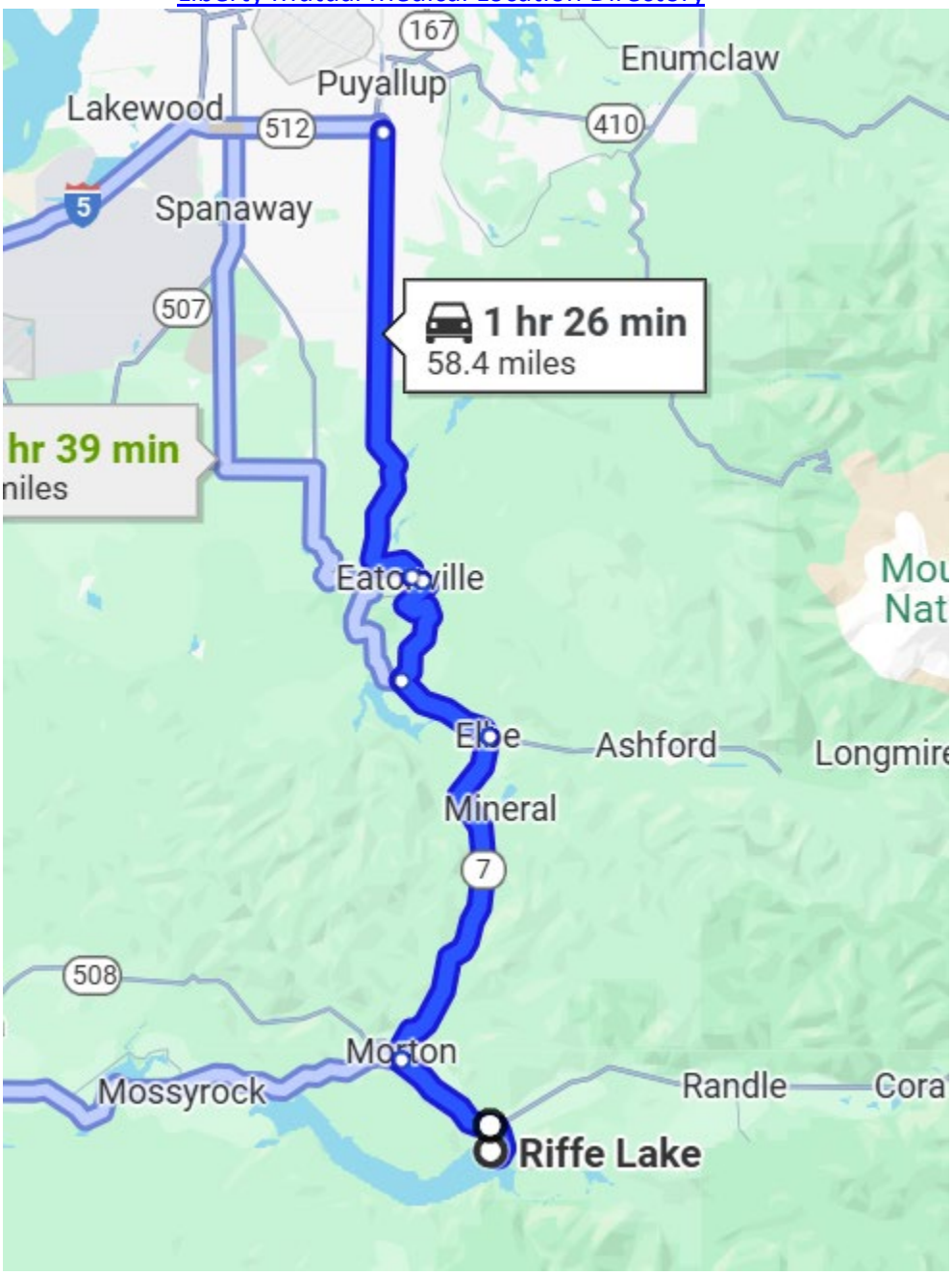
Directions to the Nearest Hospital:

Take Champion Haul Rd to US-12 W
4 min (2.0 mi)
Head northeast toward Champion Haul Rd
472 ft
Turn left onto Champion Haul Rd
1.8 mi
Sharp right onto Bridgeover Rd

213 ft
Continue onto Kosmos Rd
0.1 mi
Turn left onto US-12 W
6 min (5.6 mi)
Follow 7th St and Adams Ave to your destination in Morton
2 min (0.4 mi)
Turn right onto 7th St
0.2 mi
Turn right onto Adams Ave
0.2 mi
Turn right

DIRECTIONS TO THE NEAREST URGENT CARE

Liberty Mutual Medical Location Directory



Directions to the Nearest Occupational Clinic:
Take Champion Haul Rd to US-12 W
4 min (2.0 mi)
Head northeast toward Champion Haul Rd
472 ft
Turn left onto Champion Haul Rd

1.8 mi
Sharp right onto Bridgeover Rd
213 ft
Continue onto Kosmos Rd
0.1 mi
Drive from WA-7 N and WA-161 N to Puyallup
1 hr 17 min (56.4 mi)
Turn left onto US-12 W
5.3 mi
Turn right onto WA-7 N
16.8 mi
Turn left onto WA-7 N/Mountain Hwy E
4.9 mi
Turn right onto Alder Cutoff Rd E
6.7 mi
Continue onto Center St E
0.5 mi
Turn right onto WA-161 N/Washington Ave N
22.3 mi
Turn left

1. WORK SCOPE

This Site-Specific Health and Safety Plan addresses the health and safety practices and procedures that will be exercised by all Haley & Aldrich employees participating in all work on the Project Site. This plan is based on an assessment of the site-specific health and safety risks available to Haley & Aldrich and Haley & Aldrich's experience with other similar project sites. The scope of work includes the following:

Enter a complete description of the project work scope and breakdown the types of activities involved. For construction monitoring projects, specify the types of field control activities to be performed. Summarize general work activities and testing, sampling and handling requirements and intensity of contact with site media.)

Project Task Breakdown

Task No.	Task Description	Employee(s) Assigned	Work Date(s) or Duration
1	Sixteen soil samples will be collected using hand tools (e.g. stainless-steel hand augers and shovels) up to a depth of 5-ft bgs.	TBD	1 week, dates TBD

Subcontractor(s) Tasks

Firm Name	Work Activity	Work Date(s) or Duration
N/A		

Projected Start Date:

Projected Completion Date:

2. SITE OVERVIEW / DESCRIPTION

Site Classification

Commercial

Site Description

The City of Tacoma, Power Division's (Tacoma Power) property (Property) is located in Rainey Valley, within the Riffe Lake reservoir, in an area referred to as Kosmos Flats. The Site (tax parcel number 030775001000) is located within the Property with Rainey Creek to the west, the former log pond area to the south, an old mill road and the former stockpile area from the emergency independent remedial action (IRA) to the east, and the north bank of the ravine and old mill road to the south. The Site topography generally slopes to the south toward Riffe Lake, but the local topography gradually slopes to the northwest, toward Rainey Creek in the area near the identified petroleum seeps which were covered by a protective cap under the emergency IRA in 2019.

The Kosmos Flats is a plateau and is referred the upland area. This area was formerly the location of the Kosmos lumber mill. The building foundation, railroad rails, metal, and concrete debris from the former mill can be seen in the upland area. The former mill location is on the east bank, above an outside bend of Rainey Creek channel. Other Site features include a surface water conveyance ditch and a former log pond dike. There is approximately a 38-foot elevation difference between the top and bottom of the creek's bank and the bank ranges from 1 horizontal to 1 vertical (1H:1V) to 3H:1V slope along the Site. Downstream of the protective cap, the bank is generally at a 2H:1V slope. At the protective cap, the bank's slope is generally at a 3H:1V slope. Upstream of the protective cap, the bank steepens to 1H:1V with almost vertical portions for an approximate 300-foot length before the slope becomes less steep. Near the cap on the upstream side is a ravine that trends from the creek's bank to the east toward the upland area of the Site. This ravine contained metal and other debris from historical mill operation; however, most of the visible debris was removed by Tacoma Power in October 2021.

