Amended Closure Plan

Smith Chrome Plating
1012 N. 9th Avenue
Walla Walla, Washington
EPA/State ID #: WAD 027572205

Prepared for:
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1 INTRODUCTION

This Amended Closure Plan is for final clean closure of the Smith Chrome Plating, Inc. (SCP) facility. The SCP facility is located in Walla Walla, Washington. Closure of the facility is required under Washington Administrative Code (WAC) 173-303-200(12).

SCP was required, according to Agreed Order and Stipulated Penalty No. 8971 (effective February 15, 2012) to complete and submit to Ecology an approved closure plan for the Plating Room and Cleaning Room. SCP submitted a closure plan titled "Floor Cleaning, Encapsulation, and Upgrade", dated May 15, 2012, and prepared by Michael Johnson, PE. Ecology approved the closure plan in August 2012.

Investigations and upgrades that have been completed since the approved closure plan are presented in this Amended Closure Plan.

1.1 Facility Contact Information

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1.2 Facility Description

SCP operated as an electroplating facility, primarily serving the agricultural industry. The plating process is used to increase wear resistance, return worn parts to service, and to extend the effective service life of agricultural equipment. SCP ceased chrome plating activities in May 2022.

The SCP facility has reported as a large quantity generator (LQG) of dangerous waste from 2007 through 2021 pm their Dangerous Waste Annual Report.

1.3 Facility History, Function, Location and Layout

Please refer to the 2012 Closure Plan for a discussion of facility history, function, location, and layout (Lean Environment Inc. [LEI] 2012). This section provides facility updates since the 2012 Closure Plan was submitted, including investigations and upgrades.

A vicinity map of the area around the facility is included as Figure 1. A site map of the facility layout is provided as Figure 2. Figure 3 provides details of the layout of the Plating Room, while Figure 4 provides details of the layout of the Cleaning Room, before and after 2012 upgrades.

1.3.1 Cleaning Room Floor Investigation

The Cleaning Room is located in the east central portion of the facility. This room contains dip tanks with heated caustic (sodium hydroxide) and hydrochloric acid that were used to clean parts before the chrome plating process.

In 2012, Smith Chrome completed a comprehensive investigation and upgrade of the Cleaning Room floor. This work was described in *Certification of Completion - Phase I: Floor Cleaning, Encapsulation, and Upgrade of the Cleaning Room,* (ChemMet 2012). The investigation and upgrade of the Cleaning Room revealed that the floor pad was in better condition than originally anticipated when the Floor Plan was drafted. The following conditions in the Cleaning Room were observed and are described in the Phase I Certification of Completion in greater detail:

- The concrete pad making up the floor was approximately 4 inches thick, much thicker than originally anticipated;
- On uncracked concrete, staining was limited to a depth of less than 1 millimeter (mm) in the 50 plus years the facility has been in operation;
- On cracked surfaces, staining did not penetrate beyond about 1 mm;
- Where cracks occurred, above the abandoned copper pipe/tube heating system, staining was seen on the crack surfaces but, even on the deepest cracks [about 1½-inch long (= 3.8 cm = 38 mm)], staining did not penetrate to the copper.
- A plastic vapor barrier exists beneath the concrete pad. Note: this barrier was present in the Cleaning Room as well as in the Plating Room.

The better-than-expected condition of the Cleaning Room floor, concrete sampling and the identification of previously unknown improvements confirmed that the release to the soils beneath the cleaning room is unlikely. Nevertheless, SCP opted to proceed with a complete overhaul of the Cleaning Room floors and walls.

1.3.2 Cleaning Room Upgrades

Prior to inspection, all tanks were emptied and removed from the cleaning room. Cleaning of the room consisted of scarification of the floor to remove the existing hard coating, about ¼" thick, down to bare concrete. The floors were inspected, cleaned, inspected again, sampled and repaired. Prior to sealing the floor, concrete berms were installed to create secondary containment for the cleaning room tanks. Then the floors, and berms were sealed.

Next, the walls were pressure-washed and the wash water was collected, designated and disposed of accordingly. The walls were sealed with two 0.005" layers of a two-part Novalac epoxy coating quartz-filled system, first, white, then gray to ensure proper coverage. The final coating on the walls was about 0.02" thick. The floor area in the process area also received the same two-part coating of approximately 0.02" thick. The floor outside the process area, west of the concrete berm was coated with about 0.02" layer of ICO-HI Guard Coating ®which is a chemical resistant Novalac epoxy with an abrasive anti-slip grit.

After the coatings cured the process side walls were covered (encapsulated by) a fully-adhered 0.06" thick PVC liner. The floor and the berm were also covered with the same PVC material. The liner is resistant to the process chemicals in use including sodium hydroxide, hydrochloric acid, and chromic acid plating solutions. The process side of the concrete berm is fully encapsulated and has sufficient containment volume for the largest process tank. There is a layer of PVC liner over epoxy wall and floor coatings, over a 3-inch layer of crack-free concrete, which is underlain by a pre-existing polymer sheet.

1.3.3 Plating Room Investigation

Because the condition of the Cleaning Room floor was better than anticipated, SCP opted to conduct an assessment of the Plating Room floor in 2012 to assess whether similar improvements are necessary to prevent a release. The plating room floor is comprised of a concrete slab coated with an unspecified polymer coating that appears to be the same as in the Cleaning Room. The concrete floor is approximately 4 inches thick. The concrete is largely intact and no cracks were identified that could lead to a pathway in the environment. Cutouts of the Plating Room concrete floor confirmed that a plastic vapor barrier (the same type as the one identified below the cleaning room floor) is located below the concrete. The plastic vapor barrier appears to be made of PVC or possibly HDPE and is in good condition.

The floors beneath the chrome tanks were inspected with a handheld video camera. The floors under the tanks were largely intact and about the same throughout the room, staining was noted but the floor integrity was observed to be generally undamaged. As was the case with the cleaning room floor, the plating room was covered with what appears to be an epoxy-cement coating. The matte surface of the existing coating had been discolored over the years of service. Except as noted below, the existing floor coating appears to be intact and provides functional barrier against chrome solution coming in contact with the concrete.

The floor coating beneath the chrome tanks were intact and functional. Inspection of the floor under tanks showed nothing but stained coating; there were no obvious cracks or discontinuities in the coating.

The plating room investigation concluded that the majority of the existing polymer coating was intact and operating as intended, but identified a few areas where the coating had become compromised, exposing the concrete slab beneath. Accordingly, the plating room investigation proposed that SCP be allowed to repair those areas where the coating was compromised instead of scarify and replace the entire coating. Ecology agreed to this approach but required that SCP sample the exposed concrete to assess whether chromium was migrating through the exposed concrete. This assessment was conducted and documented in several letters dated July 2014 through September 2014. The analysis confirmed that chromium contacting the concrete was not penetrating through the concrete surface. Based on this analysis and the Plating Room Floor Investigation and Assessment (ChemMet 2013), Ecology agreed to a repair rather than complete replacement approach as follows:

1. Repair the floor and coating where compromised
2. Seal the wall-floor joints
3. Re-line the sump and put into service for emergency only with an alarm

The Independent Qualified Registered Professional Engineer (IQRPE) who signed the Plating Room Certification of Completion (ChemMet 2016) stated that after reviewing the manufacturer's specifications, that the repairs outlined below satisfactorily encapsulate the Plating Room floor and would prevent chrome solution from releasing to the subgrade, provided the floor is reasonably maintained.

1.3.4 Plating Room Upgrades

Floor repairs were performed in several steps as follows:

1. The floor was vacuumed to remove loose material and to clean out cracks. (Note the vacuum was equipped with HEPA filter to remove any hazardous dust.)
2. The cracks and areas where previous coating and underlying concrete had been compromised were coated/filled with Rapid Set ®Cement ALL ™, a fast-setting, high-strength, non-shrink grout.
3. Seal the repaired surface with Euclid Diamond Clear ® (EDC). EDC provides protection against water penetration but is not as resistant to chromic acid as are urethane compounds.
4. Installation of a final chemical resistant coating, Hi-Build Ultra Clear Coat ® from Daich Coatings Corp. It provides an acrylic coating enhanced with urethane.

The final, composite, floor coating is a hard, resistant surface that, when properly maintained, will prevent chrome plating solution from reaching the underlying concrete, ultimately preventing exposure to soil.

1.3.4.1 Sealing wall-floor joints

The floor/wall joints were cleaned and sealed with NP 1™, a polyurethane sealant. The floor slopes to the sump with the top of the sump approximately 4.5 inches below the floor/wall edge. A volume of approximately 225 cubic feet, not including the approximately 10 cubic feet volume of the sump, can be contained before any liquid reaches the top edge of the floor. The largest tank has a volume of only 192 cubic feet, so that the largest potential leak in any one tank will not overflow to another room.

1.3.4.2 Sump Improvements

The original liner of the sump was removed at the request of Ecology. Though inspection of the coated concrete sump showed no sign of cracks, Ecology requested that the sump should be relined. The relining consisted of the following improvements:

- A leak sensor was installed in the unlined sump
- Next the sump was lined with a modified polyvinyl base terpolymer sheet (same material that was used to line the plating tanks) on top of the sensor.
- Then another leak sensor was installed in the lined sump at a height of 1 inch above the bottom of the sump.
- The sensors were connected to an alarm system that notified SCP management. This alarm is not intended to be maintained after facility closure.

The leak sensors have not been triggered since installation in 2012.

1.4 Products and Production Processes

Please refer to the 2012 Closure Plan for a discussion of products and production processes (LEI 2012).

1.5 Dangerous Waste Management and Units

Dangerous waste was primarily managed at two locations at the facility: (1) the Cleaning Room, and (2) the Plating Room. The principle source of waste generation was from rinsing parts following immersion in sodium hydroxide, hydrochloric acid, and chromic acid. In addition, waste generated from the facility was stored in the waste accumulation area in the southeast area of the shipping/receiving area.

The majority of waste generated in the cleaning room was from rinsing operations. Wastewater was transferred from a 260-gallon polypropylene rinse tank to 330-gallon totes, designated and transferred to the waste accumulation area at the east end of the loading bay. Spent chrome solutions generated from the plating room were occasionally transferred to a separate 330-gallon tote, designated and disposed as dangerous waste. This Amended Closure Plan covers the entire facility, including the cleaning room, waste accumulation area, and the plating room.

Refer to the 2012 Closure Plan for a historical discussion of dangerous waste management at the facility.

1.6 Unit Description

Refer to the 2012 Closure Plan for a historical discussion of the components that made up the facility's dangerous waste management systems (LEI 2012).

The cleaning room is located in the south central portion of the facility (Figure 2). Since the upgrade conducted between 2012 and 2016, the cleaning room has had significant upgrades to its layout and operating procedures including epoxy coating and encapsulation, rearrangement of the tanks and installation of secondary containment, as well as a change to how rinsing is done and collection of the rinse water within a tank, rather than on the floor or within the sump (Figure 4).

The plating room is situated on the western half of the facility building (Figure 2). Upgrades to the plating room include inspecting, repairing, and sealing the floor, sealing the wall/floor joints, and sump upgrades (Figure 3).

1.6.1 Maximum Waste Inventory

Based on the 2012 Closure Plan:
The maximum amount of dangerous waste that could be present in the system is limited to the retention on floor, the rinse tank and the sumps, plus the retained waste in up to four 330 gallon totes. The waste management capacity is 2,216 gallons in the plating room floors and sump, 269 gallons in the rinse tank, 1320 gallons in four totes, and 57 gallons in the cleaning room sump. Therefore, the maximum capacity is 3,862 gallons. (Lean Environment 2012).

During cleaning room floor cleaning, encapsulation and upgrade activities in 2012, the cleaning room sump was removed from service, cleaned, inspected, sampled, and filled in, and the cleaning room layout was reconfigured so that the former location was outside of the process area.

Following cessation of operations, SCP designated and disposed of approximately 6,000 gallons of chrome plating solutions from plating process tanks in May 2022. These solutions were not considered waste until there was no longer a use for them. Therefore, the total waste at cessation of operations included the plating room solutions plus the cleaning room waste, minus the cleaning room sump and amounted to approximately 9,805 gallons.

2 CLOSURE PERFORMANCE STANDARD

The SCP Facility will be closed in a manner that complies with the performance standard in WAC 173-303-200 (12)(c) and, therefore, achieves clean closure.

The objectives of closure activities at the SCP Facility are as follows:

- Minimize the need for further maintenance.
- Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated runoff, or dangerous waste decomposition products to the ground, surface water, groundwater, or the atmosphere.
- Remove all waste and waste residues and properly dispose of them off site.
- Remove the tanks, containers, piping, and ancillary items that made up the chrome plating/cleaning process and properly dispose of them off site.
- If evidence of a release to soil is observed, perform soil sampling and analysis to compare soil concentrations with standard MTCA Method A cleanup levels for unrestricted site use, and remove any contaminated soils with concentrations above these levels.
- Decontaminate the Plating Room concrete walls and floors, and wood beams that exhibit evidence of staining to meet site-specific criteria for abrasive blasting to a *clean debris surface* in accordance with the Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45 Table 1).
- Return the land to the appearance and use of surrounding land areas to the degree possible, given the nature of the previous dangerous waste activity.

Clean Debris Surface means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area. *Definition from Note 3 of Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45 Table 1).*

Note that the floors and sumps have not been used for or regulated as waste management units, but have functioned as tertiary containment following cleaning and encapsulation of the cleaning room floors, in addition to other improvements to facility processes over the last 10 years.

3 CLOSURE ACTIVITIES

This section addresses activities that will be completed during closure of the facility. The following activities are described:

- Removal of wastes and waste residues (Section 3.1)
- Removal of tanks, equipment, piping, and other ancillary equipment (Section 3.2)
- Inspecting the remaining plating and cleaning room structures prior to decontamination (Section 3.3)
- Decontamination of the plating and cleaning room structures (Section 3.4)
- Identifying and managing contaminated environmental media (Section 3.5)
- Confirming clean closure (Section 3.6)
- Sampling and analysis and constituents to be analyzed (Section 3.7)
- Role of the independent registered professional engineer (Section 3.8)
- Closure certification (Section 3.9)
- Conditions that will be achieved when closure is complete (Section 3.10)
- Waste management (Section 3.11)

3.1 Removal of Wastes and Waste Residues

SCP designated and disposed of approximately 6,000 gallons of chrome plating solutions from plating process tanks in May 2022. Waste solutions in the cleaning room remain in place and will be removed and properly disposed as dangerous waste. Residues from cleaning floors, walls, sumps, and ceilings will be collected and containerized for characterization and disposal. Wastes will be containerized, labeled, staged, and disposed of as described in Section 3.11.

Liquid waste streams stored in process tanks in the Cleaning Room have not yet been removed and remain in place. SCP plans to remove the contents of these tanks and then remove and dispose of these tanks as dangerous waste following approval of this Plan.

