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ANCHOR QEA

Memorandum

February 28, 2017

To: Grant Holdcroft and Jan Brower, Kitsap Public Health District

From: Clay Patmont, Jason Cornetta, and Greg Brunkhorst, Anchor QEA

cc: Madeline Wall and Chris Matthews, Washington State Department of Ecology
Linda Berry-Maraist and Stephanie Foster, Olympic Property Group

Re: Port Gamble Bay Sediment Stockpile Sampling and Analysis Plan

Introduction

This Sediment Stockpile Sampling and Analysis Plan (SAP) describes procedures to characterize mixed sediment and wood debris recently dredged from Port Gamble Bay and currently stockpiled and rinsed ("sparged") on upland areas of the former Pope & Talbot sawmill facility (Mill Site) in Port Gamble, Washington. Dredging, offloading, and stockpiling activities were completed by Olympic Property Group under the oversight of the Washington State Department of Ecology (Ecology), consistent with permit requirements. Sparging operations to protectively rinse salinity and ammonia from the stockpiles is ongoing, under Ecology oversight.

As described in the Cleanup Action Plan (Ecology 2013), chemicals of concern (CoC) identified in Port Gamble Bay sediments are limited to wood debris, cadmium, carcinogenic polycyclic aromatic hydrocarbon, and dioxins/furans. The concentrations of these CoCs in the stockpiles, as well as salinity and ammonia levels in leachate from the stockpiles, will be characterized to determine their suitability for disposal and/or beneficial reuse.

Sampling Objectives

Proposed suitability criteria for placement of sparged sediments at the Port Gamble Model Airplane Field Limited Purpose Landfill (LPL), summarized in Table 1, are based on site-specific risk assessment and groundwater protection requirements. Based on the results of the verification sampling, if necessary, stockpiles with higher concentrations will be protectively segregated from other soils to meet the Table 1 suitability criteria.

Soil Sample Collection

Sample locations within the dredge sediment stockpile areas on the Mill Site are shown on Figure 1. The stockpile areas have been subdivided into 79 areas, each representing between approximately 1,100 and 1,500 cubic yards of material. A discrete sediment sample will be collected from each of the 79 areas shown on Figure 1. Stockpile samples will be collected using either a direct push technology (DPT) drill rig, excavator, or hand auger. Samples will be collected over a depth interval from 1 foot below the stockpile surface to a minimum of 5 feet below the stockpile surface, and deeper if sampling methods and stockpile height allow. At each sampling location, soil will be collected from the excavator bucket, hand auger, or DPT liner using decontaminated stainless steel spoons or scoops, following procedures listed in ASTM E1676. Sufficient soil will be collected for all soil chemical testing and placed into a decontaminated stainless steel mixing vessel for homogenization. Consistent with ASTM recommendations, procedures for sample collection and processing will include the following:

- The surface of the location at which the sample is to be collected will be cleared of debris such as leaves and twigs.
- If grass or other plants are present, the plants will be cut to ground level and removed before the sample is collected.
- Gravel and rocks greater than 2 inches will be excluded from the sample.
- Soil samples will be qualitatively described, including color, texture, and the presence of roots, leaves, and soil organisms.
- Following homogenization, an aliquot of soil will be placed into laboratory-supplied sample containers and placed into a cooler for delivery to the analytical laboratory.

Equipment Decontamination

The following general decontamination procedures will be followed for field sampling equipment:

- Pre-wash rinse with tap or site water.
- Wash with a solution of tap water or site water and phosphate-free soap (e.g., Alconox).
- Rinse three times with distilled water.
- Cover (no contact) all decontaminated items with aluminum foil.
- Store in a clean, closed container for next use.

Station Positioning

A handheld Differential Global Positioning System will be used to navigate to the planned sampling locations. Collection at the sampling location will be guided by the navigation system, with an accuracy of ±10 feet. When positioned at the sampling location, the coordinates will be recorded in

latitude and longitude, in decimal degrees, to five decimal places. Positions will be relative to the Washington State Plane Coordinates, North; North American Datum 1983.