Background and Historic Site Usage

The Property is currently vacant with temporary signage and jersey barriers along the eastern side of the Site. The future Property uses are to be available to the public as a recreational wildlife area when accessible. Tacoma Power intends to return to a normal full-pool elevation of approximately 778.5 feet where the Site would be inundated during portions of the year for public recreation and water storage. Prior to Tacoma Power purchasing the Property, the area was used a lumber mill.

Site Status

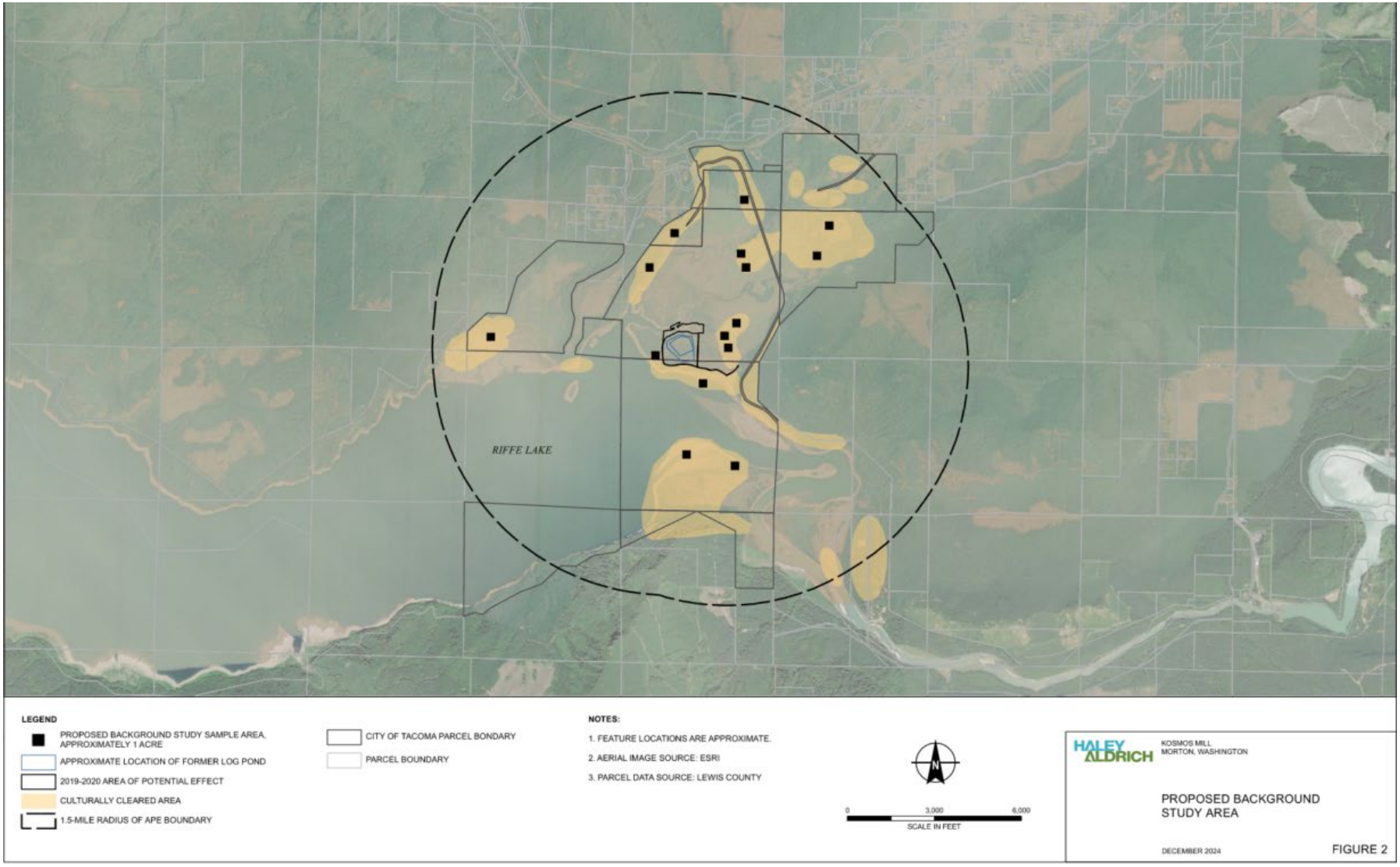
Indicate current activity status and describe operations at the site:

Partially Active

The area is a recreational wildlife area

Site Plan
Is a site plan or sketch available? Yes
Work Areas
List and identify each specific work areas(s) on the job site and indicate its location(s) on the site plan:

Site Plan



3. HAZARD ASSESSMENT

Site Chemical Hazards

Is this Site impacted with chemical contamination? Yes

Source of information about contaminants: Previous Investigation

Contaminant of Concern	Location/Media	Concentration	Units
Total Petroleum Hydrocarbons (TPH)	**Soil**	**13,000**	**mg/kg**
Total Petroleum Hydrocarbons (TPH)	**Groundwater**	**5,000**	**ug/L**
Arsenic	**Soil**	**11.1**	**mg/kg**
Lead	**Soil**	**157**	**mg/kg**

Total Petroleum Hydrocarbons (TPH): is a term used to describe a large family of several hundred chemical compounds that originally come from crude oil. Crude oil is used to make petroleum products, which can contaminate the environment. Because there are so many different chemicals in crude oil and petroleum products, it is not practical to measure each one separately. However, it is useful to measure the total amount of TPH at a site.

TPH is a mixture of chemicals, but they are all made mainly from hydrogen and carbon, called hydrocarbons. Scientists divide TPH into groups of petroleum hydrocarbons that act alike in soil or water. These groups are called petroleum hydrocarbon fractions. Each fraction contains many individual chemicals.

Click + Add Additional Chemical Language

Site Hazards Checklist

Weather			
Cold Temperatures	Lightning Storms	High Winds	

Cold Temperatures

Cold stress may occur at any time work is being performed at low ambient temperatures and high velocity winds. Because cold stress is common and has potentially serious illnesses associated with outdoor work during cold seasons, regular monitoring and other preventative measures are vital.

Refer to OP1003-Cold Stress for additional information and mitigation controls.

Lightning Storms

Where the threat of electrical storms and the hazard of lightning exist staff shall ensure site procedures exist to: (1) detect when lightning is in the near vicinity and when there is a potential for lightning and (2) to notify appropriate site personnel of these conditions and (3) implement protocols to stop work and seek shelter.

The 30-30 Rule states that if time between seeing the lightning and hearing the thunder is less than 30 seconds, you are in danger and must seek shelter. You must also stay indoors for more than 30 minutes after hearing the last clap of thunder.

High Winds

While high winds are commonly associated with severe thunderstorms and hurricanes they may also occur as a result of differences in air pressures, such as when a cold front passes across the area. They can cause downed trees and power lines, and flying debris (such as dust or larger debris), which adds additional risks and could lead to power outages, transportation disruptions, damage to buildings and vehicles, and serious injury.

Wind Advisory are issued for sustained winds 25 to 39 mph and/or gusts to 57 mph. High Wind warnings are issued by the National Weather Service when high wind speeds may pose a hazard or is life threatening. The criteria for this warning will varies by state. The Beaufort Wind Scale is a helpful tool to when dealing with high winds.