Documentation of the final disposition of all dangerous wastes and dangerous waste residues, including contaminated media, debris, and all cleaning residuals will be provided and summarized to support the Certification of Closure.

All records and analyses associated with these designations and wastes will be retained for five (5) years.

3.2 Removal of Tanks, Equipment, Piping, and Other Ancillary Equipment

Historically the facility had a porous pot, dual tank, and ion exchange canisters and related piping and appurtenances, however, these were removed from service, decontaminated by washing or wiping, and the tanks were disposed as dangerous waste, and documentation was provided to Ecology in March 2012 in accordance with Section 3.2.2 of the Agreed Order.

Beginning on June 10, 2022, SCP cut up the empty chrome contaminated plating process tanks, tank liners, and other equipment into small pieces, designated it as a dangerous waste, and accumulated the waste in a lined roll-off container. Beginning on July 25, 2022, SCP removed chrome contaminated wood and steel items, plastic plating bath balls, floor sweepings, designated it as a dangerous waste, and accumulated in a roll-off container. The air scrubber and associated piping and venting equipment were recently disassembled, and contaminated piping and vents were accumulated in a roll-off box for disposal. SCP also removed the PVC linings from the walls in the cleaning room and accumulated in a roll-off container for disposal as dangerous waste. All of these items have been designated as dangerous waste and transported off-site for disposal. See Section 3.11 for waste management and disposal procedures.

3.3 Inspection Prior to Decontamination

After removing all wastes from the Cleaning Room and Chrome Room, but prior to beginning decontamination activities, SCP will visually inspect the floors and sumps in the plating and cleaning rooms to identify all cracks and other openings through which waste, debris, or decontamination media such as blasting debris could be released to the environment. If cracks or other openings are found, SCP will investigate and evaluate all cracks and openings to determine if releases of dangerous waste or dangerous waste constituents have occurred at or from SCP's operations. When this investigation and evaluation are complete, SCP will seal or repair all cracks or other openings in the facility's floor or walls to prevent releases prior to and during decontamination, if necessary.

SCP will maintain a record of the location and dimensions of all cracks or other openings identified during this evaluation, as well as any other indication of the potential for spills or releases and will use this information to determine whether there is any need to recommend focused soil sampling and analysis during closure for Ecology review. The records will be kept in SCP's operating record or in the field notebook(s) used by the independent qualified registered professional engineer overseeing closure.

Cleaning Room and Plating Room Floors

Plating room and cleaning room floors have either a polymer (plating room) or an epoxy coating. They will be inspected prior to cleaning. Any areas that appear to have staining or are located in areas likely to have been impacted by operations will be decontaminated as provided in Section 3.4 below.

Plating Room and Cleaning Room

The ceilings and walls in the plating room and cleaning room will be inspected prior to decontamination to identify stained areas that require decontamination. Any areas that appear to have staining or are located in areas likely to have been impacted by operations will be decontaminated as provided in Section 3.4 below.

3.4 Decontamination

SCP will decontaminate metal surfaces, concrete floors and walls, and wood surfaces in the plating room during closure as described in the following sections. Table 1 provides a summary of proposed decontamination methods by location in the facility.

3.4.1 Metal Surfaces

Interior metal surfaces will be decontaminated if necessary using water washing and spraying until they meet the clean debris surface standard. Wash water will be collected and recirculated. When decontamination is complete, wash water used in this process will be placed in containers and moved to the dangerous waste accumulation area; it will be evaluated for dangerous waste designation purposes, and appropriately treated or disposed of offsite, in accordance with Section 3.11 Waste Management.

3.4.2 Concrete Surfaces

SCP intends to leave the concrete walls and floors in place after decontamination. Concrete surfaces such as the walls in the plating room, will be decontaminated with abrasive blasting to meet the clean debris surface standard. Because the walls are of concrete block construction, abrasive blasting is not recommended to the full depth of 0.6 centimeters (cm) to maintain structural integrity.

Appropriate safeguards will be used to minimize the release of particulate matter to the ambient air. The removed material will be placed into containers, sampled or evaluated for waste characterization purposes, and disposed at a permitted off-site dangerous waste treatment, storage, and disposal facility. Concrete surfaces will be considered decontaminated when the surface layer has been removed and when they have met the clean debris surface standard.

3.4.3 Wood Surfaces

Wood surfaces that appear visually contaminated during inspection will be decontaminated by physical extraction technology using abrasive blasting to meet the clean debris surface standard; care will be taken to focus on removal of the surface layer of debris. The residuals from the physical extraction process will be placed in containers and moved to the dangerous waste accumulation area and disposed of in accordance with Section 3.11.

3.4.4 PVC-Lined Surfaces in Cleaning Room

These surfaces were covered in 2012 as described in Section 1.3.2 and the PVC-lining was recently removed for disposal as a dangerous waste. These surfaces will be inspected prior to decontamination, as they are not expected to be contaminated and may not require decontamination.

3.4.5 Treatment Residuals

The residuals from the physical extraction process will be placed in containers and moved to the dangerous waste accumulation area. Residuals will be evaluated for dangerous waste designation purposes and disposed of offsite (see Section 3.11 for waste management characterization and disposal procedures). The independent qualified registered professional engineer retained to assist with SCP’s closure certification will oversee decontamination activities and confirm visual inspection of decontaminated surfaces.

Based on note 9 of Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45 Table 1), any soil, waste, and other non-debris material that remains on the debris surface (or remains mixed with the debris) after treatment is considered a treatment residual that must be separated from the debris using, at a minimum, simple physical or mechanical means. Examples of simple physical or mechanical means are vibratory or trommel screening or water washing. The debris surface need not be cleaned to a “clean debris surface”' as defined in note 3 when separating treated debris from residue; rather, the surface must be free of caked soil, waste, or other non-debris material. Treatment residuals are subject to the waste specific treatment standards for the waste contaminating the debris.

Table 1. Summary of Proposed Decontamination Methods by Location

Location	Type of Material	Decontamination Method	Performance Standard
Plating Room Walls	Concrete block	Abrasive blasting	Treatment to a clean debris surface[1]
Plating Room Floor	Polymer-coated concrete	Abrasive blasting	Treatment to a clean debris surface[1]
Plating Room Wood Beams	Wood	Abrasive blasting	Treatment to a clean debris surface[1]
Cleaning Room Walls	Concrete block	Abrasive blasting as needed	Treatment to a clean debris surface[1]
Cleaning Room Floor	Epoxy-coated concrete	Abrasive blasting	Treatment to a clean debris surface[1]
Doors	Metal doors	Abrasive blasting or high-pressure washing as needed	Treatment to a clean debris surface
Other	Windows: metal/glass	Abrasive blasting or high-pressure washing as needed	Treatment to a clean debris surface

1 Wood beams (2x4s) and concrete block walls should not be blasted down to 0.6cm to preserve structural integrity; therefore, blasting would occur only to a clean debris surface.

3.5 Identifying and Managing Contaminated Environmental Media

During the course of decontamination, the floor, walls, sumps and structural interfaces will be inspected by a licensed, independent professional engineer. Any cracks, defects, spalling, or significant etching that exists in the existing structure will be noted and catalogued by the professional engineer. These notes will be retained in the closure manual and submitted to the Department of Ecology. In the event the professional engineer concludes there is reasonable evidence of a significant release, additional investigation, which may include coring, sampling or other means, may be included as necessary to assess whether the release reached soil or groundwater as discussed in Section 3.7.

If the result of a soil sample analysis is above the clean closure level for any constituent, the area represented by the sample will be considered to be outside the standard for clean closure and SCP will propose additional actions, such as soil removal, to meet clean closure levels.

3.6 Confirming Clean Closure

When closure activities are complete, SCP anticipates that all wastes and waste residues will be removed, tanks and equipment will be decontaminated and removed, the concrete floors and walls in the process areas in the Smith Chrome structures will be decontaminated. Any soils or groundwater that are impacted as a result of a release will be removed or decontaminated so that MTCA unrestricted site use cleanup levels are achieved.

SCP will confirm that the concrete walls, floors, and wood beams are decontaminated and meet the clean closure standard by visually inspecting to confirm that there is a “clean debris surface” as defined in the Alternative Treatment Standards for Hazardous Debris. Photos and field notes will be used to confirm that these standards are achieved.

SCP will confirm that any surfaces that require pressure-washing are decontaminated and meet the closure standard. The IQRPE will confirm that the closure performance standards in Section 2 to a *clean debris surface* are met in accordance with the Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45 Table 1).

Based on review of previous floor investigations and upgrades, soil contamination is not anticipated, however, the IQRPE will confirm during closure inspection activities.

SCP's Sampling and Analysis Plan is described in Section 3.7 of this Closure Plan, and included as Appendix A. Sampling will be conducted for designation of decontamination waste.

If facility inspection determines soils should be sampled as noted above, soil will be analyzed by EPA Method 6010 for metals. Waste designation samples will be analyzed for TCLP metals.

Table 2 shows the number and type of samples anticipated at each location, and the analytical methods to be used. Table 3 provides a summary of the constituents to be analyzed along with criteria for either clean closure or soil cleanup levels.

3.7 Sampling and Analysis Plan and Constituents to be Analyzed

3.7.1 Sampling and Analysis Plan

SCP has prepared a detailed sampling and analysis plan for closure to meet WAC 173-303-110 and 173-303-610 requirements. The sampling and analysis plan is included with this closure plan as Appendix A. The sampling and analysis plan describes all sampling anticipated during closure, including sampling of potentially affected soils (see Section 3.5 of this Closure Plan). In the event of a conflict between the Amended Closure Plan and the SAP, the Amended Closure Plan will be the controlling document. The detailed sampling and analysis plan includes the following:

- Statement of purpose and objectives
- Organization and responsibility for sampling and analysis activities
- Project schedule
- Detailed procedures for sample collection and handling
- Identity of chemical constituents that will be analyzed (see Section 3.7.2 of this closure plan)
- Analytical techniques and procedures consistent with this closure plan and Chapter 173-303 WAC, modified, if necessary, to meet data quality objectives
- Specific sampling location and a unique identification number for all random and bias soil samples that were selected in accordance with this closure plan
- Procedures for decontamination of sampling equipment
- Procedures for management of waste materials generated by sampling activities
- Protocols for sample labeling and chain of custody
- Practical quantification limits (PQLs) sufficiently low to determine compliance with clean closure standards
- Description and number of quality assurance and quality control samples including blanks, matrix spikes, surrogate samples, laboratory control samples, and duplicates, as appropriate
- Provisions for splitting samples with Ecology, when appropriate
- Procedures for reporting results

Table 2. Anticipated Sample Types, Numbers, and Analyses to be Performed

Sample Type	Media	Number	Analysis
Blasting Debris	Decontamination Waste	up to 10	EPA Method 1311 TCLP/ RCRA-8 Metals (As, Ba, Cd, Cr, Pb, Hg, Ag, Se)/EPA Method 6020/200.8/7471/ 7470/245.1
Pressure-Wash Rinse Water	Decontamination Water	only if needed*	1. RCRA-8 Metals (As, Ba, Cd, Cr, Pb, Hg, Ag, Se) by EPA Method 6020/200.8/7471/7470/245.1 2. pH by EPA Method 5400-H+B or 9040C 3. EPA Method 1311 TCLP Metals (As, Ba, Cd, Cr, Pb, Hg, Ag, Se)/Method 6020/200.8/7471/7470/245.1
Metals (if needed)	Soil	only if needed	RCRA-8 Metals (Ag, As, Ba, Cd, Cr, Pb, Hg, Ag, Se) by EPA Method 6020/200.8/7471/7470/245.1

Note: TCLP – Toxics Characteristic Leaching Procedure

Number of debris samples based on procedures described in Section 3.11 Waste Management

* Water samples will not be collected if the surfaces cleaned by pressure washing are cleaned to a *clean debris surface* in accordance with Section 2 Closure Performance Standard, however TCLP samples will be collected for waste designation purposes.

3.7.2 Constituents to be Analyzed

Metals that are known to have been used at the facility include lead, chromium, and barium. However, samples will be analyzed for the following constituents:

- Arsenic
- Barium
- Cadmium
- Chromium
- Lead
- Mercury
- Silver
- Selenium

Samples will be collected to designate decontamination waste. In the event that pressure washing is utilized, rinse samples will be collected to designate waste rinse water following high-pressure water washing of the walls and the epoxy-coated concrete floors in the plating room and cleaning room. If evidence of a release to the soil underlying the concrete floors or sumps is discovered, soil samples would be collected and analyzed for the suite of metals listed above. Samples of wood waste debris from blasting or sanding will be collected and analyzed for TCLP metals as described in Table 2.

If analysis of several samples are required, the first few samples will be analyzed for the full list; thereafter, samples will be collected for analysis of lead, chromium and barium, unless other metals on the list appear to be a concern based on initial laboratory analysis.

Table 3. Constituents to be Analyzed

Constituent	TCLP Threshold Level (mg/L)	MTCA Method A Soil Cleanup Level (mg/kg)
Arsenic	5	NE
Barium	100	NE
Cadmium	1	2
Chromium	5	2,000(Cr III)/19(Cr VI)
Lead	5	250
Mercury	0.2	2
Silver	5	NE
Selenium	1	NE
pH	<=2 >=12.5	--

Notes:
Cr - chromium
TCLP – Toxics Characteristic Leaching Procedure
mg/kg – milligrams per kilogram
µg/L – micrograms per liter
MTCA – Model Toxics Control Act
mg/L – milligrams per liter
NE – not established

3.7.3 Revisions to the Sampling and Analysis Plan and Constituents to be Analyzed

As the SCP facility is planning for closure of the operations and facility, no revisions are anticipated to the SAP once it is approved by Ecology. However, if conditions vary from what was anticipated during development of this Amended Closure Plan, the SAP may need to be revised, and Ecology will be notified and allowed to review changes prior to implementation.

3.8 Role of the Independent Qualified Registered Professional Engineer

An independent qualified registered professional engineer (IQRPE) will monitor SCP's closure activities by observing field activities and reviewing records. At a minimum, this will include field observation and a review of records of the following activities:

- Removal of waste (and removal of any unit components or other materials) and disposition of waste (and other materials removed) to ensure the removal was complete and materials were properly disposed.
- Decontamination procedures and results to ensure that the closure plan for decontamination was followed and the clean closure standard for decontamination was achieved - this will include inspecting concrete walls or floors after decontamination to confirm that a "clean debris surface" and other decontamination performance standards are achieved.
- Management of decontamination residuals to ensure management was properly carried out.
- Sampling procedures and results.
- Sample labeling and handling, including chain-of-custody procedures.
- When closure is complete, the independent qualified registered professional engineer will sign and stamp SCP's certification of clean closure.

3.9 Certification of Clean Closure

Within 60 days of closure of the facility, SCP will submit to Ecology, by registered mail, certification that the facility has been closed in accordance with this closure plan. The certification will be signed by SCP's owner. SCP's owner will make the following certification:

I certify under penalty of the law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing of violations.