Sample Storage and Delivery

Sample container requirements, holding times, and preservation requirements are outlined in Table 2. Sample containers, instruments, working surfaces, technician protective gear, and other items that may come into contact with sample material must meet high standards of cleanliness. All equipment and instruments that will be used and are in direct contact with various media collected for chemical analyses must be made of glass, stainless steel, or HDPE, and will be cleaned prior to each day's use and between sampling events.

Chain-of-Custody Procedures

Chain-of-custody (COC) procedures will be followed for all samples throughout the collection, handling, and analysis processes. The principal document used to track possession and transfer of samples is the COC form. Each sample will be represented on a COC form the day it is collected. All manual data entries will be made using an indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, and then dating and initialing the change. Blank lines and spaces on the COC form will be lined out, dated, and initialed by the individual maintaining custody. Electronic COC forms generated from a custom field application will be emailed directly to the laboratory and quality assurance managers.

A COC form will accompany each shipment of samples to the analytical laboratory. Each person in custody of samples will sign the COC form and ensure that the samples are not left unattended unless properly secured. Copies of all COC forms will be retained in the project files.

All samples will be shipped or hand delivered to the analytical laboratory no later than 1 day after collection. Samples collected on Friday may be held until the following Monday for shipment, provided that this delay does not jeopardize any holding time requirements.

Specific sample shipping procedures are as follows:

- Coolers or containers containing samples for analysis may be shipped via overnight delivery to the laboratory. In the event that Saturday delivery is required, the field coordinator will contact the analytical laboratory before 3 p.m. on Friday to ensure that the laboratory is aware of the number of containers shipped and the airbill tracking numbers for those containers. Following each shipment, the field coordinator will call the laboratory and verify that the shipment from the day before has been received and is in good condition.
- Coolant ice will be sealed in separate plastic bags and placed in the shipping containers.
- Individual sample containers will be placed in a sealable plastic bag, packed to prevent breakage, and transported in a sealed ice chest or other suitable container.

- Glass jars will be separated in the shipping container by shock-absorbent material (e.g., bubble wrap) to prevent breakage.
- The shipping containers will be clearly labeled with sufficient information (name of project, time and date container was sealed, person sealing the container, and consultant's office name and address) to enable positive identification.
- COC forms will be enclosed in a plastic bag and taped to the inside lid of the cooler.
- A minimum of two signed and dated custody seals will be placed on adjacent sides of each cooler prior to shipping.
- Each cooler will be wrapped securely with strapping tape, labeled "Glass – Fragile" and "This End Up," and will be clearly labeled with the laboratory's shipping address and the consultant's return address.

Upon transfer of sample possession to the analytical laboratory, the person(s) transferring custody of the sample container will sign the COC form. Upon receipt of samples at the laboratory, the custody seals will be broken, and the receiver will record the condition of the samples on a sample receipt form. COC forms will be used internally in the laboratory to track sample handling and final disposition.

Laboratory Analysis

Samples will be analyzed by Analytical Resources, Inc. (ARI), located in Tukwila, Washington. ARI is accredited by Ecology. All chemical testing will adhere to SW-846 QA/QC procedures and analysis protocols (USEPA 1998) or follow the appropriate ASTM International or Standard Method protocols. Analytical methods and expected reporting limits for each parameter are included in Table 3. In addition to the analytical methods specified in Table 3, five randomly selected soil samples will be analyzed for the full suite of Model Toxics Control Act soil cleanup level parameters as specified in Table 4.