Biological			
Ticks	Large/Small Mammals	Mosquitoes	Wildlife Droppings
Stinging Insects	Venomous Spiders	Poisonous Plants	

Ticks

Ticks are generally found in wooded, brushy, or grassy areas. They favor moist, shaded areas with fallen leaves and low vegetation, often sitting on the tips of tall grass or on shrubs waiting for a host to pass. Adult ticks are approximately the size of sesame seeds and are most active from March to mid-May and mid-August to November. Both nymphs and adults can transmit Lyme disease. Ticks can be active any time the temperature is above freezing. Ticks burrow into the host's skin to position themselves to withdraw blood. Infected ticks pass pathogens to the host through the bloodstream. Once imbedded, they may remain on the host for days. On humans, they frequently crawl to fleshy parts of the body and into difficult to reach spots such as the groin, armpit, or scalp.

A fine-tipped tweezer is recommended for tick removal tool and should be in the first-aid kit. Follow these steps: Pull upward with steady, even pressure. Do not twist or jerk the tick; this can cause mouth parts to break off and remain in the skin. If this happens, remove the parts with tweezers. If unable to remove easily with tweezers, leave them alone and let the skin heal.

After removing the tick, thoroughly clean the bite area and hands with rubbing alcohol, iodine scrub, or soap & water. Dispose of live ticks by submersal in alcohol, placing it in a sealed bag/container, wrap it tightly in tape or flush it down the toilet. Never crush ticks with your fingers. Do not attempt to use nail polish remover, petroleum jelly, lotion or heat to try to get the tick to exit skin. Swift removal is key.

Wear light-colored clothing so ticks stand out and long-sleeved shirts and long pants to reduce skin exposure. Tuck your shirt into your pants and tuck your pants into your socks to close gaps. Use repellent containing 20-30% DEET (N, N-diethyl-m-toluamide) on exposed skin and clothing. Avoid hands, eyes and mouth and wash off repellent when back indoors. Treat clothing with or purchase clothing with products containing 0.5% permethrin. It remains protective through several washings. Conduct frequent tick checks on clothing and skin. Have others check your back, scalp, and behind your ears and check gear for "hitchhikers". As soon as returning indoors, take a bath or shower and do a full-body inspection using a mirror. Wash field clothes and tumble dry on high to kill any ticks that may be hidden. If working in an area of significant tick habitat PPE may need to be upgraded to a Tyvek suit. Implementation of controls is crucial to minimize or eliminate the possibility of a tick bite. Should a staff member find an embedded tick they need to report it immediately to Corporate H&S. If a staff member has been bitten contact Corporate H&S and Work Care at 888-449-7787 to initiate the Tick Management Protocol. Once bitten, it takes approximately 48 hours to transmit Lyme Disease.

Large Mammals

When working in remote locations staff may come near wild or stray dogs, coyotes, foxes or other large animals. It is important that staff avoid contact with these animals.

There are increasing reports of wild dog attacks on household pets, attacks on human are uncommon and rare or infrequent at best. However, attacks by individual or small groups of domestic dogs occur frequently resulting in injury or a fatality on rare occasion. Wild dogs may become skilled at hunting in

groups for small game and large game from rabbits and hares to deer and moose. The impact of wild dogs, on livestock and wildlife, varies by location and is influenced by factors such as availability of other food, number of dogs, and competition by other predators. Wild dogs kill house cats and may injure or kill domestic dogs. Areas where people have not hunted and trapped wild dogs, a fear of humans may not have developed and in such dogs may attack people and children. This can be a serious problem in areas where feral dogs feed at and live around garbage dumps near human dwellings. Such situations occur most frequently around small remote towns. In urban settings domestic dogs can be territorial and exhibit aggressive behavior such as barking and snarling when their area is encroached. It is not uncommon for domestic dogs to travel in small packs.

If the pack displays aggressive behavior and charges do not run or turn your back. When confronted by one or more dog it is important not to run or exhibit any behavior that may be construed as a challenge (e.g., looking the dog in the eyes, showing your teeth, or attempting to pet the dog).Stand still and place your work bag between you and the dog and then begin to move slowly away from the dog(s) while not turning your back. If you see a stray dog approaching from a distance, look for a place that's secure. Step inside a fenced area, enter a place of business, or knock on a neighbor's door. It is always better to be safe than risk a potentially dangerous situation.

Small Mammals

Rodents, are the most abundant order of mammals. There are hundreds of species of rats; the most common are the black and brown rat. Other rodents you may encounter are mice, beavers, squirrels, guinea pigs, capybaras and coypu.

The Brown Rat has small ears, blunt nose, and short hair. It is approximately 14-18” long (with tail). They frequently infest garbage/rubbish, slaughterhouses, domestic dwellings, warehouses, and supermarkets. They also frequent any space with an easy meal and potential nesting sites. The Black Rat is identified by its tail, that is always longer than the length from the head to the body. It is also slimmer and more agile than the Brown rat. Its size varies according to its environment and food supply.

The House Mouse has the amazing ability to adapt and can frequently be found in human dwellings. In buildings, mice will live anywhere and difficult to keep out. Mice are omnivorous, they will eat anything. Rats and mice often become a serious problem in cold winter months when they seek food and warmth inside buildings. They may suddenly appear in large numbers when excavation work disturbs their in-ground nesting locations or their food source is changed.

Some major problems caused by rats and mice are contaminating the food they eat with urine and excrement. Gnawing into materials such as paper, wood, or upholstery, to use as nest material. Also gnawing plastic, cement, soft metals such as lead and aluminum, and wiring, which may cause a fire hazard. Occasionally biting people and may kill small animals. They, or the parasites they carry, like fleas, mites and worms, spread many diseases such as salmonella, trichinosis, rat bite fever, hantavirus, Weil's disease, and bubonic plague. They damage ornamental plants by burrowing among the roots or feeding on new growth. They also eat garden vegetables, such as corn and squash. These rodents have

been a problem for centuries, because of their incredible ability to survive and are so difficult to eliminate. In addition, they are extremely compatible with human behavior and needs.

Avoid contact with rodents, if possible. Avoid contact with rodent excrement. Do not eat food or water that may have encountered rodent excrement. If exposed, wash hands and avoid touching your face with your hands.

Mosquitos

Work outdoors with temperatures above freezing will likely bring staff into contact with mosquitos. There are a variety of mosquito species that can transmit a range of diseases. Birds act as reservoirs for the viruses that can be collected by the mosquito and transmitted to a person. Majority of mosquitos are mainly a nuisance but staff need to take appropriate precautions to minimize the potential transmission of a virus that can result in one of the following diseases: West Nile, Eastern Equine Encephalitides and Western Encephalitides. Knowing some key steps that can minimize the risk of mosquito bites is, therefore, important in reducing the risks. Workers working outdoors should be aware that the use of PPE techniques is essential to preventing mosquito bites especially when working at sites where mosquitoes may be active and biting.

Use repellents containing DEET, picaridin, IR3535, and some oil of lemon eucalyptus and para-menthane-diol products provide longer-lasting protection. To optimize safety and effectiveness, repellents should be used according to the label instructions. Cover as much of your skin as possible by wearing shirts with long-sleeves, long pants, and socks whenever possible. Avoid use of perfumes and colognes when working outdoors during peak times when mosquitoes may be active; mosquitoes may be more attracted to individuals wearing perfumes and colognes.

Wildlife Droppings

Project sites involving abandoned buildings may bring staff into contact with animal droppings. There are many diseases that one can be exposed to from a variety of animals.

Mice and Rats
Hantavirus is transmitted to humans from dried droppings, urine, or saliva of mice and rats. The disease begins as a flu-like illness with fever, chills, and muscle aches, but can rapidly progress to a life-threatening condition marked by respiratory failure as fluids fill the lungs. Persons working in infested buildings are at increased risk to this disease, particularly during dusty clean-up activities.