The closure certification also will be signed and stamped by an independent qualified registered professional engineer who is familiar with SCP's closure activities.

The IQRPE will submit the following information to support its closure certification:

- All field notes and photographs related to closure activities, including the results of the inspection of the facility surfaces for cracks and other openings prior to decontamination.
- A description of any minor deviations from the approved closure plan and justification for these deviations.
- Documentation of the final disposition of all dangerous wastes and dangerous waste residues, including contaminated media, debris, and all treatment residuals.
- All laboratory and/or field data, including sampling procedures, sampling locations, quality assurance/quality control samples, and chain of custody procedures for all samples and measurements, including samples and measurements taken to determine background conditions and/or determine or confirm clean closure.
- A summary report which identifies and describes the data reviewed by the independent registered professional engineer and tabulates the analytical results of samples taken to determine and confirm clean closure.
- A description of what the facility looks like at completion of closure, including a description of what parts of the former facility operations, if any, will remain after closure.

3.10 Conditions That Will Be Achieved When Closure Is Complete

SCP plans to completely remove all chemicals, tanks, equipment, and other ancillary equipment associated with chrome plating operations, and to decontaminate the facility's concrete, metal and wood surfaces that were impacted by facility operations. When closure is complete, all waste and all unit parts, associated equipment and piping, will be removed and properly disposed of offsite. The concrete floors, and walls, metal beams, and wood surfaces will be completely decontaminated, but will remain on site for potential future use for other activities.

3.11 Waste Management

Waste will be generated through the decontamination of the plating and cleaning rooms at the Smith Chrome facility. This waste may include:

- Solid waste generated from abrasive media blasting/sanding of concrete floors, concrete walls, and wood beams.

Section 3.11.1 details the characterization, handling, and management of wastes generated during the decontamination of the facility in accordance with applicable regulations.

Initial decontamination of the floor and wall surfaces of the cleaning and plating rooms will be completed using abrasive blasting. Used abrasive media and debris generated during abrasive blasting, scarification, grinding and planing, or vibratory finishing have the potential to be impacted with COCs.

Solid waste from blasting decontamination of concrete floor and wall surfaces, and wood beams will be collected and containerized for characterization and disposal. Samples will be collected from the debris and submitted for laboratory analysis to characterize the waste for disposal. Laboratory analysis is discussed in Section 3.7.

If further decontamination of the surfaces of the cleaning and plating rooms is required, additional abrasive media blasting will be used to remove further contaminants and material from the surfaces of the rooms. Used abrasive media and debris generated during abrasive blasting, scarification, grinding and planing, or vibratory finishing have the potential to be impacted with COCs.

The used abrasive media and debris from the surfaces will be bulk placed into lined roll-off bins or drums for characterization and disposal. Characterization sampling procedures are described in Section 3.11.1.

There is the potential for some of the wastes to be classified as dangerous or hazardous waste based upon the toxicity characteristic criteria. Evaluation of whether these wastes designate as dangerous or hazardous wastes is discussed in detail in Section 3.11.1.

Waste samples will be analyzed for those metals listed in the toxicity characteristics list in WAC 173-303-090(8)(c) as indicated in Section 3.11.1. Analytical results will be compared directly to the listed limits. The waste will be handled according to applicable regulations and requirements, and all analytical results will be provided to the disposal facility for profiling and acceptance.

3.11.1 Waste Management Procedures

Waste containers will be sampled by composite methods, and the sample will be sent to a Washington State-accredited laboratory for analysis. Composite samples will be collected from multiple drums (up to 5 drums per composite sample) of the same type of waste, such as blasting debris. If roll-off bins are used to hold waste, a composite sample will be collected from at least three representative and safely accessible locations from within the bin. Composite samples will be collected using a hand auger or push tube and submitted for laboratory analysis to characterize the wastes for disposal. Up to 10 samples for waste characterization purposes will be collected. Because much of the waste is anticipated to have similar characteristics, these samples will be used to assist with waste designation and to document the concentrations of the waste.

Samples will be analyzed for TCLP metals as indicated in Table 3. Upon receipt of results, decisions will be made, in consultation with the waste disposal contractor, regarding disposal.

Steps will be taken to limit on-site storage of confirmed hazardous or dangerous wastes to within regulatory established storage time limitations (e.g., 90 days). A hazardous or dangerous waste designation will be attached to the waste upon receipt of analytical data and subsequent characterization indicating such a waste status. Disposal certificates will be produced and provided to Ecology upon final treatment or disposal of all dangerous and hazardous wastes.

Wastes will be containerized and staged on-site until the results of analytical testing have been reviewed. Each container will be labeled with the following information:

- Wastes awaiting analytical results will be stored in the hazardous waste accumulation area and be segregated from other known wastes.
- The words “Hazardous Waste Pending Analysis” or “Dangerous Waste Pending Analysis” and the associated hazard of the contents.
- Medium contained in container (i.e., solids/debris or decontamination water)
- Date accumulation began (start date), and
- Other appropriate information, including existing profile or applicable waste codes.

Waste will be sampled and analyzed in accordance with the SAP (Appendix A). A log of wastes generated will be maintained on site that includes the following information:

- The date the waste was generated.
- The date samples were shipped to a testing facility.
- Testing facility information: name, address, and phone number.

Laboratory data will be evaluated in accordance with waste characterization procedures in WAC 173-303 and the dangerous waste Toxicity Characteristic List maximum concentrations, as identified in WAC 173-303-090(8)(c).

If the analytical results from the TCLP leachate are below the Toxicity Characteristics List values, the waste will be characterized, profiled, and disposed of off-Site at an appropriate offsite disposal facility.

If the analytical results for the TCLP leachate exceed the Toxic Characteristic List values the solid waste will be managed as Hazardous or Dangerous Waste and sent off-site for disposal with profiling and manifesting documentation appropriate to the accepting facility.

For containers with contents determined to be dangerous or hazardous waste:

- The generation date will be used for the start date for the accumulation time limit.
- Pending analysis label will be removed and dangerous or hazardous waste labels will be applied.
- It will be verified that all applicable hazard labels that accurately identify the hazards associated with the contents of the containers are present.

Wastes will then be assigned an existing waste profile or a waste profile will be completed with the appropriate facility if the waste material does not fit within the parameters of a waste profile currently in use by SCP. As needed, a separate profile form will be completed for each waste type as required by the accepting facility.

Based on wastes previously shipped off site, it is anticipated that wastes generated during the decontamination of the cleaning and plating rooms will be assigned to one or more of the following characteristic waste codes:

- D002: Corrosive Waste

- D004: Arsenic
- D006: Cadmium
- D007: Chromium
- D008: Lead
- D010: Selenium

Wastes will be transported using a Uniform Hazardous Waste Manifest and will comply with the requirements of applicable federal and state laws for transportation of hazardous or dangerous wastes, and the requirements of the receiving facility. The receiving facility may require analyses in addition to those discussed herein.

Personnel at the disposal or treatment facility are responsible for verifying that the waste stream samples are consistent with the information on the completed profiles. Applicable state and federal hazardous and dangerous waste regulations will be followed during waste transport, treatment, and disposal (40 CFR 261, 49 CFR 170-178, and WAC 173-303). Following final waste treatment or disposal, certification will be provided that specifies the treatment or disposal method used.

4 CLOSURE SCHEDULE

Once the closure plan is approved by Ecology and finalized, notification of closure will be submitted by the facility in accordance with WAC 173-303-200(12)(b).

Closure activities will begin within 60 days of receipt of an approved amended closure plan.

Within 45 days of implementation of closure, a written report will be provided to Ecology that includes the documentation and certifications described in Section 3.9

5 COST OF CLOSURE

This section is not included as it is waived per paragraph 3.2.4.4(a) of the Agreed Order.

6 SIGNATURES

PBS has prepared this Amended Closure Plan for use by Smith Chrome Plating, Inc. This plan is for the exclusive use of the client and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced in total or in part without the express written consent of the client and PBS.

Melanie L. Young

Digitally signed by Melanie L. Young
Date: 2023.05.10 17:17:38 -07'00'

Melanie Young, PE
Senior Environmental Engineer
PBS Engineering and Environmental

7 REFERENCES

ChemMet, Ltd, PC. (2012). *Certification of Completion – Phase I: Floor Cleaning, Encapsulation, and Upgrade of the Cleaning Room, Smith Chrome Plating, Inc. 1012 N. 9th Avenue, Walla Walla, WA 99362*. November 29, 2012.

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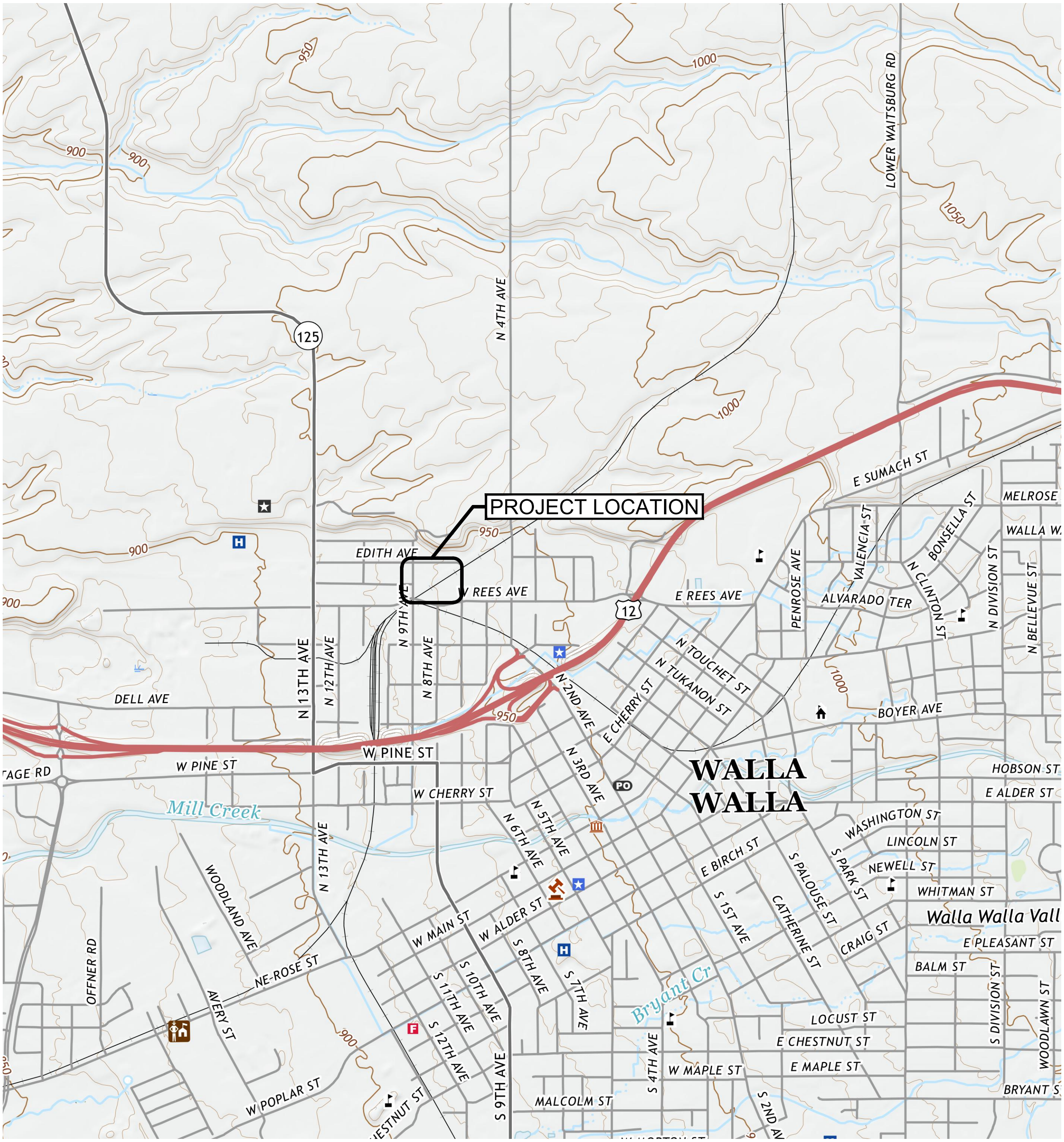
Ecology. (2005). *Guidance for Clean Closure of Dangerous Waste Units and Facilities.* Prepared by Washington State Department of Ecology, Hazardous Waste and Toxics Reduction Program. Publication #94-111, Revised May 2005.

Figures



SOURCE: USGS WALLA WALLA, WA QUADRANGLE 2020.