Piezometer Installation, Monitoring, and Reporting

In addition to collecting stockpile sediment characterization samples, six temporary piezometers will be installed using a DPT drill rig. The planned piezometer locations are shown on Figure 1. Piezometers will consist of 1-inch-diameter pre-pack PVC well screens and 1-inch-diameter PVC riser. Piezometers will be installed to the depth of the existing ground surface beneath the stockpiles. Stockpile leachate resulting from ongoing sparging operations will be monitored by collecting samples from the temporary piezometers. Samples will be collected from each piezometer, every 2 weeks, using dedicated tubing and a peristaltic pump. Field parameters will be measured from the samples using an YSI 6920 v2 Water Quality Meter or equivalent. Field parameters will include the following:

- Salinity
- Dissolved oxygen
- pH
- Ammonia

Monthly monitoring reports comparing piezometer monitoring data with suitability criteria will be sent to the Kitsap County Health District, with copies to Ecology. Once leachate field parameters meet the suitability criterial for two consecutive measurements, additional measurements will not be required, and stockpiles that pass other suitability requirements (bulk chemistry and visual inspection) may be cleared for transport to the LPL.

References

Anchor QEA, 2015. *Engineering Design Report – Port Gamble Bay Cleanup Project*. Prepared for Pope Resources, LP/OPG Properties, LLC. May 2015.

ASTM (ASTM International), 2002. *Standard Practices for Use of the Term Precision and Bias in ASTM Test Methods*, 177–90a.

Ecology (Washington State Department of Ecology), 2013. *Final Cleanup Action Plan*. Exhibit A to the Port Gamble Bay Consent Decree, No. 13-2-02720-0.

USEPA (U.S. Environmental Protection Agency), 1998. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods; Third Edition; Final Update III-A. March 1999.