Birds and Bats
Large populations of roosting birds may present a disease risk. The most serious health risks arise from disease organisms that grow in the nutrient-rich accumulations of bird droppings, feathers and debris under a roost, particularly if roosts have been active for years.

Histoplasmosis and Cryptococcosis are the most common fungal diseases associated with bird and bat dropping. Infection occurs when spores, carried by the air, are inhaled, especially after a roost has been disturbed. The active and inactive roosts of blackbirds, starlings and cowbirds have also been found to be heavily contaminated with fungus spores. Most infections are mild and produce either no symptoms or a minor influenza-like illness. Occasionally the disease can cause high fever, blood abnormalities, pneumonia and even death.

Do not touch droppings with unprotected hands. Avoid disturbing the droppings and generating dust. Employee work practices and dust control measures that eliminate or reduce dust generation during removal of manure from a building will also reduce risks of infection and development of disease. Use an industrial vacuum cleaner with a high-efficiency (HEPA) filter to bag contaminated material.

Stinging Insects

Stinging Insects fall into two major groups: Apidae (honeybees and bumblebees) and vespids (wasps, yellow jackets, and hornets). Apidae are docile and usually do not sting unless provoked. The stinger of the honeybee has multiple barbs, which usually detach after a sting. Vespids have few barbs and can inflict multiple stings.

There are several kinds of stinging insects that might be encountered on the project site. Most stings will only result in a temporary injury. However, sometimes the effects can be more severe, even life-threatening depending on where you are stung and what allergies you have. Being stung in the throat area of the neck may cause edema (swelling caused by fluid build-up in the tissues) around the throat and may make breathing difficult.

In rare cases, a severe allergic reaction can occur. This can cause "anaphylaxis" or anaphylactic shock with symptoms appearing immediately or up to 30 minutes later. Symptoms include; Hives, itching and swelling in areas other than the sting site, swollen eyes/eyelids, wheezing, chest tightness, difficulty breathing, hoarse voice, swelling of the tongue, dizziness or sharp drop in blood pressure, shock, unconsciousness or cardiac arrest. Reactions can occur the first time you are stung or with subsequent stings. If you see any signs of reaction, or are unsure, call or have a co-worker call emergency medical services (e.g., 911) right away. Get medical help for stings near the eyes, nose or throat. Stay with the person who has been stung to monitor their reaction.

Staff who are allergic to bee stings are encouraged to inform their staff/project manager. If staff member carries an Epi-pen (i.e., epinephrine autoinjector) they are encouraged to inform their colleagues in case they are stung and are incapable of administering the injection. Examine site for any signs of activity or a hive/nest. If you see several insects flying around, see if they are entering/exiting from the same place. Most will not sting unless startled or attacked. Do not swat, let insects fly away on their own. If you must, walk away slowly or gently "blow" them away. If a nest is disturbed and you hear "wild" buzzing, protect your face with your hands and run from the area immediately. Wear long sleeves, long pants, and closed-toed boots. Wear light-colored clothes such as khakis. Avoid brightly colored, patterned, or black clothing. Tie back long hair to avoid bees or wasps from entanglement. Do

not wear perfumes, colognes or scented soaps as they contain fragrances that are attractive. If bee or wasp is found in your car, stop and leave windows open.

Venomous Spiders

Venomous spiders found in the United States include the black widow and the brown recluse. These spiders occasionally find their way inside structures or buildings and can also present a risk to indoor workers including machine operators and janitors. Spiders are usually not aggressive, and most bites occur because a spider is trapped or unintentionally contacted.

Symptoms associated with spider bites can vary from minor to severe. Although extremely rare, death can occur in the most severe cases. Possible symptoms resulting from a spider bite include the following:

Black Widow are found throughout the tropics, U.S., and Canada and are not usually and only the female is venomous. The female is shiny black, usually with a reddish hourglass shape on the underside of her spherical abdomen. Her body is about 1.5” long, while the male is approximately half that. The spider's span ranges from 1-3”. Adult males are harmless, have longer legs, and usually yellow and red bands and spots over their back, while the young black widows are colored orange and white. The bite of a black widow is often not painful and may go unnoticed. However, the poison injected by the spider's bite can cause severe reactions in certain individuals.
Symptoms include abdominal pain, profuse sweating, swelling of the eyelids, pains to muscles or soles of the feet, salivation and dry-mouth (alternating), and paralysis of the diaphragm. If a person is bitten, they should seek immediate medical attention. Clean the area of the bite with soap and water. Apply a cool compress to the bite location. Keep effected limb elevated to about heart level. Ask a doctor if Tylenol or aspirin can be taken to relieve minor symptoms.

Brown recluse spiders are usually light brown in color, but in some instances can be darker. Brown recluse spiders are highly venomous spiders, native to the United States, found coast to coast. The brown recluse varies in size, but some can obtain bodies of 5/8” in length with a leg span of 1-½” in diameter. They can be identified by their three pairs of eyes along the head area and their fiddle shaped markings on the back. Most brown recluse bites are defensive rather than offensive. They generally only bite if they feel threatened.

If bitten by a brown recluse, an individual may experience open, ulcerated sores, which when left untreated may become infected and cause tissue necrosis. If an individual believes a spider has bitten them, they need to seek medical attention as soon as possible.

Inspect or shake out any clothing, shoes, towels, or equipment before use. Wear protective clothing such as a long-sleeved shirt and long pants, hat, gloves, and boots when handling stacked or undisturbed piles of materials. Minimize the empty spaces between stacked materials. Remove and reduce debris and rubble from around the outdoor work areas. Trim or eliminate tall grasses from outdoor work areas. Store apparel and outdoor equipment in tightly closed bags. Keep tetanus boosters up-to-date (every 10 years). Spider bites can become infected with tetanus spores. Additional information in the case of bites can be obtained from the Poison Center (1-800-222-1222).

Location/Terrain			
Economically Depressed	Slip/Trip/Falls	Public Rd/Right of Way	Remote Work Area

Economically Depressed Areas

Economically depressed areas may have high crime rates. Projects involving work in and around inactive industrial sites may bring staff into contact with indigent and homeless persons. Staff could be subjected to crime that includes but may not be limited to thievery, vandalism, and violence. Prior to the start of work staff need to understand the work locations and the potential for exposure to low level crime.

Staff members should never work alone in these areas. A buddy system is required. Conduct during daylight hours. Secure equipment and vehicles. If warranted, contact the local police department for a security detail. Leave the work area immediately and contact the local authorities if staff members feel threatened or are threatened.

Slips, Trips & Falls

Slip and trip injuries are the most frequent injuries to workers. Statistics show most falls happen on the same level resulting from slips and trips. Both slips and trips result from unintended or unexpected change in the contact between the feet and the ground or walking surface. Good housekeeping, quality of walking surfaces (flooring), awareness of surroundings, selection of proper footwear, and appropriate pace of walking are critical for preventing fall accidents.

Site workers will be walking on a variety of irregular surfaces, that may affect their balance. Extra care must be taken to walk cautiously near rivers because the bottom of the riverbed maybe slick and may not be visible. Rocks, gradient changes, sandy bottoms, and debris may be present but not observable.

Take your time and pay attention to where you are going. Adjust your stride to a pace that is suitable for the walking surface and the tasks you are doing. Check the work area to identify hazards - beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain. Establish and utilize a pathway free of slip and trip hazards. Choose a safer walking route. Carry loads you can see over. Keep work areas clean and free of clutter. Communicate hazards to on-site personnel and remove hazards as appropriate.