Scale 1" = 2000'

0' 1000' 2000' 4000'

PREPARED FOR: SMITH CHROME PLATING, INC

PBS

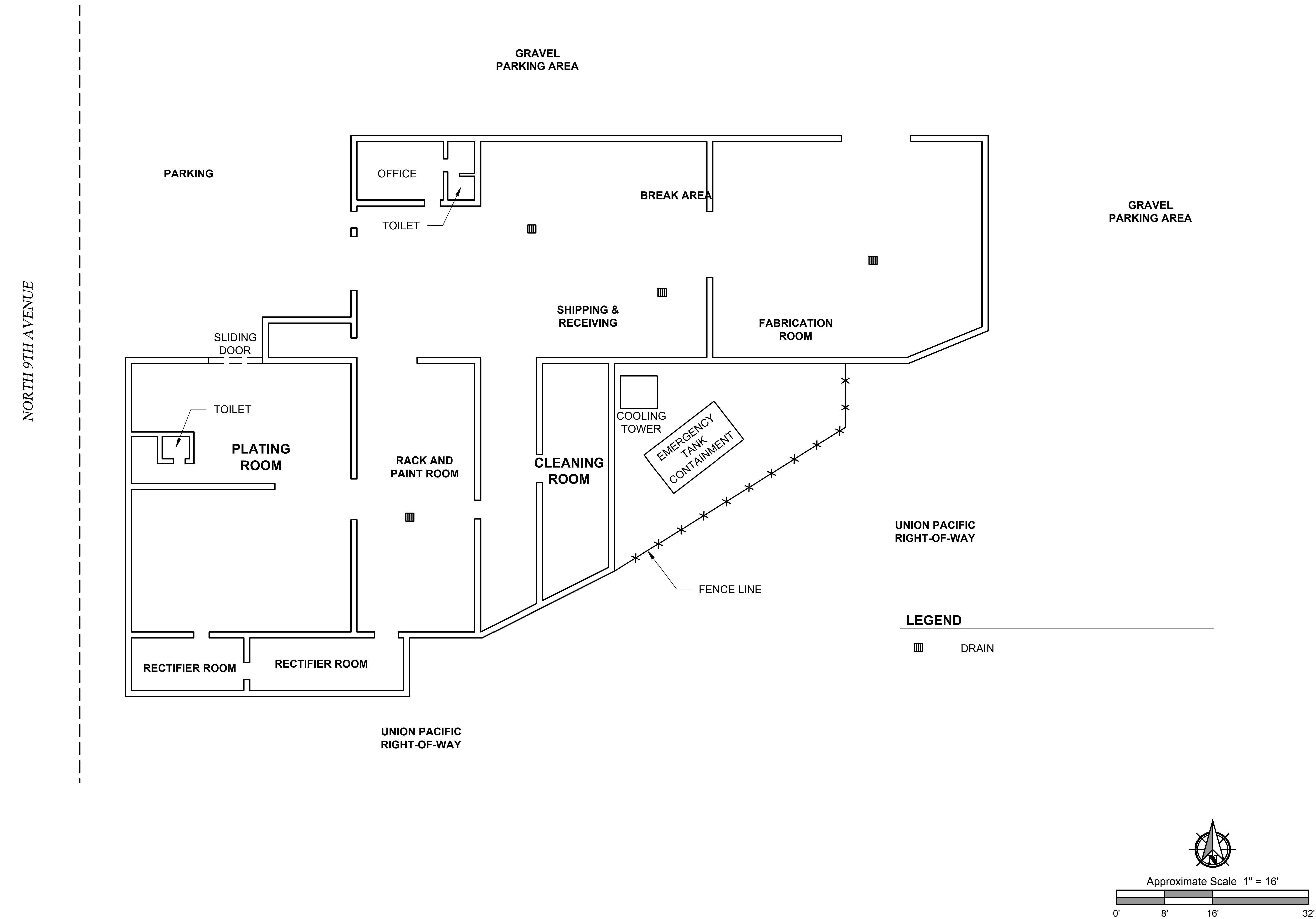
VICINITY MAP

1012 NORTH 9TH AVENUE
WALLA WALLA, WASHINGTON

OCT 2022
41841.000

FIGURE
1

Filename: L:\Projects\41000\41842 Smith Chrome\DWG\41842.000_Fig_1-4.dwg Layout Tab: VICINITY MAP User: Katie Breyman CAD Plot Date/Time: 10/24/2022 4:53:47 PM



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PBS Engineering and Environmental Inc.
214 East Galer Street, Ste 300
Seattle, WA 98102
206.233.9639

pbsusa.com

SITE PLAN

SMITH CHROME PLATING

1012 NORTH 9TH AVENUE, WALLA WALLA, WASHINGTON

PROJECT

41841.000

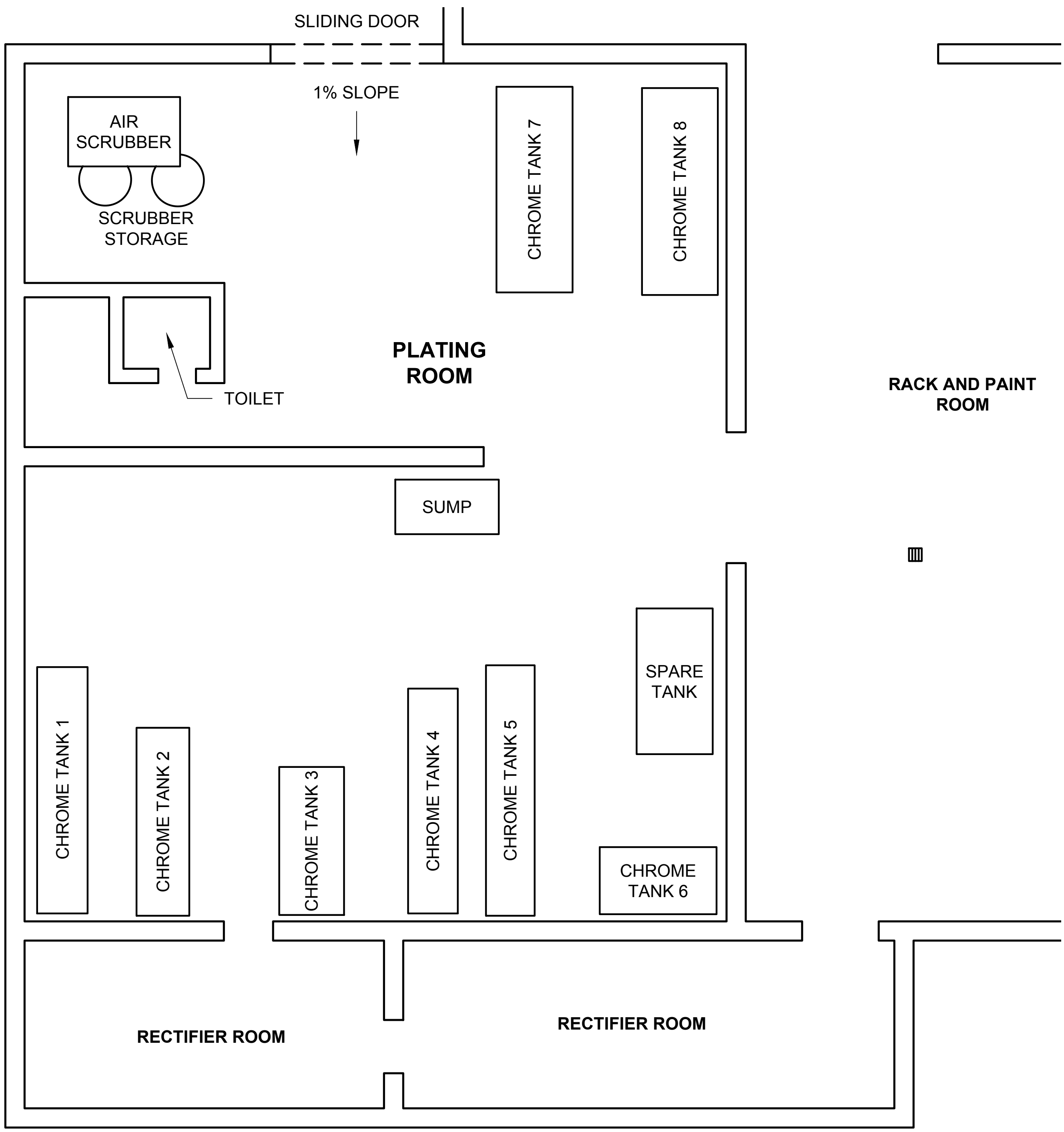
DATE

OCT 2022

SHEET ID

2

PREPARED FOR: SMITH CHROME PLATING, INC



LEGEND

DRAIN

NOTE: ALL TANKS AND AIR SCRUBBER MATERIALS REFER TO THEIR LOCATION PRIOR TO REMOVAL IN 2022

Approximate Scale 1" = 8'

0' 4' 8' 16'

PREPARED FOR: SMITH CHROME PLATING, INC

PBS

PLATING ROOM DETAIL

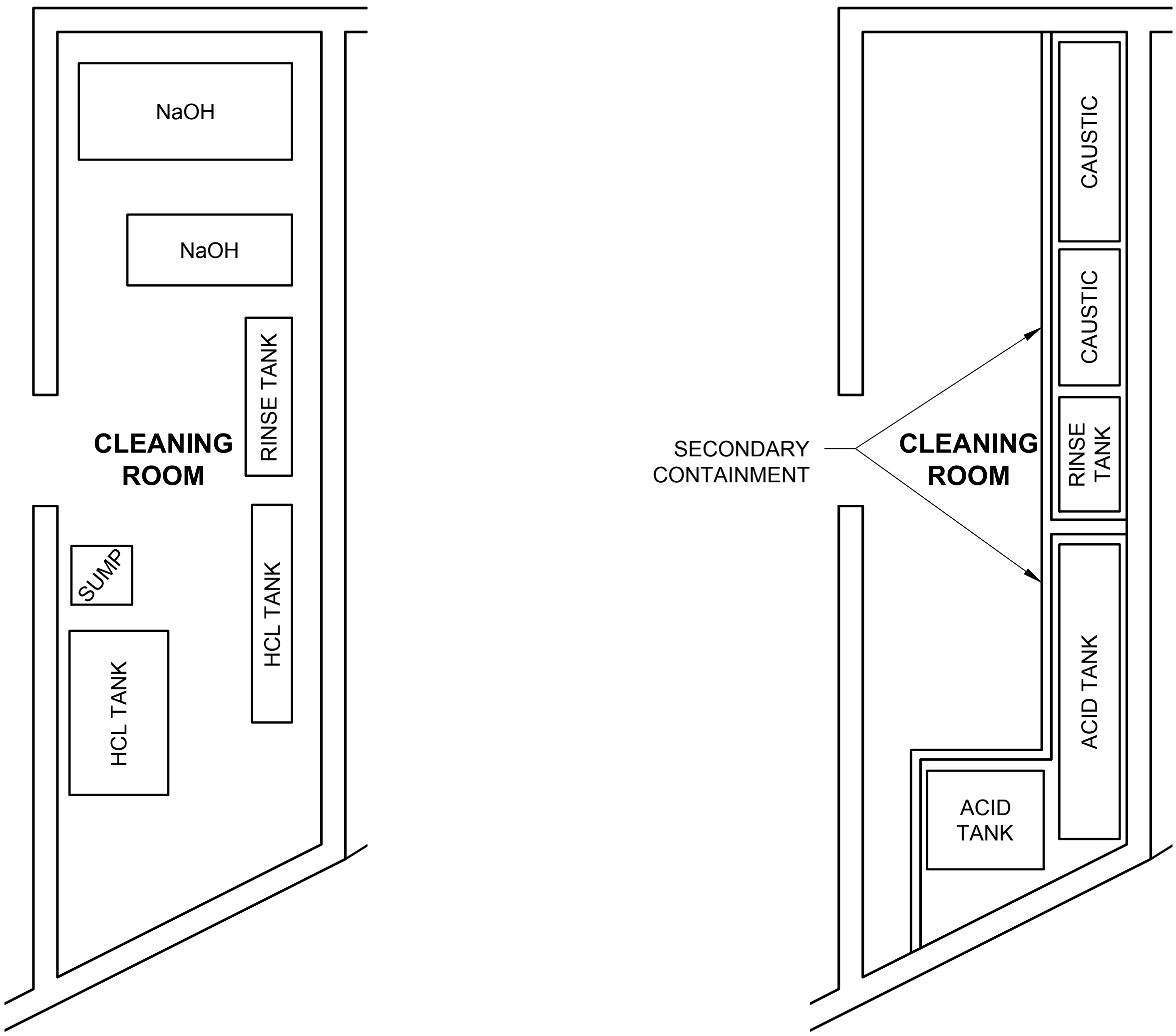
1012 NORTH 9TH AVENUE
WALLA WALLA, WASHINGTON

OCT 2022
41841.000

FIGURE
3

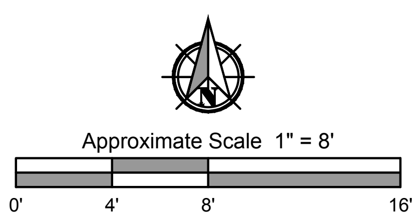
PRE-2012 CLEANING & UPGRADES

POST-2012 CLEANING & UPGRADES



LEGEND

DRAIN



PREPARED FOR: SMITH CHROME PLATING, INC

PBS

CLEANING ROOM DETAILS

1012 NORTH 9TH AVENUE
WALLA WALLA, WASHINGTON

OCT 2022
41842.000

FIGURE
4

Appendix A
Sampling and Analysis Plan

Sampling and Analysis Plan

Smith Chrome Plating
1012 N. 9th Avenue
Walla Walla, Washington
EPA/State ID #: WAD 027572205

Prepared for:
Smith Chrome Plating, Inc.
1012 N. 9th Avenue
Walla Walla, Washington

March 29, 2023
PBS Project 41842.000

214 E GALER STREET, SUITE 300
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Table of Contents

Supporting Data

APPENDICES

1 INTRODUCTION

PBS Engineering and Environmental Inc. (PBS) has prepared this Sampling and Analysis Plan (SAP) for final clean closure of the Smith Chrome Plating, Inc. (SCP) facility. The SCP facility is located in Walla Walla, Washington. Closure of the facility is required under Washington Administrative Code (WAC) 173-303-200(12).

1.1 Purpose and Objectives

The purpose of the SAP is to describe the sample collection, handling, and analysis procedures to be implemented during closure activities. This SAP identifies specific sampling and analysis protocols, project schedule, and organization and responsibilities. It also provides detailed information regarding the sampling and data quality objectives (DQOs), sample location and frequency, equipment, and procedures to be used during the closure sampling; sample handling and analysis; procedures for management of waste; quality assurance protocols for field activities and laboratory analysis; and reporting requirements.

2 PROJECT ORGANIZATION AND MANAGEMENT

This section describes the overall project management strategy for implementing the field investigation. To ensure efficient decision making for field sampling and laboratory analysis, key data collection decisions, decision criteria, process for decision making, quality assurance/quality control (QA/QC) procedures, and responsibilities are described below.

These decision and communication plans will be followed by field personnel under direction of the field coordinator and project manager. Site quality control to ensure proper communication and adherence to this SAP is discussed in Section 8.0. The following key personnel have been identified for the project. A summary of key personnel roles and contact information is provided in Table 2-1.

2.1 Project Manager

The Project Manager has overall responsibility for developing the SAP, monitoring the quality of the technical and managerial aspects of the closure process, implementing the SAP, and corresponding corrective measures, where necessary. The project manager for this project is Melanie Young, PE, Senior Environmental Engineer.

2.2 Project Principal

The Project Principal provides oversight of all project activities and reviews all deliverables before their submittal to the regulatory agency. The Project Principal is Tom Mergy, LHG, Principal Hydrogeologist.

2.3 Laboratory Project Manager

The Laboratory Project Manager will provide analytical support and will be responsible for providing certified, pre-cleaned sample containers and sample preservatives (as appropriate) and for ensuring that all chemical analyses meet the project quality specifications detailed in this SAP. Fremont Analytical, Inc. of Seattle, Washington will be the laboratory for this project. The Laboratory PM is to be determined.

2.4 Project QA/QC Officer

The Project QA/QC Officer has the following responsibilities:

- Monitor and verify that the work is performed in accordance with the SAP and other applicable procedures.
- Assess the effectiveness of the QA/QC program and to recommend modifications to the program when applicable.
- Assure that the personnel assigned to the project are trained relative to the requirements of the QA/QC program and for reviewing and verifying the disposition of nonconformance and corrective action reports.

The project QA/QC Officer is Ken Nogeire, LHG, Senior Hydrogeologist.