Figures

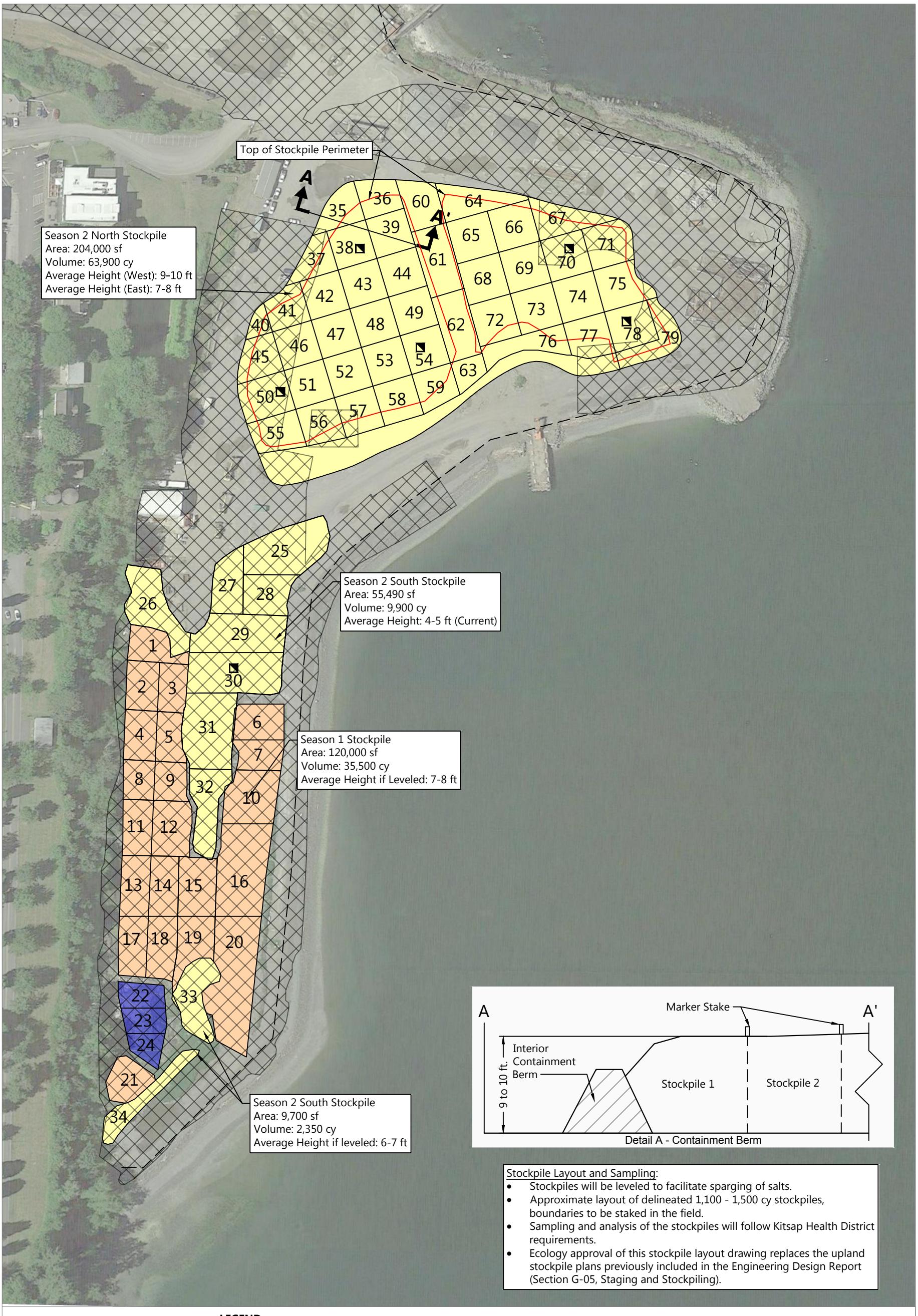

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Figure 1
Season 1 and Season 2 Stockpile Locations

Port Gamble Bay Cleanup Project
Port Gamble, Washington

Tables

Table 1
Port Gamble Model Airplane Field Limited Purpose Landfill Suitability Criteria

Item	Criterion
Bulk material cPAH TEQ	Maximum concentration may not exceed 29,000 µg/kg Average concentration may not exceed 480 µg/kg
Bulk material dioxin/furan TEQ	Maximum concentration may not exceed 260 ng/kg Average concentration may not exceed 45 ng/kg
Stockpile leachate chloride and ammonia	Maximum chloride concentration may not exceed 250 mg/L Average concentration may not degrade groundwater

Notes:

1. Bulk material concentrations (cPAHs and dioxin/furans) are based on site-specific risk assessment, including ecological protection levels (maximum concentrations) and human health protection (average concentrations).
2. Stockpile leachate chloride maximum concentration is based on the requirements in Washington Administrative Code 173-200.
3. Groundwater antidegradation requirements will be determined based on comparison with baseline groundwater quality being collected at the Port Gamble Model Airplane Field Limited Purpose Landfill.

µg – microgram
cPAHs – carcinogenic polycyclic aromatic hydrocarbons
kg – kilogram
L – liter
mg – milligram
ng – nanogram
TEQ – toxicity equivalency quotient

Table 2
Guidelines for Sample Handling and Storage

Analyte	Container[a]	Holding Time	Preservative
Total solids	4-ounce glass jar	14 days	Cool/4°C
		6 months	Freeze -18°C
Cadmium		6 months	Cool/4°C
		2 years	Freeze/-18°C
LOI	4-ounce glass jar	6 months	Cool/4°C
		2 years	Freeze/-18°C
PAHs	8-ounce glass jar	14 days until extraction	Cool/4°C
		1 year until extraction	Freeze/-18°C
		40 days after extraction	Cool/4°C
PCDD/PCDF Congeners	4-ounce glass jar	1 year until extraction	Freeze -18°C
		1 year after extraction	Freeze -18°C
Hexavalent chromium[b]	4-oz glass jar	28 days	Cool/4°C
Metals[b]	4-oz glass jar	6 months; 28 days for Hg	Cool/4°C
		2 years	Freeze[b]/-18°C
SVOCs/PCB Aroclors/Pesticides[b]	16-oz glass jar	14 days until extraction	Cool/4°C
		1 year until extraction	Freeze/-18°C
		40 days after extraction	Cool/4°C
VOCs[b]	2-oz glass jar, no headspace	14 days	Cool/4°C
TPH-Gx[b]	2, 40-mL vials	14 days	Cool/4°C methanol preserved according to EPA sampling method 5035 (Encore or Terracore samplers)
TPH-Dx[b]	8-ounce glass jar	14 days until extraction	Cool/4°C
		1 year until extraction	Freeze/-18°C
		40 days after extraction	Cool/4°C