Public Right of Way

H&A staff and their subcontractors conducting work on public roads and/or right of ways can be exposed to vehicular traffic and expose the public to the hazards of the job site. Where a hazard exists to site workers because of traffic or haulage conditions at work sites that encroach public streets or highways, a system of traffic controls in conformance with the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), or state program, is required. A Temporary Traffic Control Plan (TCP) describes traffic controls to be used for facilitating vehicle and pedestrian traffic through a temporary traffic control zone TCPs are required to provide for worker protection and safe passage of traffic through and around job sites with as little inconvenience and delay as possible.

The plan may range in scope from being very detailed, to merely referencing typical drawings contained in the MUTCD. The degree of detail in the TCP depends entirely on the complexity of the situation, and TCP's should be prepared by persons knowledgeable about the fundamental principles of temporary traffic control and the work activities to be performed.

H&A Project Managers or their subcontractors need to establish appropriate control measures and obtain any permits when project work is on or encroaches public roadways. You may need flaggers or police details. Cease work and notify the field supervisor immediately if any conditions are such that safety is jeopardized. Utilize protective vehicles whenever appropriate or position equipment so in between the work and oncoming traffic.

Miscellaneous			
Extended Shift			

Extended Shift

An extended shift can include extending a workday beyond eight hours. Extended or unusual work shifts may be more stressful physically, mentally, and emotionally. Non-traditional shifts and extended work hours may disrupt the body's regular schedule, leading to increased fatigue, stress, and lack of concentration. This leads to an increased risk of operator error, injuries and/or accidents. The degree to which an individual is exposed to fatigue risk factors depends upon the work schedule. As both the duration of the workday and the number of days worked increase so does the fatigue risk factors. Staff Managers need to be aware of the fatigue risk factors and ensure projects are structured to mitigate these factors. Staff Members also have a responsibility to manage the personal fatigue risk factors that they can control outside of work (e.g, duration and quality of sleep, diet, drugs, and alcohol)

Fatigue is a message to the body to rest and can be eliminated with proper rest. However, if rest is not possible, fatigue can increase and becomes distressing and eventually debilitating. Fatigue symptoms, both mental and physical, vary and depend on the person and degree of overexertion. Examples

include: weariness, sleepiness, irritability, reduced alertness, lack of memory, concentration and motivation, increased susceptibility to illness, depression, headache, loss of appetite, and digestive problems.

When possible, managers should limit use of extended shifts and increase the number of days worked. Working shifts longer than 8 hours generally result in reduced productivity and alertness. Additional breaks and meals should be provided when working extended shift periods. Tasks requiring heavy physical labor or intense concentration should be performed at the beginning of the shift if possible. This is an important consideration for pre-emergency planning.

Make efforts, when feasible, to ensure that unavoidable extended work shifts and shift changes allow affected employees time for adequate rest and recovery. Project Managers need to plan to have an adequate number of personnel available to enable workers to take breaks, eat meals, relax, and sleep.

Plan for regular and frequent breaks throughout the work shift. If at remote sites, ensure if possible, that there is a quiet, secluded area designated for rest and recuperation. In addition to formal breaks such as lunch or dinner, encourage use of micro breaks to change positions, move about, and shift concentration. Personnel should look to obtain an adequate quantity and quality of sleep.

Task Hazard Summary

Task Physical Hazards Checklist				
Potential Task Hazards	**Task 1** **Soil Sampling**	**Task 2**	**Task 3**	**Task 4**
Ergonomics	☒	☐	☐	☐
Traffic	☒	☐	☐	☐
Hand/Power Tools	☒	☐	☐	☐
Manual Lifting	☒	☐	☐	☐
Slippery Surfaces	☒	☐	☐	☐
Ground Disturbance	☒	☐	☐	☐
Other:	☐	☐	☐	☐

Summary of Physical Hazards & Controls

Ergonomics

Most Work-related Musculoskeletal Disorders (WMSDs) are caused by Ergonomic Stressors. Ergonomic Stressors are caused by poor workplace practices and/or insufficient design, which may present ergonomic risk factors. These stressors include, but not limited to, repetition, force, extreme postures, static postures, quick motions, contact pressure, vibration, and cold temperatures.

WMSDs are injuries to the musculoskeletal system, which involves bones, muscles, tendons, ligaments, and other tissues in the system. Symptoms may include numbness, tightness, tingling, swelling, pain, stiffness, fatigue, and/or redness. WMSD are usually caused by one or more Ergonomic Stressors. There may be individual differences in susceptibility and symptoms among employees performing similar tasks. Any symptoms are to be taken seriously and reported immediately.

See OP1053 Ergonomics for more information.

Controls

- Ensure workstations are ergonomically correct so bad posture is not required to complete tasks.
- Take periodic breaks over the course of the day.

- Stretch during break times.
- Break up tasks that require repetitive motion.
- Contact Corporate H&S with any ergonomic concerns

Traffic

To ensure worker protection and the safe passage of traffic through and around job sites, Site Traffic Control procedures may need to be implemented on project sites. Job zone control and traffic management are necessary when Simultaneous Operations (SIMOPS) or third parties could be at risk of injury by entering the work zone, or when the work crew is at risk of injury by other operations.

Traffic patterns shall be evaluated. Conditions such as high pedestrian traffic, peak periods, daily deliveries or SIMOPS known, Heavy equipment traffic volume and light duty traffic volume shall be evaluated

Early identification and planning for site operations that require job zone control and traffic management, including SIMOPS, is the responsibility of the Project Manager and primary contractor manager. Traffic control plans shall be consistent with the Manual on Uniform Traffic Control Devices.

See OP1025 Signs, Signals, and Barricades and/or OP1043 Site Traffic Control for more information.

Controls

- Alternate walkways where possible.
- Use of the local police to direct traffic.
- Use of an air horn to alert drivers or other workers.
- Maintain good housekeeping and clean the area as work is completed.
- Use the ‘buddy’ or ‘watchperson’ system while performing work.
- Use a spotter for backing, tight maneuvers and bin/tank/equipment drop-offs.
- Use traffic control devices, field vehicles and barricades and avoid the use of caution tape.
- Park all vehicles (with wheels in a safe direction away from work) to block traffic with a flashing yellow light. Park so that access to the vehicle is away from oncoming traffic while working.
- When parking a vehicle and equipment, utilize a ‘first move forward’ driving practice.
- Work in an upright position, face traffic and make eye contact with drivers when possible.
- Minimize work time in traffic.
- Establish a ‘Stop Work’ hand signal.
- Personnel shall always wear high visibility vest

If public sites, such as public roads, bicycle paths or footpaths, are closed or rerouted, local and regulatory requirements shall be followed and traffic control permits shall be put in place. Proper traffic guiding equipment includes stop/slow paddle signs, flaggers, flashing lights and directional signs.

All personnel on-site should be aware of the plan of the day and the Traffic Control Plan should be communicated with all parties involved during the pre-shift meeting.

Repetitive Motion

Repetitive Motion or Strain Injuries are injuries effecting muscles, nerves, and tendons by repetitive movement and overuse. Almost any kind of awkward or repetitive motion you make could lead to an injury over time. Actions like bending or twisting of the wrists, reaching for materials, working with your hands above shoulder level, or grasping objects can increase wear and tear on the body. The condition mostly effects the upper body.

Controls

- Arrange your work zone, supplies and tools as much as possible to avoid reaching, leaning, bending and twisting your waist or wrists.
- During rest breaks, use stretches to loosen up your body.
- Vary tasks if you can so that you are not making the same movement repeatedly over for a long period.

Hand and Power Tools

Hand and power tools can expose staff to a wide range of hazards depending upon the tool used. Hazards can include but are not limited to: falling, flying, abrasive, and splashing objects, or harmful dusts, fumes, mists, vapors, or gases.

Serious accidents often occur before steps are taken to evaluate and avoid or eliminate tool-related hazards. Staff must recognize the hazards associated with the different types of tools and the safety precautions necessary to prevent those hazards.