Table 2-1. Key Project Roles and Contact Information

Project Role	Name	Phone/Email	Email
Project Manager	Melanie Young, PE	Office: 206.766.7660 Mobile: 206.376.7988	melanie.young@pbsusa.com
Project Principal	Tom Mergy, LHG	Office: 206.766.7633	tom.mergy@pbsusa.com
Project QA/QC Officer	Ken Nogeire, LHG	Office: 206.766.7614	ken.nogeire@pbsusa.com
Laboratory (PM TBD)	Fremont Analytical, Inc.	Main: 206.352.3790	info@fremontanalytical.com

3 PROJECT SCHEDULE

PBS plans to conduct site inspections prior to cleaning, and additional inspection following cleaning after Ecology approves the Amended Closure Plan. Once decontamination activities commence, sampling and analysis activities, including collection of waste characterization samples and potential rinse samples, will begin. Waste characterization and rinse samples will be submitted to Fremont Analytical in Seattle, Washington, an Ecology accredited laboratory on a 5-day turnaround time.

After inspections are conducted, it will be determined if soil samples will be collected. If soil samples are collected, they will be submitted to Fremont Analytical in Seattle, Washington, an Ecology accredited laboratory on a 5-day turnaround time.

4 SAMPLING APPROACH

4.1 Rinse Water Sampling

Rinse samples may be collected to assess rinse water following high-pressure water washing (if used for decontamination) of epoxy-coated concrete floors in the plating room and cleaning room. Following cleaning to a clean surface, a sample of rinse water will be collected, once for each approximately 400-square foot area of pressure washed, epoxy-coated concrete floor. Based on this framework, it is anticipated that at least one sample will be collected from the cleaning room, and four samples will be collected from the plating room. Rinse samples will be analyzed for metals as listed in Table 4-1.

4.2 Soil Sampling

If evidence of a release to the soil underlying the concrete floors or sumps is discovered, soil samples would be collected and analyzed for the suite of metals listed in Table 4-1.

The purpose of collection and analysis of soil samples is to evaluate if soil could have been contaminated by a release.

Table 4-1. Anticipated Sample Types, Numbers, and Analyses to be Performed

Sample Type	Media	Estimated Number	Test Method
Blasting Debris	Decontamination Waste	up to 10	EPA Method 1311 TCLP for RCRA-8 Metals (As, Ba, Cd, Cr, Pb, Hg, Ag, Se)/EPA Method 6020/200.8/7471/7470/245.1
Pressure-Wash Rinse Water	Water	only if needed*	1. RCRA-8 Metals (As, Ba, Cd, Cr, Pb, Hg, Ag, Se) by EPA Method 6020/200.8/7471/7470/245.1 2. pH by EPA Method 4500-H+B or 9040C 3. EPA Method 1311 TCLP for Metals (As, Ba, Cd, Cr, Pb, Hg, Ag, Se)/Method 6020/200.8/7471/7470/245.1
Soil (if needed)	Soil	only if needed	RCRA-8 Metals (Ag, As, Ba, Cd, Cr, Pb, Hg, Ag, Se) by EPA Method 6020/200.8/7471/7470/245.1

Note:
EPA – U.S. Environmental Protection Agency
RCRA Resource Conservation and Recovery Act
TCLP – Toxics Characteristic Leaching Procedure
* Water samples will be collected only if pressure-washing is used.

5 SAMPLE HANDLING AND QUALITY CONTROL PROCEDURES

5.1 Sample Identification

Sample labels will be completed and attached to containers in the field to prevent misidentification. All sample labels will include identifying information including sampler, site name, sample identification, analytical parameters, and sample collection date and time. Additional sample collection and documentation procedures are described in Section 5.5. Sample naming conventions for are discussed in the following sections.

Blasting Debris (BD) Waste

Abrasive blasting (BD) debris samples will be named based on the general area of the facility that was decontaminated. Using the grid that is discussed above under rinse water, the area of the facility that the debris is from will be combined with an identifier for blasting debris or BD. For example, a blasting debris sample from the seventh row of the column 'D' would be identified as BD-D7. A duplicated blasting debris sample will have the ID BD-X. The relationship between the duplicate sample and associated parent sample will be noted in the daily field report (DFR) but will not be disclosed on the chain-of-custody or to the laboratory.

Rinse Water

Rinse water (RW) samples will be named based on the area of the facility that was decontaminated. A grid will be laid out in the area of decontamination consisting of a letter and number to identify the location, for example, a rinse sample from the seventh row of the column 'D' would be identified as RW-D7. A duplicated rinse water sample will have the ID RW-X. The relationship between the duplicate sample and associated parent sample will be noted in the daily field report (DFR) but will not be disclosed on the chain-of-custody or to the laboratory.

Soil

Soil sample locations will be named based on distance from the presumed source area/central area of concern. In the event that a duplicate soil sample is collected, the parent sample will be identified as described above and the duplicate sample will have the ID SS-X. The relationship between the duplicate sample and associated parent sample will be noted in the daily field report (DFR) but will not be disclosed on the chain-of-custody or to the laboratory.

5.2 Decontamination Procedures

Non-disposable tools and sampling equipment will be decontaminated between collection of samples. Equipment requiring decontamination between samples includes but is not limited to hand auger, shovel or trowel, stainless steel spoon, and swing sampler or sampling cup. Decontamination will consist of submersion and physical scrubbing of sampling equipment in a tap water and laboratory grade detergent (Alconox) solution. Following scrubbing in the detergent solution, equipment will be rinsed with tap water and then final rinsed with distilled water.

Decontamination and residual sample media will be containerized and disposed of in accordance with the procedures established in Section 7.

5.3 Sample Container and Handling Procedures

In addition to providing analytical methods, Table 5–1 summarizes the specifications for minimum sample volume, sample preservation, container requirements, and holding times. Sample handling protocols, including specifications for sample labeling, handling, and shipping, along with chain-of-custody record preparations and control, are described in detail in the following sections.

Table 5–1. Laboratory Container Requirements

Parameter	Test Method	Container(s)	Preservative cool to 4°C	Holding Time
Solid Debris Waste				
TCLP Metals	TCLP: EPA 1311 RCRA-8 Metals: EPA 6020/200.8/7471/7470/245.1	4 oz jar	None	Analyze within 180 days after extraction
Rinse Water				
RCRA-8 Metals	EPA 6020/200.8/7471/7470/245.1	1x 250 mL Polyethylene	Nitric Acid	Analyze within 28 days
TCLP Metals	TCLP: EPA 1311 RCRA-8 Metals: EPA 6020/200.8/7471/7470/245.1	Varies, minimum 1 x 250 mL	None	Analyze within 180 days after extraction
Soil				
RCRA-8 Metals	EPA 6020/200.8/7471/7470/245.1	4 oz jar	None	Analyze within 28 days

Notes:
mL= milliliters
RCRA = Resource Conservation and Recovery Act
TCLP = Toxicity Characteristic Leaching Procedure
EPA = Environmental Protection Agency

5.4 Field Quality Assurance/Quality Control Samples

QA/QC samples are collected and analyzed to assess the quality of the sampling and analysis by both the field personnel and the laboratory. For samples sent to the laboratory, field QA samples will be collected as provided in Table 5-2; additional sample descriptions follow.

Table 5-2. Summary of Field QA/QC Samples

Laboratory	QA/QC Sample	Purpose	Frequency	Number of Samples
Analysis by Fremont Lab	Field Duplicate	Precision	10%	One waste debris One rinse water One soil
Analysis by Fremont Lab	MS/MSD	Accuracy	5%	One rinse water

Field Duplicates

Field duplicates are used to document sampling and laboratory analysis reproducibility or precision. Duplicate samples are typically selected from sampling locations known to have historical detections of analytes. Field duplicates will be issued unique sample identifications that will not allow Fremont to identify the source. The duplicate names will be established as noted in Section 5.1.

Matrix Spike and Matrix Spike Duplicate (MS/MSD)

MS/MSD samples are used to evaluate matrix interference and to a lesser extent, determine laboratory accuracy. The sampling location in which the MS/MSD samples are collected will be selected in the field.

5.5 Sample Documentation and Chain-of-Custody Procedures

Collected samples are to be handled in a manner that ensures their integrity and traceability to the sampling location. This is achieved through the use of trained field and laboratory personnel; controlled field, transport, and laboratory conditions; and implementation of rigorous sample preparation, containerization, preservation, storage, packaging, transportation, and custody procedures. Sample custody procedures are designed to ensure that the following objectives are met:

- Each sample is identified uniquely and correctly.
- Each sample is traceable to its source/point of origin.
- Sample representativeness is preserved.
- Sample alteration, such as by preservation or filtration, is documented.
- A record of sample integrity is established and maintained throughout the custody process.
- Sample custody is to be maintained and documented in the field, during shipment, and at the analytical laboratory.
- Shipment custody includes time spent under the control of, and tracking by, the carrier (Federal Express or United Parcel Service).

A permanent record for each sample will be documented by sample labels, DFRs, chain of custody, sampler receipt (completed by the lab), and occasionally in photographs.

Chain-of-Custody

Chain-of-custody forms will accompany sample containers during transit to, and upon receipt by, the laboratory. A sample of a chain-of-custody form is provided in Appendix B. The chain-of-custody form will be prepared prior to field activities and completed at the end of each field day. Following courier pick-up of the samples, a photocopy of the chain-of-custody will be made and retained in the project files. The original copy will be submitted with the data package to the lab. PBS will retain an electronic copy (returned by the lab) with the project files.

The chain-of-custody will be filled out using indelible ink and will include the following:

- Project name and number
- The signatures of sampling personnel
- Sample identification number, which includes sample location code
- Sampling dates and times
- Total number of containers per sample location
- Analyses to be performed on each sample
- Sample relinquisher, date, and time
- Hazards associated with samples
- Any remarks and/or special instructions

Standard protocol is that samples will be delivered to the lab by PBS personnel. Transfer of sample custody will occur as follows:

- PBS will sign, date, and enter time on the chain-of-custody form under "Relinquished by."
- Lab will sign under "Received by" and enter date and time.

If an individual other than the sampler in charge of sample custody is to deliver the samples to a common carrier (such as Federal Express), custody must first be transferred to the individual following the previously described protocol. The samples are now under the custody of the individual, who will perform the following:

- Sign, date, and enter the time on the chain-of-custody form under “Relinquished by”
- Retain a copy of the original signed chain-of-custody
- Place the chain-of-custody within the shipment container in a sealable water-tight plastic bag
- Seal the container and affix a custody seal, using a minimum of two seals per container
- Complete other carrier-related shipping papers

Deliver the sealed container to the common carrier and retain all shipping information with the copy of the chain-of-custody.

Sample Labels

A label is affixed to each sample bottle prior to transportation to the laboratory. The label and the sample number will not indicate whether a sample is a duplicate. Such designation will be made only on the DFR and Field Form. Information on sampling labels will include:

- Sampler (Company)
- Site Name
- Sample Number
- Date
- Time
- Parameters to be analyzed

The label will be identified upon receipt by the laboratory and cross-referenced to the chain-of-custody record. When the samples arrive at the laboratory following delivery, the sample custodian will receive the samples. Any inconsistencies will be noted on the custody record. Laboratory personnel will notify PBS immediately if any inconsistencies exist in the paperwork associated with the samples. PBS will verify the sample custodian has accurately transcribed sample names from the chain-of-custody and notify Fremont of any discrepancies.

Field Forms

PBS field personnel are responsible for preparing and submitting the DFR to the PBS PM. Samples of these forms are provided in Appendix B. A DFR with attachments, such as the chains-of-custody forms, is to be submitted daily. DFRs, in combination with its attachments, are to present an accurate and complete picture of sampling activities; they should be precise, factual, legible, and objective, and at minimum contain:

- The project number
- The day’s weather conditions (temperature, humidity, wind, cloud cover)
- Work performed, samples taken including QC samples, and personnel involved
- Available analytical field results
- Physical parameter measurements, calculation results, and any required QC data
- All sampling, sample handling, chemical parameter measurements problems, deviations from the approved plan, and corrective actions that could affect fulfillment of DQOs or minimum data reporting requirements
- Signatures of responsible authority and initials of persons conducting changes
- Verbal or written instructions from PBS PM for retesting or changes of work

Sample Receipt Form

The laboratory directly logs samples into their computer tracking system and notes problems in sample packaging, chain-of-custody, and sample preservation. The following will occur during sample receipt:

- The carrier and the time of arrival are documented in the log. The number of items on the bill (if applicable) is checked with the actual number received to ensure that all samples arrived.
- Notation is made as to whether the sample container was sealed.
- The container is opened, the internal ambient temperature is taken by use of an included temperature blank, and the samples itemized. All deviations are noted and reported to the sample coordinator.

Documentation

All completed forms should be reviewed and maintained by the PBS PM. Corrective actions taken upon discovery of anomalies are to be documented. All QC records are to ultimately be maintained as part of the project QC file.

Corrections to Documentation

The PBS PM is responsible for ensuring that the requisite QC records are generated and controlled. The QA/QC officer will verify that these controls are implemented as follows:

- Measurements and observations are recorded at the time they are made.
- Documentation is orderly, legible, and traceable to relevant items/conditions.

- Documentation includes sufficient information to be readily interpreted by staff other than those responsible for its generation.
- Changes or revisions to a record are made in a manner that preserves the original data, such as by drawing a single line through a hard copy entry or maintaining historical records of electronic entries/files.
- Changes to records are signed (or initialed) and dated.
- As a minimum standard, changes to a record are subject to the same review and approval protocols as the original entry.
- Records adequately document digressions from specified procedures and identify authorization for the digression.
- Project documents and records, including photographic and electronic records, are protected from loss, damage, misuse, or deterioration.

5.6 Sample Packaging and Delivery

Samples will be transferred to the selected laboratory for analysis via sturdy waterproof coolers. Samples will be packaged, stored on ice and delivered on a per mobilization basis to ensure that samples are held for the minimum amount of time prior to delivery to the laboratory. Given the location of the site from the laboratory, daily shipments of samples to the laboratory are not planned unless warranted by special circumstances. Samples will be held under established chain-of-custody procedures and kept at 4 ± 2 degrees Celsius (°C). Before a sample can be put in the cooler, any drains in the cooler must be sealed with tape to prevent leaking and all pertinent information shall be placed on the sample label. Each cooler will be packed as follows:

- Ensure sample lids are tight.
- Place sufficient inert cushioning material in the bottom of the cooler.
- Wrap all glass sample containers in plastic-bubble wrap. Place samples upright in the cooler so they do not and will not touch during transport.
- Fill cooler with enough packing material to prevent breakage of glass bottles.
- Place sufficient ice in cooler to maintain the internal temperature at 4 ± 2°C during transport. The ice will be double-bagged to prevent the melt water from contacting the samples. If chemical ice is used, it should also be placed in a plastic bag.
- Shipment of samples is not expected for this project. If the sample cooler will be shipped by PBS, the following will occur:
  - Place associated chain-of-custody in a waterproof plastic bag and place it on top of the sample containers.
  - Seal coolers at a minimum of two locations with signed custody seals or evidence tape before transferring off site. Attach a completed shipping label with return address to the top of the cooler. Place "This Side Up" labels on all four sides and "Fragile" labels on at least two sides.
  - Affix custody seals on the front right and back left corners so the cooler can’t be opened without breaking the tape. Further seal the cooler with strapping tape applied completely around it at least three times in two different locations. Do not cover any labels.
- If the cooler will be picked up by a Fremont courier, place the signed chain-of-custody on top of the shipment.