See OP 1026 Hand and Power Tools for more information.

Controls

- Keep all tools in good condition with regular maintenance.
- Use the right tool for the job. Do not use a tool for a task which it was not designed for.
- Examine each tool for damage before use and do not use damaged tools.
- For tools that are damaged or defective, red tag the tool and take out of service.
- Operate tools per the manufacturers' instructions.
- Use the appropriate personal protective equipment.
- All electrically powered tools will be connected through a ground fault circuit interrupter (GFCI).
- All personnel must be trained on the use of the tool they are utilizing.

Manual Lifting/Moving

Most materials associated with investigation, remedial, or construction-related activities are moved by hand. The human body is subject to damage in the forms of back injury, muscle strains, and hernia if caution is not observed in the handling process.

Controls

- Under no circumstances should any one person lift more than 49 pounds unassisted.
- Always push, not pull, the object when possible.
- Size up the load before lifting. If it is heavy or clumsy, get a mechanical aid or help from a worker.
- Bend the knees; it is the single most important aspect of lifting.
- When performing the lift:
    - Place your feet close to the object and center yourself over the load.
    - Get a good handhold.
    - Lift straight up, smoothly and let your legs do the work, not your back!
    - Avoid overreaching or stretching to pick up or set down a load.
    - Do not twist or turn your body once you have made the lift.
    - Make sure beforehand that you have a clear path to carry the load.
    - Set the load down properly.

4. PROTECTIVE MEASURES

The personal protective equipment and safety equipment (if listed) is specific to the associated task. The required PPE and equipment listed must be onsite during the task being performed. Work shall not commence unless the required PPE or Safety Equipment is present.

Required Safety & Personal Protective Equipment

Required Personal Protective Equipment (PPE)	**Task 1**	**Task 2**	**Task 3**	**Task 4**
	Soil Sampling			
Safety Glasses	☒	☐	☐	☐
Safety Toed Shoes	☒	☐	☐	☐
Class 2 Safety Vest	☒	☐	☐	☐
Nitrile Gloves	☒	☐	☐	☐
Level of protection required	D	Select	Select	Select
Required Safety Equipment				
First Aid Kit	☒	☐	☐	☐
Safety Cones	☒	☐	☐	☐
Choose an item.	☐	☐	☐	☐

5. TRAINING REQUIREMENTS

The table below lists the training requirements staff must have respective to their assigned tasks and that are required to access the Site.

Site Specific Training Requirements

N/A

Task Specific Training Requirements

Required Training Type	**Task 1**	**Task 2**	**Task 3**	**Task 4**
	☐	☐	☐	☐

6. AIR MONITORING PLAN AND EQUIPMENT

Exposures to airborne substances shall be fully characterized throughout project operations to ensure that exposure controls are effectively selected and modified as needed.

Is air/exposure monitoring required at this work site for personal protection?

Is perimeter monitoring required for community protection?

Air monitoring plan not applicable

Air Monitoring/Screening Equipment Requirements

The required equipment listed above must be on site. Work shall not commence unless the equipment is present and in working order.

Monitoring Plans

***If chemical does not have an action level use TLV or REL, whichever is lowest, to be used as an action level. If TLV or REL are the same as PEL, cut the PEL in half for an action level.**

Parameter/ Contaminant	Equipment	Action Level*	Response Activity
Choose an item.	Choose an item.		

Zone Location		Monitoring Interval
Choose an item.	Choose an item.	Choose an item.

7. DECONTAMINATION & DISPOSAL METHODS

All possible and necessary steps shall be taken to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities (e.g., avoid sitting or leaning on, walking through, dragging equipment through or over, tracking, or splashing potential or known contaminated/impacted materials.)

Personal Hygiene Safeguards

The following minimum personal hygiene safeguards shall be adhered to:

1. No smoking or tobacco products in any project work areas.
2. No eating or drinking in the exclusion zone.
3. It is required that personnel present on site wash hands before eating, smoking, taking medication, chewing gum/tobacco, using the restroom, or applying cosmetics and before leaving the site for the day.

It is recommended that personnel present on site shower or bathe at home at the end of each day of working on the site.

Decontamination Supplies

All decontamination should be conducted at the project site in designated zones or as dictated by Client requirements. Decontamination should not be performed on Haley & Aldrich owned or leased premises.

☐ Acetone	☒ Distilled Water	☐ Polyethylene Sheeting
☒ Alconox Soap	☐ Drums	☐ Pressure/Steam Cleaner
☒ Brushes	☐ Hexane	☒ Tap Water
☒ Disposal Bags	☐ Methanol	☒ Wash tubs
☒ 5 Gallon Buckets	☒ Paper Towels	☐ Other:

Location of Decontamination Station

Decontamination supplies will be stored in the vehicle.

Standard Personal Decontamination Procedures

Outer gloves and boots should be decontaminated periodically as necessary and at the end of the day. Brush off solids with a hard brush and clean with soap and water or other appropriate cleaner whenever possible. Remove inner gloves carefully by turning them inside out during removal. Wash hands and forearms frequently. It is good practice to wear work-designated clothing while on-site which can be removed as soon as possible. Non-disposable overalls and outer work clothing should be bagged onsite prior to laundering. If gross contamination is encountered on-site contact the Project Manager and Field Safety Manager to discuss proper decontamination procedures.

The steps required for decontamination will depend upon the degree and type of contamination but will generally follow the sequence below.

1. Remove and wipe clean hard hat
2. Rinse boots and gloves of gross contamination
3. Scrub boots and gloves clean
4. Rinse boots and gloves
5. Remove outer boots (if applicable)
6. Remove outer gloves (if applicable)
7. Remove Tyvek coverall (if applicable)
8. Remove respirator, wipe clean and store (if applicable)
9. Remove inner gloves (if outer gloves were used)

PPE that is not grossly contaminated can be bagged and disposed in regular trash receptacles.

Small Equipment Decontamination

Pretreatment of heavily contaminated equipment may be conducted as necessary:

1. Remove gross contamination using a brush or wiping with a paper towel
2. Soak in a solution of Alconox and water (if possible)
3. Wipe off excess contamination with a paper towel

Standard decontamination procedure:

4. Wash using a solution of Alconox and water
5. Rinse with potable water
6. Rinse with methanol (or equivalent)
7. Rinse with distilled/deionized water

Inspect the equipment for any remaining contamination and repeat as necessary.

Disposal Methods

Procedures for disposal of contaminated materials, decontamination waste, and single use personal protective equipment shall meet applicable client, locate, State, and Federal requirements.

Disposal of Single Use Personal Protective Equipment

PPE that is not grossly contaminated can be bagged and disposed in regular trash receptacles. PPE that is grossly contaminated must be bagged (sealed and field personnel should communicate with the Project Manager to determine proper disposal.

Standard Disposal Methods for Contaminated Materials

- Excess sample solids, decontamination materials, rags, brushes, poly-sheeting, etc. that are determined to be free of contamination through field screening can usually be disposed into client-approved, on-site trash receptacles.
- Uncontaminated wash water may be discarded onto the ground surface away from surface water bodies in areas where infiltration can occur.
- Contaminated materials must be segregated into liquids or solids and containerized separately for offsite disposal.

Any additional requirements that are designated by the workplan or by client specifications should be entered here.

8. SITE CONTROL

The overall purpose of site control is to minimize potential contamination of workers, protect the public from the site's hazards, and prevent vandalism. Site control is especially important in emergency situations. The degree of site control necessary depends on site characteristics, site size, and the surrounding community. The following information identifies the elements used to control the activities and movements of people and equipment at the project site.

Communication

Internal
Haley & Aldrich site personnel will communicate with other Haley & Aldrich staff member and/or subcontractors or contractors with:

Face to Face Communication

External
H&S site personnel will use the following means to communicate with off-site personnel or emergency services.

Cellular Phones

Visitors

Project Site
Will visitors be required to check-in prior to accessing the project site?

No

Visitor Access
Authorized visitors that require access to the project site need to be provided with known information with respect to the site operations and hazards as applicable to the purpose of their site visit. Authorized visitors must have the required PPE and appropriate training to access the project site.

Site Safety Officer is responsible for facilitating authorized visitor access.

Zoning

Work Zone
The work zone will be clearly delineated to ensure that the general public or unauthorized worker access is prevented. The following will be used:

Cones

9. SITE SPECIFIC EMERGENCY RESPONSE PLAN

The Emergency Response Plan addresses potential emergencies at this site, procedures for responding to these emergencies, roles, responsibilities during emergency response, and training. This section also describes the provisions this project has made to coordinate its emergency response with other contractors onsite and with offsite emergency response organizations (as applicable).

During the development of this emergency response plan, local, state, and federal agency disaster, fire, and emergency response organizations were consulted (if required) to ensure that this plan is compatible and integrated with plans of those organizations. Documentation of the dates of these consultations are the names of individuals contacted is kept on file and available upon request.

The site has been evaluated for potential emergency occurrences, based on site hazards, and the major categories of emergencies that could occur during project work are:

- Fire(s)/Combustion
- Hazardous Material Event
- Medical Emergency
- Natural Disaster

A detailed list of emergency types and response actions are summarized in Table X below. Prior to the start of work, the SHSO will update the table with any additional site-specific information regarding evacuations, muster points, or additional emergency procedures. The SHSO will establish evacuation routes and assembly areas for the Site. All personnel entering the Site will be informed of these routes and assembly areas.

Pre-Emergency Planning

Before the start of field activities, the Project Manager will ensure preparation has been made in anticipation of emergencies. Preparatory actions include the following:

Meeting with the subcontractor/and or client concerning the emergency procedures in the event a person is injured. Appropriate actions for specific scenarios will be reviewed. These scenarios will be discussed, and responses determined before the sampling event commences. A form of emergency communication (i.e.; Cell phone, Air horn, etc.) between the Project Manager and subcontractor and/or client will be agreed on before the work commences.

A training session (i.e., “safety meeting”) given by the Project Manager or their designee informing all field personnel of emergency procedures, locations of emergency equipment and their use, and proper evacuation procedures.

Ensuring field personnel are aware of the existence of the emergency response HASP and ensuring a copy of the HASP accompanies the field team(s).

Onsite Emergency Response Equipment

Emergency procedures may require specialized equipment to facilitate work rescue, contamination control and reduction or post-emergency cleanup. Emergency response equipment stocked

Table 9.1 Emergency Equipment and Emergency PPE			
Emergency Equipment	**Specific Type**	**Quantity Stocked**	**Location Stored**
First Aid Kit	N/A	1	Vehicle
Emergency PPE	**Specific Type**	**Quantity Stocked**	**Location Stored**

EVACUATION ALARM
Will be communicated during the Onsite Kickoff Meeting
EVACUATION ROUTES
Will be given a map after site specific training
EVACUATION MUSTER POINT(S)/ SHELTER AREA(S)
Will be given a locations after site specific training
EVACUTION RESPONSE DRILLS
The Site relies on outside emergency responders and a drill is not required.

Table 9-2 – Emergency Planning

Emergency Type	Notification	Response Action	Evacuation Plan/Route
Chemical Exposure	Report event to SHSO immediately	Refer to Safety Data Sheet for required actions	Remove personnel from work zone
Fire - Small	Notify SHSO and contact 911	Use fire extinguisher if safe and qualified to do so	Mobilize to *Muster Point*
Fire – Large/Explosion	Notify SHSO and contact 911	Evacuate immediately	Mobilize to *Muster Point*
Hazardous Material – Spill/Release	Notify SSO; SHSO will contact PM to determine if additional agency notification is	If practicable don PPE and use spill kit and applicable procedures to contain the release	See Evacuation Map for route, move at least 100 ft upwind of spill location
Medical – Bloodborne Pathogen	Notify SHSO	If qualified dispose in container or call client or city to notify for further instruction.	None Anticipated
Medical – First Aid	Notify SHSO	If qualified perform first aid duties	None Anticipated
Medical – Trauma	If life threatening or transport is required call 911, immediately	Wait at site entrance for ambulance	Noe Anticipated
Security Threat	Notify SHSO who will call 911 as warranted	Keep all valuables out of site and work zones delineated.	None Anticipated
Weather – Earthquake/Tsunami's	STOP WORK and evacuate Site upon any earthquake	Turn off equipment and evacuate as soon as is safe to do so	Mobilize to *Shelter Location*
Weather – Lightning Storm	STOP WORK	Work may resume 30 minutes after the last observed lightning.	None Anticipated
Weather – Tornadoes/Hurricanes	Monitor weather conditions STOP WORK and evacuate the site	Evacuate to shelter location or shelter in place immediately	Mobilize to *Shelter Location*
MUSTER POINT		*SHELTER LOCATION*	
In case of site emergencies, site personnel shall be evacuated per this table and will not participate in emergency response activities. Site emergencies shall be reported to local, state, and federal governmental agencies as required.			

10. HASP ACKNOWLEDGEMENT FORM

All Haley & Aldrich employees onsite must sign this form prior to entering the site.

I hereby acknowledge receipt of, and briefing on, this HASP prior to the start of on-site work. I declare that I understand and agree to follow the provisions, processes, and procedures set forth herein at all times while working on this site.

Printed Name	Signature	Date

ATTACHMENT A
HASP AMENDMENT FORM

HASP AMENDMENT FORM

This form is to be used whenever there is an immediate change in the project scope that will require an amendment to the HASP. For project scope changes associated with "add-on" tasks, the changes must be made in the body of the HASP. Before changes can be made, a review of the potential hazards must be initiated by the Haley & Aldrich Project Manager.

This original form must remain on site with the original HASP. If additional copies of this HASP have been distributed, it is the Project Manager's responsibility to forward a signed copy of this amendment to those who have copies.

Amendment No.	
Site Name	
Work Assignment No.	
Date	
Type of Amendment	
Reason for Amendment	
Alternate Safeguard Procedures	
Required Changes in PPE	

Project Manager Name (Print)	Project Manager Signature	Date

Health & Safety Approver Name (Print)	Health & Safety Approver Signature	Date

ATTACHMENT B
TRAINING REQUIREMENTS

TRAINING REQUIREMENTS

Health and Safety Training Requirements

Personnel will not be permitted to supervise or participate in field activities until they have been trained to a level required by their job function and responsibility. Haley & Aldrich staff members, contractors, subcontractors, and consultants who have the potential to be exposed to contaminated materials or physical hazards must complete the training described in the following sections.

The Haley & Aldrich Project Manager/FSM will be responsible for maintaining and providing to the client/site manager documentation of Haley & Aldrich staff members' compliance with required training as requested. Records shall be maintained per OSHA requirements.

40-Hour Health and Safety Training

The 40-Hour Health and Safety Training course provides instruction on the nature of hazardous waste work, protective measures, proper use of personal protective equipment, recognition of signs and symptoms which might indicate exposure to hazardous substances, and decontamination procedures. It is required for all personnel working on-site, such as equipment operators, general laborers, and supervisors, who may be potentially exposed to hazardous substances, health hazards, or safety hazards consistent with 29 CFR 1910.120.

8-hour Annual Refresher Training

Personnel who complete the 40-hour health and safety training are subsequently required to attend an annual 8-hour refresher course to remain current in their training. When required, site personnel must be able to show proof of completion (i.e., certification) at an 8-hour refresher training course within the past 12 months.