- Evidence of sample custody shall be traceable from the time the sample is taken until the filled sample bottles are received by the laboratory. Receipts from post offices, copies of bills of lading, and air bills will be retained as part of the chain-of-custody documentation.
- In the event that sample coolers are be shipped, they shall be shipped such that samples arrive at the laboratory the day after shipping or be sent by a courier to arrive the same day. The laboratory will be notified of the sample shipment and the estimated date of arrival.
- For each cooler, weight limit for the carrier will be observed (if applicable).

Laboratory Addresses and Points of Contact:
PBS Shipping Contact: Project Manager - Melanie Young
206.766.7640

Contracting Analytical Laboratory:
Fremont Analytical, Inc.
3600 Fremont Avenue N
Seattle, Washington 98103
206.352.3790

6 ANALYTICAL TESTING

All samples will be submitted to Fremont Analytical, Inc., an Ecology-accredited analytical laboratory located in Seattle, WA. The laboratory follows approved methods (EPA, Standard Methods, ASTM, State-specific methods) for the analysis of water and soil. All samples will be submitted on a standard 5-day turnaround time. Analytical parameters for specific samples are presented in Table 5-1. Analytical methods for these parameters are specified in Table 4-1.

7 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

Any investigation-derived waste associated with collecting soil samples will be handled by SCP's disposal vendor, along with closure waste and waste residuals. PBS will collect and containerize as directed by SCP in accordance with the Amended Closure Plan waste management procedures.

8 DATA QUALITY OBJECTIVES

Field and laboratory activities will be conducted in such a manner that the results will be valid and meet the DQOs for this project. Guidance for QA/QC will be derived from the protocols developed within the most recent version of USEPA SW-846 (Test Methods for Evaluating Solid Waste: Physical/Chemical Methods), as appropriate. The DQOs are designed to achieve the following:

- Assist the Project Manager and project team to focus on the factors affecting data quality during the planning stage of the project.
- Facilitate communication among field, laboratory, and project staff as the project progresses.
- Document the planning, implementation, and assessment procedures for QA/QC activities for sampling and analysis related to closure.
- Verify that the DQOs are achieved.
- Provide a record of the project to facilitate report preparation.

The DQOs for the project include both qualitative and quantitative objectives, which define the appropriate type of data and specify the tolerable levels of potential decision errors that will be used as a basis for establishing the quality and quantity of data needed to support the facility closure. To verify that the DQOs are achieved, this SAP details aspects of sample collection and analysis, including analytical methods, QA/QC procedures, and data quality reviews. This SAP describes both qualitative and quantitative measures of data quality to verify that the DQOs are achieved.

Detailed QA/QC procedures in the field and laboratory are provided in the following sections. The DQOs will be used to develop and implement procedures to verify that data collected is of sufficient quality to adequately address the objectives of the closure process. All observations and measurements will be made and recorded in such a manner as to yield results representative of the media and conditions observed and/or measured. Goals for representativeness will be met by verifying that sampling locations are selected properly, that a sufficient number of samples are collected, and that field screening and laboratory analyses are conducted properly.

The quality of the laboratory data will be assessed by precision, accuracy, representativeness, completeness, comparability, and sensitivity. Definitions of these parameters and the applicable QC procedures are described in Sections 8.1 through 8.6. Quantitative DQOs are provided following each definition. Laboratory DQOs have been established by the analytical laboratory. Applicable quantitative goals for these DQOs are listed in Table 8-1.

Chemical analyses shall meet data quality objectives for precision, accuracy, and completeness. Accuracy goals, measured by the LCS and to a lesser extent, the MS recovery and the surrogate recovery, are determined by the laboratory and are based upon QC limits established in published EPA methods. The completeness goal for water and soil analytical data is 95 percent. Table 8–1 summarizes targeted data quality objectives for the laboratory parameters. Data quality objectives are applicable to all samples submitted to the laboratory, including primary samples, duplicates, and MS/MSDs.

The maximum allowable reporting limit for each analyte shall be no greater than the concentration of the applicable criteria listed in Table 2 of the Amended Closure Plan.

8.1 Precision

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of two or more measurements compared to their average values. Precision is calculated from results of duplicate sample analyses. Precision is quantitatively expressed as the relative percent difference (RPD) and is calculated as follows:

$$\text{RPD (\%)} = \left| \frac{X_1 - X_2}{(X_1 + X_2)/2} \right| \bullet 100\%$$

where: X_1 = measured concentration in the first sample
X_2 = measured concentration in the second sample

There are no specific RPD criteria for organic chemical analyses. If organic analyses become necessary, quantitative RPD criteria for will be based on laboratory-derived control limits.

8.2 Accuracy

Accuracy is a measure of the closeness (bias) of the measured value to the true value. The accuracy of chemical analytical results is assessed by “spiking” samples in the laboratory with known standards (a surrogate or matrix spike of known concentration) and determining the percent recovery. The accuracy is measured as the percent recovery (%R) and is calculated as follows:

$$\%R = \left(\frac{(M_{sa} - M_{ua})}{C_{sa}}\right) \times 100$$

Where:

$\%R$ = percent recovery
M_{sa} = measured concentration in spiked aliquot
M_{ua} = measured concentration in unspiked aliquot
C_{sa} = actual concentration of spike added

Laboratory matrix spikes and surrogates will be carried out at the analytical laboratory in accordance with EPA SW-846 and Ecology methods and procedures for inorganic and organic chemical analyses. The frequency of matrix spikes and matrix spike duplicates will each be one per batch of 20 samples or less for soil samples. Quantitative percent recovery criteria for organic analyses will be based on laboratory-derived control limits for surrogate recovery and matrix spike results. The accuracy of sample results can also be affected by the introduction of contaminants to the sample during collection, handling, or analysis. Contamination of the sample can occur because of improperly cleaned sampling equipment, exposing samples to chemical concentrations in the field or during transport to the laboratory, or because of chemical concentrations in the laboratory. To demonstrate that the samples collected are not contaminated, laboratory method blank samples will be analyzed. The laboratory will run method blanks at a minimum frequency of 5 percent, or one per batch, to assess potential contamination of the sample within the laboratory.

8.3 Representativeness

Representativeness is a qualitative assessment of how closely the measured results reflect the actual concentration or distribution of the constituent concentrations in the matrix sampled. The sampling plan design, sample collection techniques, sample handling protocols, sample analysis methods, and data review procedures have been developed to verify that the results obtained are representative of the site conditions. These issues are addressed in detail in Sections 5 and 6, Analytical Testing, and Section 9, Quality Control Procedures.

8.4 Completeness

Completeness is defined as the percentage of measurements judged to be valid (%C). Results will be considered valid if they are not rejected during data validation (Section 9, Quality Control Procedures). Completeness is calculated as follows:

$$\%C = \frac{(SE - SR)}{SE} \bullet 100\%$$

where: SE = number of samples collected
SR = number of samples rejected

Objectives for completeness are based, in part, on the subsequent uses of the data (i.e., the more critical the use, the greater the completeness objective). The objectives for completeness of samples are expressed as percentages, which refer to the minimum acceptable percentages of samples received at the laboratory in good condition and acceptable for analysis. The objectives of completeness for other samples are 95 percent for soil and water samples. These objectives will be met through the use of proper sample containers, proper sample packaging procedures to prevent breakage during shipment, proper sample preservation, and proper labeling and chain-of-custody procedures. A loss of 5 to 10 percent of intended samples is common, and the goals set are sufficient for intended data uses.

The objectives for completeness of chemical analyses are also expressed as percentages and refer to the percentages of analytical requests for which usable analytical data are produced. The initial objective for completeness of chemical analyses in the laboratory is 95 percent.

8.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. The use of standard Ecology and EPA methods and procedures for both sample collection and laboratory analysis will make the data collected comparable to both internal and other data generated.

8.6 Sensitivity

Analytical sensitivities are measured by practical quantitation limits (PQLs), which are defined as the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. PQLs are determined by the laboratory. The detection or reporting limits for actual samples may be higher depending on the sample matrix and laboratory dilution factors.

Table 8-1. Project Data Quality Objectives

Analyte	Analytical Method	Precision – Water (RPD %)	Precision - Soil (RPD %)	Accuracy (%R)	Completeness (%C)
RCRA-8 Metals	EPA 6020/200.8/7471/ 7470/245.1	+/- 35%	+/- 50%	Lab-determined	95

RPD – relative percent difference
%C – percent complete
%R – percent recovery

9 QUALITY CONTROL PROCEDURES

9.1 Field Quality Control

Field QC samples (e.g., duplicate samples) will be collected during this project as specified in Section 5.4. The basis for field data collection activities will be documented in the DFR. Deviations from established protocols will also be documented in the DFR.

Based on the sampling frequency and number of samples anticipated, and the associated analytical methods used to analyze the samples, it is estimated that one field duplicate sample rinse sample, and if soil samples are collected, one duplicate soil sample will be collected per sampling event and submitted for laboratory analysis.

9.2 Laboratory Quality Control

Analytical laboratory QA/QC procedures are provided in Fremont Analytical's *Quality Assurance Manual* that is on file at PBS's office. Laboratory QC procedures are summarized below:

Laboratory Quality Control Criteria. Results of the QC samples from each sample group will be reviewed by the analyst immediately after a sample group has been analyzed. The QC sample results will then be evaluated to determine whether control limits were exceeded. If control limits are exceeded in the sample group, corrective action (e.g., method modifications followed by reprocessing the affected samples) will be initiated prior to processing a subsequent group of samples.

All primary chemical standards and standard solutions used in this project will be traceable to documented and reliable commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities identified in the standard will be documented.

The following paragraphs summarize the procedures that will be used to assess data quality throughout sample analysis.

Laboratory Duplicates. Analytical duplicates provide information on the precision of the analysis and are useful in assessing potential sample heterogeneity and matrix effects. Analytical duplicates are subsamples of the original sample that are prepared and analyzed as a separate sample. A minimum of one duplicate will be analyzed per sample group or for every 20 samples, whichever is more frequent.

Matrix Spikes and Matrix Spike Duplicates. Analysis of matrix spike (MS) samples provides information on the extraction efficiency of the method on the sample matrix. By performing matrix spike duplicate (MSD) analyses, information on the precision of the method is also provided for organic analyses. A minimum of 1 MS/MSD will be analyzed for every sample group or for every 20 samples, whichever is more frequent.

Laboratory Control Samples. A laboratory control sample (LCS) is a method blank sample carried throughout the same process as the samples to be analyzed, with a known amount of standard added. The blank spike compound recovery assesses analytical accuracy in the absence of any sample heterogeneity or matrix effects.

Surrogate Spikes. All project samples analyzed for organic compounds will be spiked with appropriate surrogate compounds as defined in the analytical methods. Surrogate recoveries will be reported by the laboratories; however, no sample result will be corrected for recovery using these values.

Method Blanks. Method blanks are analyzed to assess possible laboratory contamination at all stages of sample preparation and analysis. A minimum of one method blank will be analyzed for every extraction batch or for every 20 samples, whichever is more frequent.

9.3 Data Quality Control

All data generated by Fremont Analytical will undergo two levels of QA/QC evaluation: one by the laboratory and one PBS. As specified in Fremont Analytical's *Quality Assurance Manual*, the laboratory will perform initial data reduction, evaluation, and reporting. The analytical data will then be validated at PBS under the supervision of the Project QA/QC Officer. The following types of QC information will be reviewed, as appropriate:

- Method deviations
- Sample transport conditions (temperature and integrity)
- Sample extraction and holding times
- Method reporting limits
- Blank samples
- Duplicate samples
- Surrogate recoveries
- Percent completeness
- RPD (precision)

PBS will review field records and results of field observations and measurements to verify procedures were properly performed and documented. The review of field procedures will include the following:

- Completeness and legibility of field logs
- Preparation and frequency of field QC samples
- Equipment calibration and maintenance
- Sample Chain-of-Custody forms

Corrective actions are described in Section 10, Corrective Actions.

9.4 Data Assessment Procedures

The Project Manager and Project QA/QC Officer are responsible for data review and validation. Upon receipt of each data package from the laboratory, calculations using the equations presented for precision, accuracy and completeness will be performed. Results will be compared to DQOs. Data validation parameters are outlined in Section 8.

9.5 Performance Audits

Field performance will be monitored by the Project Manager through regular review of sample chain-of-custody forms, field forms, and field measurements. The Project Manager and/or the Project QA/QC Officer may also perform periodic review of work in progress at the site.

Accreditations held by the Fremont Analytical are considered to demonstrate the laboratory's ability to properly perform the requested analyses in accordance with the specified methods. As such, performance audits of the laboratory by PBS will not be conducted.

10 CORRECTIVE ACTIONS

Corrective actions will be the joint responsibility of the Project Manager and the Project QA/QC Officer. Corrective procedures can include the following:

- Identifying the source of the violation.
- Reanalyzing samples, if holding time criteria permit.
- Resampling and analyzing.
- Re-measuring parameter.
- Evaluating and amending sampling and analytical procedures.
- Qualifying data to indicate the level of uncertainty.

During field sampling operations, the Project Manager and field staff will be responsible for identifying and correcting protocols that may compromise the quality of the data. All corrective actions taken will be documented in the field notes.

11 DOCUMENTATION AND RECORDS

Project files and raw data files will be maintained at PBS's Seattle office. Project records will be stored and maintained in a secure manner. Each project team member is responsible for filing all necessary project information or providing the information to the person responsible for the filing system. Individual team members may maintain files for individual tasks, but team members must provide such files to the central project files upon completion of each task. A project-specific index of file contents will be kept with the project files. Hard copy documents will be scanned and converted to electronic data and will be maintained in the database at PBS throughout the duration of the project.

12 HEALTH AND SAFETY

PBS will conduct all work in accordance with our corporate health and safety program. A task hazard analysis will be prepared and reviewed prior to conducting this work, and staff that will collect samples will be OSHA 40-hour HAZWOPER trained, in accordance with the general provisions of WAC 173-340-810.

13 REFERENCES

United States Environmental Protection Agency (USEPA). *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* EPA publication SW-846, Third Edition, Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), and V (2015).

Appendix A

Standard Operating Procedures

Sampling Groundwater Monitoring Wells
Drilling and Soil Sampling Procedures

STANDARD OPERATING PROCEDURE
Sampling Groundwater Monitoring Wells

1 BACKGROUND AND PURPOSE

Groundwater samples are collected from monitoring wells for analysis of physical and chemical parameters, either by using field observations and portable equipment and/or using established laboratory analytical methods. The goal of this process is to obtain groundwater samples that are representative of the aquifer (i.e., avoiding a sample that has been impacted by surface or atmospheric conditions).

Low-flow or zero volume purging and sampling methods were developed to produce samples with the least amount of interference resulting from the collection method. Low-flow purging techniques became the industry standard for collecting a groundwater sample because the methods slow groundwater velocity to the well, minimize turbidity and agitation in the water column, and reduce the volume of purged groundwater requiring disposal. These techniques include the use of pumps dedicated to specific wells or the use of a portable pump system. A zero volume/no purging method requires installation of a collection vessel within the well prior to the sample collection event, allowing the water column within the well to equilibrate with the aquifer prior to retrieving the sample. The appropriate technique is dependent on project-specific goals and data quality requirements. Sampling methodology should be confirmed with the PBS project manager (PM) prior to preparing for groundwater monitoring.

The procedures in this Standard Operating Procedure (SOP) are specific to standard monitoring wells with a single-slotted interval. It is assumed that low-flow purging and sampling protocols are used, although these protocols can be easily adjusted for other sampling methods. Temporary borings advanced for a single field event may be sampled using the techniques presented in this SOP.

2 EQUIPMENT AND SUPPLY LIST

- Well lock keys
- Groundwater Sampling Field Form and Depth to Groundwater Field Form
- Copies of field forms and data tables from previous groundwater monitoring event
- Electronic water level probe or interface probe (if dense or light non-aqueous phase liquids [DNAPL or LNAPL] are potentially present)
- Tubing cutters, knife or scissors (note: some sites do not allow the use of a knife on-site)
- Decontamination equipment
- Measuring cup
- Safety cones
- Bolt cutters
- Replacement well caps, bolts, and padlocks
- Small cup, turkey baster, or large sponge to purge standing water inside well monument
- Fish hooks, stainless steel weight, and fishing line to retrieve objects in the well
- Site map and health and safety plan

- Personal protection equipment (PPE) required for the site, including nitrile gloves (confirm with site-specific health and safety plan)
- Submersible pump or peristaltic pump and associated equipment
- Compressed gas source (nitrogen or air compressor), battery source, or generator and fuel
- Control box
- Disposable tubing, if necessary
- Flow-through cell and water quality parameter meter (e.g. YSI model)
- Buckets or containers for purge water and drum labels
- Sample containers, labels, packaging material
- Coolers and ice for samples

3 PROCEDURE

This section outlines standard procedures used for collecting groundwater samples from a monitoring well. Project Managers may modify or remove tasks as dictated by project needs; for example, turbidity or depth-to-bottom measurements may not be warranted at a site with sufficiently developed wells.

Preparation for a monitoring event begins in the office. The first step is to read the scope of work (e.g., proposal, sampling and analysis plan (SAP), work plan) to determine the number and location of monitoring wells to be sampled, health and safety considerations, quality control (QC) samples needed, sample containers required, and equipment needed for the site (peristaltic pump, bladder pump, both, etc.). Recommended preplanning procedures are as follows:

- Prepare, review, or update Health and Safety Plan (HASP) for the site.
- Obtain appropriate PPE for the site (e.g., hard hat, safety vest, gloves, safety glasses, life vest, flame retardant [FR] shirt or other client-required PPE).
- Determine number and type of samples to be collected.
- Determine which laboratory can meet analytical requirements (required analysis, screening levels).
- Order sample containers from laboratory, making sure to order QC sample containers and at least one extra set of containers. Ensure that a Safety Data Sheet (SDS) is provided for any sample preservative supplied by the laboratory.
- Print all forms needed for sampling event (work plan, HASP, depth to water forms, groundwater sampling forms, labels, chain of custody, etc.).
- Schedule PBS vehicle and equipment use on PBS calendars, as warranted.
- Order rental equipment for sampling event, if not available internally.

After arriving at the site, the following procedures should be followed:

- Don appropriate PPE and place safety cones around the work zone, if required by the HASP or deemed necessary by site conditions.
- Open all of the monitoring wells on-site and wait a minimum of 15 minutes for water levels to approach an equilibrium state with atmospheric pressure before taking any measurements.

- Note the general condition of the well on the depth to groundwater field form. Check well for damage or evidence of tampering, and record pertinent observations. Note any maintenance tasks that should be completed, such as well cap or padlock replacement.
- Collect depth to water measurements from each monitoring well, decontaminating the probe between locations. If possible, gauging should be conducted in order from the least to the most contaminated well. The measurements should be collected from all wells prior to beginning sample collection, unless project scope or site conditions indicate otherwise.
- Measure the depth to water relative to the marking on the well casings. If there is no mark, use the north side of the casing. Record the water level on the depth to groundwater field form. Note if DNAPL or LNAPL is present (this typically requires a meter capable of detecting NAPL-water interfaces). If NAPL is present, additional decontamination procedures will be warranted.
- Measure depth to bottom of well to record if sedimentation in the well has occurred.
- Make sure all information is completed on the depth to groundwater field form and sign and date it.

Sampling a groundwater monitoring well utilizing low-flow techniques relies on stabilization of field water quality parameters to determine when groundwater is representative of aquifer conditions. Measurement of groundwater quality parameters with a water quality parameter meter occurs in a closed system in which groundwater does not come in contact with open air; this is important for valid measurements because dissolved oxygen (DO), oxidation-reduction potential (ORP), and pH measurements can be sensitive to reactions with the atmosphere. A flow-through cell (flow cell) connected to the water quality parameter meter provides this closed system and is used to measure field parameters prior to collecting groundwater samples. Stabilization of selected parameters indicates that collected groundwater is representative of the aquifer and conditions are suitable for sampling to begin. See protocol below for stabilization parameters.

Low-flow purge and sample methods require care when placing a portable pump and/or tubing in the well to minimize disturbance to the water column. Pumping rates must be maintained at 0.1 to 0.5 liter per minute to reduce drawdown; the pump should never be run higher than 0.5 liters per minute prior to sampling.

For monitoring wells, sampling should proceed as follows:

- If using a portable pump setup, slowly lower the pump or tubing to the midpoint of the screen or sample interval. Secure the pump or tubing at the surface to prevent it from moving (not applicable if using dedicated pumps).
- Connect the bladder pump (attaching control box, compressor or nitrogen tank with regulator) or peristaltic pump to flow cell containing water quality parameter probes. Place the water level probe in the well so water levels can be measured as you are pumping. Start the pump and adjust the pumping rate to between 0.1 and 0.5 liters per minute (using a measuring cup to calculate the flow rate). Begin recording readings on the groundwater sampling field form. Be sure to purge the initial volume of water in the tubing before taking a reading.
- During purging, record readings of groundwater parameters (listed below) and water level every 3 to 5 minutes on the groundwater sampling field form. A drawdown of less than 0.3 feet in the water column, once the pumping rate has stabilized, is desirable; however, less permeable aquifer material or a clogged well filter pack may result in a deeper drawdown. At a minimum, the depth-to-water should be stabilized for three consecutive readings taken between 3 to 5 minutes apart (in conjunction with the stabilization of the other parameters). Visually describe and record turbidity. Purging is considered complete when the groundwater parameters have stabilized for three consecutive readings.

Field Parameter	Stabilization Goal
Temperature	+/-3%
Specific Conductance	+/- 3% mS/cm
pH	+/- 0.1 pH units
DO	+/- 10% or +/- 0.3 mg/L
ORP	+/- 10 millivolts
Depth to Water	+/- 0.3 feet

Please note that multi-parameter meters may have a resolution greater than the stabilization goal. Note the meter capabilities. If the field parameters do not stabilize within the stabilization goal, but are within the resolution of the meter, it may be acceptable to collect a sample in this scenario. This MUST be noted on the field form.

- Measure turbidity of the sample water using field instruments prior to sample collection and upon any obvious visual changes in turbidity during sample collection.
- Prior to collecting the water sample, the tubing originating in the well must be disconnected from the influent (inflow) side of the flow cell.
- Directly fill the sample containers from the tubing originating in the well. If you are collecting samples for volatile organic compound (VOC) analysis, you may need to decrease the pump rate to minimize volatilization of compounds from the sample; if this is the case, other samples should be collected first. You may restore the flow rate upon completion of filling sample containers for VOC analysis. Fill unpreserved bottles first. Filtered samples should be collected after all other samples have been collected.
- Groundwater samples collected for VOC analysis must be collected with zero headspace in the sample vial. This can be confirmed by gently tapping the sealed vial against a gloved hand to ensure that air bubbles are not present.
- If a duplicate sample is required for the well, it should be filled concurrently with the regular sample. This is accomplished by alternating bottles of the same type during sample collection (e.g., filling one bottle from each sample, then the second bottle from each sample.)
- Groundwater samples for dissolved metals analysis must be field filtered with a 0.45 micron filter directly connected to the tubing. Mark “field filtered” or “FF” on the bottle label, field form, and chain of custody.
- Prior to filling or just after filling, label each bottle with the project name, sample name, and sample date and time, and make sure it is properly sealed. The sample containers may also be labeled with what analysis will be performed (confirm with Project Manager). Place in a cooler with ice and pack for transportation.
- As necessary, pull pump and discard tubing. Decontaminate the pump based on the decontamination procedures established for the site.
- Make sure all information is completed on the groundwater field form and sign and date it.
- Close and lock the well.
- Contain purge and decontamination water in the appropriate containers as established for the project.
- Dispose of used sampling supplies and other waste in appropriate container as established for the project.

If low-flow sampling is not used at the site, these procedures should be modified as appropriate. The objective is to provide high-quality groundwater samples representative of the aquifer. Modifications to this SOP should keep this objective in mind at all times.

After fieldwork is completed:

- Ensure that chain-of-custody form has necessary information including site name, project manager, sample names, date and time collected, requested analysis, special notes (field filtered, MS/MSD, etc.).
- Scan and save field sheets to project folder on server. Retain original field copies in project folder; these are legal documents and should be retained as per PBS guidelines for document retention.
- Report any sampling or well maintenance issues to the project manager for evaluation and remedy.
- Clean and store PBS equipment for use on next project. Report any equipment damage or malfunctions or missing/depleted calibration solutions to the office equipment manager.
- Ship rental equipment back to vendor immediately to minimize project costs. Borrowed PBS equipment should be returned promptly to the lending office.

References

Puls, R.W. and M.J. Barcelona. *Groundwater Issue Paper: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*. US Environmental Protection Agency, EPA 540-S-95-504 (1996).

Yeskis, D. and Bernard Zavala. *Groundwater Issue Paper: Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers*. US Environmental Protection Agency, EPA 542-S-02-001 (May 2002).

STANDARD OPERATING PROCEDURE
Drilling and Soil Sampling Procedures

1 PURPOSE

This Standard Operating Procedure (SOP) provides an overview of mobile drilling methods typically used during environmental investigations along with associated health and safety issues. This document outlines procedures to be followed by PBS personnel during drilling and soil sampling activities. Groundwater and soil gas sample collection through the use of drill rigs are covered under separate SOPs.

2 TYPES OF DRILL RIGS

There are three types of drilling methods that are typically used for environmental investigations: direct push, auger, and sonic. Each type of drilling method is described below. A fourth option, discussed in Section 2.4, is a hand auger tool.

2.1 Direct-Push Drilling

Direct-push drilling methods are a common drilling technology used in environmental investigations due to the small diameter borehole (two and one-quarter inch (2.25")) that generates significantly less investigation-derived waste (IDW). The rigs are hydraulically powered, and use static and percussion force to advance the drill rods. Limited access rigs are available for interior locations while track-mounted rigs allow for sampling in locations with unimproved roads.

The rods are equipped with disposable plastic liners that contain the soil retrieved for observation and sampling. The entire column of rods is removed from the ground each time to retrieve soil for sampling. The rod lengths can be 3, 4, or 5 feet. Because of this, if caving or excessive slough is a concern, the borehole may be temporarily cased to keep it clear and open during soil sample retrieval.

2.2 Hollow Stem Auger Drilling (HSA)

Hollow stem auger drilling methods use hollow corkscrew drilling flights to advance into the subsurface. The borehole is typically 11 inches in diameter, with the flights having a 6-inch inner diameter space in which to retrieve samples or construct wells. The hollow stem auger drill rigs have better capability to penetrate higher density deposits that the direct push probe method. Some direct-push rigs have the capacity to drill with hollow stem auger flights, but these rigs typically do not have the mechanical power to drill through challenging soil. The use of auger drill rigs for environmental investigations is typically for the installation and decommissioning of monitoring wells.

Soil sampling with an auger drill rig is conducted through the use of split spoon samplers or Shelby tubes deployed through the inner hollow space. Split spoon samplers are typically 2.5 feet in length and advanced by hammer weight blow into the undisturbed soil. Shelby tubes are typically used in soft deposits such as clays. Soil brought to the surface on the exterior of drilling flights is considered drill or soil cuttings. Soil samples should not be collected and analyzed from the cuttings because that soil may have come in contact with other soil or contamination from varying depths.

2.3 Rotosonic Drilling

Rotosonic drilling methods (hereafter referenced as sonic method) advance drill rod flights into the ground through the use of vibration, and full-size sonic rigs can advance rods through very challenging unconsolidated geologic formations including large cobbles. The borehole size varies but typically is 4 to 6 inches in diameter.

Due to the nature of the drilling technology, the soil can be disturbed by the vibrations, so consistency and compaction are unreliable. Soil is vibrated out of the lead flight into plastic bags for observation and sampling. The entire column of rods is removed from the ground each time to retrieve soil for sampling; if caving or excessive slough is a concern, the borehole may be temporarily cased to keep it clear during soil sample retrieval.

2.4 Hand Auger Tool

A fourth drilling option is the use of a hand auger tool, sometimes called a handheld auger. This tool, made of steel, is used to bore a hole in soil or sediments. It is intended for use only by hand and is powered by human force by twisting or screwing the tool into the soil. The soil is retrieved through a short barrel that attaches to the base of the auger rods. This tool is used for sites where the soil is relatively easy to penetrate, and when sampling is limited to the upper 5 to 10 feet of the shallow surface. Different barrels are available for coarse-grained or fine-grained material.

3 HEALTH AND SAFETY PLAN

A Health and Safety Plan (HASP) must be developed prior to fieldwork commencing. Typically, a site-specific HASP is prepared from a PBS template for drilling investigations. In all cases, pertinent safety information must be relayed to field personnel, including subcontractors, to communicate mandatory elements from the federal code for hazardous waste operations and emergency response (29 CFR 1910.120(b)(4)).

4 UTILITY LOCATES

Utility locates will be completed on all drilling projects including hand-augered sampling. The property owner or site manager should be interviewed regarding the potential location of buried utilities or other subsurface obstructions on the property. The call-in numbers are provided below. Alternately, PBS personnel can obtain log-ins to file locate requests on-line (Internet Ticket Processing, http://www.callbeforeyoudig.org/index.asp).