8-Hour Supervisor Training

On-site managers and supervisors directly responsible for, or who supervise staff members engaged in hazardous waste operations, should have eight additional hours of Supervisor training in accordance with 29 CFR 1910.120. Supervisor Training includes, but is not limited to, accident reporting/investigation, regulatory compliance, work practice observations, auditing, and emergency response procedures.

Additional Training for Specific Projects

Haley & Aldrich personnel will ensure their personnel have received additional training on specific instrumentation, equipment, confined space entry, construction hazards, etc., as necessary to perform their duties. This specialized training will be provided to personnel before engaging in the specific work activities including:

- Client specific training or orientation
- Competent person excavations
- Confined space entry (entrant, supervisor, and attendant)
- Heavy equipment including aerial lifts and forklifts
- First aid/ CPR
- Use of fall protection
- Use of nuclear density gauges
- Asbestos awareness

ATTACHMENT C
ROLES AND RESPONSIBILITIES

SITE ROLES AND RESPONSIBILITIES

Haley & Aldrich Personnel

Field Safety Manager (FSM)

The Haley & Aldrich FSM is a full-time Haley & Aldrich staff member, trained as a safety and health professional, who is responsible for the interpretation and approval of this Safety Plan. Modifications to this Safety Plan cannot be undertaken by the PM or the SHSO without the approval of the FSM.

Specific duties of the FSM include:

- Approving and amending the Safety Plan for this project
- Advising the PM and SHSOs on matter relating to health and safety
- Recommending appropriate personal protective equipment (PPE) and air monitoring instrumentation
- Maintaining regular contact with the PM and SHSO to evaluate the conditions at the property and new information which might require modifications to the HASP and
- Reviewing and approving JSAs developed for the site-specific hazards.

Project Manager (PM)

The Haley & Aldrich PM is responsible for ensuring that the requirements of this HASP are implemented at that project location. Some of the PM´s specific responsibilities include:

- Assuring that all personnel to whom this HASP applies have received a copy of it;
- Providing the FSM with updated information regarding environmental conditions at the site and the scope of site work;
- Providing adequate authority and resources to the on-site SHSO to allow for the successful implementation of all necessary safety procedures;
- Supporting the decisions made by the SHSO;
- Maintaining regular communications with the SHSO and, if necessary, the FSM;
- Coordinating the activities of all subcontractors and ensuring that they are aware of the pertinent health and safety requirements for this project;
- Providing project scheduling and planning activities; and
- Providing guidance to field personnel in the development of appropriate Job Safety Analysis (JSA) relative to the site conditions and hazard assessment.

Site Health & Safety Officer (SHSO)

The SHSO is responsible for field implementation of this HASP and enforcement of safety rules and regulations. SHSO functions may include some or all of the following:

- Act as Haley & Aldrich´s liaison for health and safety issues with client, staff, subcontractors, and agencies.
- Verify that utility clearance has been performed by Haley & Aldrich subcontractors.
- Oversee day-to-day implementation of the Safety Plan by Haley & Aldrich personnel on site.

- Interact with subcontractor project personnel on health and safety matters.
- Verify use of required PPE as outlined in the safety plan.
- Inspect and maintain Haley & Aldrich safety equipment, including calibration of air monitoring instrumentation used by Haley & Aldrich.
- Perform changes to HASP and document in Appendix A of the HASP as needed and notify appropriate persons of changes.
- Investigate and report on-site accidents and incidents involving Haley & Aldrich and its subcontractors.
- Verify that site personnel are familiar with site safety requirements (e.g., the hospital route and emergency contact numbers).
- Report accidents, injuries, and near misses to the Haley & Aldrich PM and FSM as needed.

The SHSO will conduct initial site safety orientations with site personnel (including subcontractors) and conduct toolbox and safety meetings thereafter with Haley & Aldrich employees and Haley & Aldrich subcontractors at regular intervals and in accordance with Haley & Aldrich policy and contractual obligations. The SHSO will track the attendance of site personnel at Haley & Aldrich orientations, toolbox talks, and safety meetings.

Field Personnel

Haley & Aldrich personnel are responsible for following the health and safety procedures specified in this HASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Reading the HASP in its entirety prior to the start of on-site work;
- Submitting a completed Safety Plan Acceptance Form and documentation of medical surveillance and training to the SHSO prior to the start of work;
- Attending the pre-entry briefing prior to beginning on-site work;
- Bringing forth any questions or concerns regarding the content of the Safety Plan to the PM or the SHSO prior to the start of work;
- Stopping work when it is not believed it can be performed safely;
- Reporting all accidents, injuries and illnesses, regardless of their severity, to the SHSO;
- Complying with the requirements of this safety plan and the requests of the SHSO; and
- Reviewing the established JSAs for the site-specific hazards on a daily basis and prior to each shift change, if applicable.

Visitors

Authorized visitors (e.g., Client Representatives, Regulators, Haley & Aldrich management staff, etc.) requiring entry to any work location on the site will be briefed by the Site Supervisor on the hazards present at that location. Visitors will be escorted at all times at the work location and will be responsible for compliance with their employer´s health and safety policies. In addition, this safety plan specifies the minimum acceptable qualifications, training and personal protective equipment which are required for entry to any controlled work area; visitors must comply with these

requirements at all times. Unauthorized visitors, and visitors not meeting the specified qualifications, will not be permitted within established controlled work areas.

SUBCONTRACTOR PERSONNEL

Subcontractor Site Representative

Each contractor and subcontractor shall designate a Contractor Site Representative. The Contractor Site Representative will interface directly with Insert Staff Name Here, the Subcontractor Site Safety Manager, with regards to all areas that relate to this safety plan and safety performance of work conducted by the contractor and/or subcontractor workforce. Contractor Site Representatives for this site are listed in the Contact Summary Table at the beginning of the Safety Plan.

Subcontractor Site Safety Manager

Each contractor / subcontractor will provide a qualified representative who will act as their Site Safety Manager (Sub-SSM). This person will be responsible for the planning, coordination, and safe execution of subcontractor tasks, including preparation of job hazard analyses (JHA), performing daily safety planning, and coordinating directly with the Haley & Aldrich SHSO for other site safety activities. This person will play a lead role in safety planning for Subcontractor tasks, and in ensuring that all their employees and lower tier subcontractors are in adherence with applicable local, state, and/or federal regulations, and/or industry and project specific safety standards or best management practices.

General contractors / subcontractors are responsible for preparing a site-specific HASP and/or other task specific safety documents (e.g., JHAs), which are, at a minimum, in compliance with local, state, and/or federal other regulations, and/or industry and project specific safety standards or best management practices. The contractor(s)/subcontractor(s) safety documentation will be at least as stringent as the health and safety requirements of the Haley & Aldrich Project specific HASP.

Safety requirements include, but are not limited to: legal requirements, contractual obligations and industry best practices. Contractors/subcontractors will identify a site safety representative during times when contractor/subcontractor personnel are on the Site. All contractor/subcontractor personnel will undergo a field safety orientation conducted by the Haley & Aldrich SHSO and/or PM prior to commencing site work activities. All contractors / subcontractors will participate in Haley & Aldrich site safety meetings and their personnel will be subject to training and monitoring requirements identified in this Safety Plan. If the contractors / subcontractors means and methods deviate from the scope of work described in Section 1 of this Safety Plan, the alternate means and methods must be submitted, reviewed and approved by the Haley & Aldrich SHSO and/or PM prior to the commencement of the work task. Once approved by the Haley & Aldrich SHSO and/or PM, the alternate means and methods submittal will be attached to this Safety Plan as an Addendum.

ATTACHMENT D
JOB SAFETY ANALYSES

FORMER KOSMOS MILL

KEY TASK :		
Subtask Category	**Potential Hazards**	**Controls**
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