Oregon Utility Notification Center: 1-800-332-2344
Washington Utility Notification Center: 1-800-424-5555

The Utility Notification Center needs to be contacted at least 48 hours (two business days) in advance to locate utility-owned lines up to the meter (e.g., water, gas, electric), and public utilities within the public right-of-way (e.g., sewer). In addition, a private utility locating company is typically contracted to survey for private utilities such as utility lines from meters to buildings, drain lines, buried electric cables, or irrigation and sprinkler lines.

When filing utility notification requests, PBS personnel should be as specific as possible about where to locate. Washington law requires that the proposed excavation/drilling work areas are field-marked with white paint prior to the locating event.

When beginning a project, PBS personnel must carefully think through where boreholes can be safely drilled, considering both subsurface and overhead obstructions. A site walk may be prudent once the utilities have been marked and prior to the drilling fieldwork. If safe drilling conditions cannot be confirmed, the PBS Project Manager should determine if engineering controls should be implemented, such as shielding or shutting down utility and/or power lines.

SAFETY NOTE: Drill rig masts must be a safe distance from overhead power lines to prevent mast lines and power lines being moved together by wind. Occupational Safety and Health Administration (OSHA) rules for drillers require a minimum distance of 10 feet, with additional spacing required depending on the voltage carried by the power line. The drill rig subcontractor is responsible for ensuring sufficient clearance. However, PBS personnel should verify that potentially unsafe conditions do not exist.

5 SAFETY EQUIPMENT REQUIREMENTS

The following safety equipment is required for all drilling investigations:

- Hard hat
- Hearing protection (ear muffs or plugs, must be worn when drill rig is in operation)
- Safety-toe work boots
- Safety vest
- Gloves (typically disposable)
- Safety goggles or glasses
- Life vests (only when working over water)

6 FIELD EQUIPMENT AND SUPPLIES REQUIREMENTS

The following equipment is typically required for drilling projects when soil sampling will occur. Groundwater or soil gas sampling is discussed in separate SOPs. PBS personnel should confirm that the drilling contractor will provide decontamination water, soap, brushes, and buckets.

General field supplies/equipment includes:

- 5-gallon buckets
- Bags (garbage)
- Bags (plastic zipper-type)
- Camera
- Cellular telephone and phone numbers of client, project laboratory, subcontractors, etc.
- Field notebook or daily log
- Measuring tape
- Paper towels
- Pens
- Spray paint (optional)

Soil sampling supplies/equipment includes:

- Project proposal/scope of work
- Alconox/Liquinox or similar decontamination detergent
- Distilled water (for decontamination)
- Environmental borehole log forms
- Hand auger (if required by scope)
- Ice chest with blue ice or party ice
- Nitrile or other chemically compatible gloves
- Photoionization detector (PID)
- Sample chain-of-custody forms
- Sample containers (ask lab about sample volume, preservatives, etc.)
- Sampling spade or spoons (if required by scope)

7 PRE-DRILLING ACTIVITIES

The following tasks must be performed before beginning work:

- Conduct tailgate safety meeting with all field personnel, including visitors such as the client or regulator; review Health and Safety Plan.

- Install traffic cones/barrier tape or other barrier to control pedestrian and vehicle access to work area as necessary.

The drilling subcontractor is responsible to ensure that the area on which the rig is to be positioned is cleared of removable obstacles and the rig should be leveled if parked on a sloped surface. The cleared/leveled area should be large enough to accommodate the rig and supplies. PBS personnel must confirm that the work area is cleared and safe for work prior to initiating drilling activities.

8 SOIL SAMPLING PROCEDURES

8.1 Logging and Field Screening Soil

Upon retrieval of the soil, describe as per the Geo-Environmental Field Classification chart for soil (included as an attachment). Record observations on an environmental borehole log.

If conducting head-space screening with a PID, remove one-quarter to one-half cup of soil and place in a sealable plastic bag. Seal the bag, break up the soil, and let sit for a minimum of five minutes (in colder weather, either wait for 15 to 30 minutes or put into a warm car or room). The purpose of the headspace screening is to measure what is off-gassing from the sample, and sufficient time must be allowed for that to occur. After the appropriate interval, place the end of the PID probe into the bag (through a small opening in the "zipper") and record the peak value.

If performing sheen testing, place a small sample volume (preferably darker or stained material) in a bowl partially filled with water and observe sheen indicative of petroleum contamination.

8.2 Collecting Soil Samples for Laboratory Analysis

Prior to collecting a sample for laboratory analysis, the sampler should don new gloves. If there are multiple samples to be collected from a single borehole, the gloves should be replaced to avoid cross-contamination.

Collect soil samples using a gloved hand or a clean sampling tool and place directly into the sample jar(s). For volatile organic compounds (VOCs), pack the soil to minimize jar headspace, or field preserve for VOCs using EPA Method 5035 (the field kit is obtained from the laboratory). Label samples as described under Section 8.3 Sample Numbering. Place labeled sample container(s) in the cooler with ice.

8.3 Sample Identification

Sample labels will be completed and attached to the jars in the field to prevent misidentification. All sample labels will include the following information:

- Project name or number
- Sample identification
- Sample collection date and time

The sample identification is unique to a particular sample and the format must be consistently used for all samples collected at the site. The sample identification typically includes the sample location and the collection depth. The sample location is the soil boring number or otherwise designated sample location. Standard abbreviations for sample location types are:

- DP = Direct push
- MW = Monitoring well
- SB = Soil boring
- SE = Sediment
- SO = Surface soil
- SS = Soil sample
- TP = Test pit
- WP = Well point

Examples of sample identifications are: DP-5 (4'), SS-22 (1'), and MW-3 (15')

Other naming conventions may be used, as long as the labeling is consistent and each location is clearly identifiable.

9 BOREHOLE ABANDONMENT

The licensed driller is responsible for abandoning boreholes in compliance with state regulations. PBS personnel should ensure that this occurs, and that the sealing material (typically bentonite chips) is sufficiently hydrated for a proper seal. State regulations governing this are:

- Oregon Administration Rule (OAR) 690-240
- Washington Administrative Code (WAC) 173-160

10 DECONTAMINATION PROCEDURES

Minimizing the possibility of cross-contamination between samples is a critical component of a successful soil sampling project. This is achieved by consistent and thorough decontamination of sampling equipment, such as drill rods, sampling devices (split spoons, trowels, etc.), and other tools that may come in contact with soil to be sampled.

For drilling equipment, the drilling contractor is responsible for the decontamination procedures. Typically, a pressure washer with hot water or water with added detergent is used to clean drill rods and other equipment. The use of a steam cleaner is not appropriate because of the risk of burns, and steam cleaners do a poor job of removing soil particles from equipment.

For equipment and supplies used by PBS personnel, water with added detergent is typically used for decontamination. Alternately, disposable supplies, such as gloves and sampling scoops, can be used to avoid having to decontaminate them.

PBS field personnel should work with the PBS Project Manager to confirm the appropriate decontamination procedure for each project. For example, it may be important to know the source of the driller's water used for decontamination, and distilled or deionized water may need to be used to clean hand tools.

All water and sludge generated during decontamination will be captured for later disposal. Release of water directly onto the ground or into drains or catch basins is not allowed.

11 INVESTIGATION-DERIVED WASTE

Investigation-derived waste consists of soil cuttings, decontamination water, purge water (if groundwater is encountered), and personal protective equipment (e.g., nitrile gloves, rags, paper towels, Tyvex suits, disposable bailers, and tubing). All disposable personal protective equipment may be disposed of as general refuse unless otherwise instructed by the PBS Project Manager.

Soil cuttings are typically placed in 5-gallon buckets or other appropriate containers during the execution of the fieldwork, and transferred to 55-gallon drums as the project progresses. If appropriate, the cuttings may remain in buckets as long as tight-fitting lids are placed on each bucket. For some projects, the PBS Project Manager may request that decontamination/purge water be placed into the same drums as the soil, instead of keeping the two media separate. Depending on the type of contamination, this may result in cost savings for the client during disposal. Field personnel should confirm how to contain soil and water prior to each field event.

11.1 Drum Labeling

The storage containers must be labeled as hazardous, non-hazardous, or unknown pending laboratory results. The labels must be completed using an indelible marker and include:

- Date that the contents were generated
- Nature of the contents - for example:
    - Drill cuttings
    - Purged groundwater
    - Decontamination water and/or sludge
- Contact phone number in the event emergency response personnel need to identify the contents of the container.

Drums or other storage containers should be placed in as secure a location as possible, which may be a building if the exterior area is not secure from vandalism.

12 POST-DRILLING ACTIVITIES

Upon return to the office, PBS personnel should:

- Clean and calibrate equipment prior to placing back into storage. If there were any operational issues noted, they should be reported immediately to the equipment manager.
- Submit field borehole logs for electronic formatting for future reports.
- Submit the daily field notes to the PBS Project Manager for placement into the project file. If a field notebook was used, and that notebook is not dedicated to that project, a copy of those notebook pages should be submitted.

Appendix B

Field Forms

Daily Field Report

Sample Chain of Custody (Fremont Analytical)

DAILY FIELD REPORT

PROJECT INFORMATION

Project Number:	______________	Date:	______________
Project Name:	______________	PBS Staff:	______________
Purpose:	______________	Time Arrive:	______________
Weather:	______________	Time Depart:	______________

FIELD OBSERVATIONS AND COMMENTS

Attach (as appropriate): Photographs, copy of field notes from permanent notebook, laboratory chain-of-custody

SIGNATURE

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: Page: of:

Laboratory Project No (internal):

Project Name:

Special Remarks:

Client:

Project No:

Address:

Collected by:

City, State, Zip:

Location:

Telephone:

Report To (PM):

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Fax:

PM Email:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)				Comments
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

***Matrix:** A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

****Metals (Circle):** MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl V Zn

*****Anions (Circle):** Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:

☐ Standard ☐ Next Day

☐ 3 Day ☐ Same Day

☐ 2 Day ______ (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x			x		
x			x		

SAMPLE RECEIVING. Laboratory hours are from 8:00am to 6:00pm – Monday through Friday. Turn-around times for samples received after 4:00pm begin on the following business day.

TURN-AROUND TIMES. Standard turn-around is 5 business days from the date of sample receipt for most analyses. For many analyses we offer expedited turn-around times, including:
• 3 Day (50% surcharge) • 2 Day (75% surcharge) • Next Day (100% surcharge) • Same Day – Call for availability and pricing
Expedited turn-around and/or specific data delivery requirements should be coordinated in advance. Samples received near the end of their holding time may incur an expedited analysis surcharge whether or not expedited report delivery is requested.

SAMPLE DISPOSAL. Fremont Analytical, Inc. (FAI) archives samples for 30 days after issuing the analytical report or after receiving Client instructions to suspend or terminate the project. After 30 days, FAI disposes of all sample volume in accordance with all governing regulations and laboratory best practices. Clients wishing to reclaim sample volume must request storage beyond the standard 30 days or arrange to retrieve the volume before the scheduled disposal. A $5.00 fee per sample accrues monthly for storage requested beyond 30 days. FAI reserves the right to charge a disposal fee (not to exceed $25.00/sample) for samples requiring special packaging and labeling as Hazardous Materials. “Hazardous Materials” include, but are not limited to, substances of any kind that are potentially poisonous, toxic, radioactive, explosive, or flammable, that contain biohazards or high levels of trace metals, or that pose any risk to persons or the environment through handling or disposal.

PAYMENT. All invoices are sent directly to the client contact provided. For clients with approved credit, payment terms are net 30 days from the date of the invoice. All overdue balances are subject to a 1.5% interest and service charge per month from the due date of the invoice. Third party billing will not be approved without a signed statement from the named party that acknowledges and accepts payment responsibility. In the event that payment is not received within 60 days of the invoice date, FAI may, at its option, terminate all duties without liability to the Client or others. All data produced by FAI is the property of FAI until all associated costs are paid. Clients suspending or terminating a project may be charged for services already performed whether or not analytical data is available or provided.

CONFIDENTIALITY. FAI maintains the confidentiality of all Client data. No information regarding clients’ names, sites, projects, or data will be released without direct, written authorization from the Project Manager designated on this COC Record or other authorized representative of the client company. All data and reports provided to the Client by FAI are specifically for the use of the Client. Reports are intended to be considered in their entirety. FAI is not responsible for the use or misuse of any portion of data or a report by the Client or third parties.

COMPLETE AGREEMENT, MODIFICATION, WAIVER, ENFORCEABILITY. This Agreement, including the parts incorporated herein by reference, is the complete agreement of the parties with regard to services of FAI. No modification or amendment to this Agreement shall be valid unless in writing and signed by an authorized representative of each party. This Agreement is binding on each party's heirs, successors, and assigns. If any provision of this Agreement is held invalid, illegal, or unenforceable, then the remaining provisions shall remain in effect and may be reformed and enforced by the court. Failure to require performance of any term of this Agreement shall not be deemed a waiver of the right to enforce any term of this Agreement.

JURISDICTION AND VENUE. This Agreement shall be interpreted according to the laws of the State of Washington. FAI and Client agree to submit to the jurisdiction and venue of state and federal courts in Seattle, Washington.

LIMITED WARRANTY. FAI warrants only that it will perform services using analytical methodologies with published test methods according to industry standards. If circumstances require analytic practices for which standards do not exist, FAI warrants only that its services will be in accordance with standard scientific procedures and good laboratory practices. FAI MAKES NO OTHER WARRANTIES AND DISCLAIMS ALL OTHER EXPRESS OR IMPLIED WARRANTIES. FAI MAKES NO REPRESENTATIONS OR WARRANTIES REGARDING THE FITNESS OF THE DATA IN ITS REPORTS FOR ANY PARTICULAR USE OR PURPOSE.

LIMITATIONS ON FAI'S LIABILITY. FAI shall not be liable to Client for any of the following types of damages or losses arising out of this Agreement: incidental damages, indirect damages, consequential damages, lost profits, or tort damages. CLIENT'S SOLE REMEDY SHALL BE A REFUND OF THE APPLICABLE PAYMENT TO FAI. FAI SHALL HAVE NO LIABILITY OR OBLIGATIONS EXCEPT AS STATED HEREIN.

TIME LIMITATIONS ON ACTIONS AGAINST FAI. No legal action arising out of any service provided by FAI under this Agreement may be brought against FAI more than one year after FAI has performed the service that is the subject of the legal action, regardless of whether the parties have agreed to arbitration. For the purposes of this Agreement, each Chain of Custody Record and Laboratory Services Agreement form submitted constitutes a unique set of services.

NOTICES. Client(s) shall inspect completed data packages and notify FAI of any defects or nonconformity within thirty (30) days of receipt. Remittance of payment for services or failure to provide timely notification of defects shall be considered acceptance of such services, except as to latent defects which reasonable and timely examination would not have revealed.