Notes:

a. Actual containers used will be verified with the lab prior to sample collection.

b. Only for samples analyzed for the full suite of MTCA parameters

PAHs – Polycyclic aromatic hydrocarbons

PCDD/PCDF – polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans

Table 3
Site Specific Analyte List, Analytical Methods, and Reporting Limits

Analyte	Analytical Method	Target Reporting Limit
Conventionals and Physical Tests		
Total solids (% wet)	SM 2540B	0.1
Total volatile solids (% dry)	PSEP (1997a)	0.1
Metals (mg/kg)		
Cadmium	6010C/6020A	0.1
Polycyclic Aromatic Hydrocarbons (µg/kg)		
1-Methylnaphthalene	8270D/SIM	20
2-Methylnaphthalene	8270D/SIM	20
Naphthalene	8270D/SIM	20
Acenaphthylene	8270D/SIM	20
Acenaphthene	8270D/SIM	20
Fluorene	8270D/SIM	20
Phenanthrene	8270D/SIM	20
Anthracene	8270D/SIM	20
Fluoranthene	8270D/SIM	20
Pyrene	8270D/SIM	20
Benzo(a)anthracene	8270D/SIM	20
Chrysene	8270D/SIM	20
Total benzo(b+j+k)fluoranthenes	8270D/SIM	20
Benzo(a)pyrene	8270D/SIM	20
Indeno(1,2,3-cd)pyrene	8270D/SIM	20
Dibenz(a,h)anthracene	8270D/SIM	20
Benzo(g,h,i)perylene	8270D/SIM	20
PCDD/PCDF (ng/kg)		
2,3,7,8-TCDD	1613B	0.5
1,2,3,7,8-PeCDD	1613B	2.5
1,2,3,4,7,8-HxCDD	1613B	2.5
1,2,3,6,7,8-HxCDD	1613B	2.5
1,2,3,7,8,9-HxCDD	1613B	2.5
1,2,3,4,6,7,8-HpCDD	1613B	2.5
OCDD	1613B	5.0
2,3,7,8-TCDF	1613B	0.5
1,2,3,7,8-PeCDF	1613B	2.5
2,3,4,7,8,-PeCDF	1613B	2.5
1,2,3,4,7,8-HxCDF	1613B	2.5
1,2,3,6,7,8-HxCDF	1613B	2.5
1,2,3,7,8,9-HxCDF	1613B	2.5
2,3,4,6,7,8-HxCDF	1613B	2.5
1,2,3,4,6,7,8-HpCDF	1613B	2.5
1,2,3,4,7,8,9-HpCDF	1613B	2.5
OCDF	1613B	5.0

Notes:
µg – microgram
kg – kilogram
mg – milligram
ng – nanogram
PAH – polycyclic aromatic hydrocarbons
PCDD/PCDF – polychlorinated dibenzo-p-dioxins/ polychlorinated dibenzofurans

Table 4
Full Suite MTCA Soil Cleanup Level Analyte List, Analytical Methods, and Reporting Limits

Analyte	Analytical Method	PQL[a]
Metals (mg/kg)		
Antimony	6020A	0.2
Arsenic	6020A	0.2
Beryllium	6020A	0.2
Cadmium	6020A	0.1
Chromium	6020A	0.5
Chromium III	Calculated	0.5
Chromium VI	7196A	0.1
Copper	6020A	0.5
Lead	6020A	0.1
Mercury	7471B	0.025
Nickel	6020A	0.5
Selenium	6020A	0.5
Silver	6020A	0.2
Thallium	6020A	0.2
Zinc	6020A	4.0
Polycyclic aromatic hydrocarbons (µg/kg)		
1-Methylnaphthalene	8270D-SIM	5.0
2-Methylnaphthalene	8270D-SIM	5.0
Acenaphthene	8270D-SIM	5.0
Acenaphthylene	8270D-SIM	5.0
Anthracene	8270D-SIM	5.0
Benzo(a)anthracene	8270D-SIM	5.0
Benzo(a)pyrene	8270D-SIM	5.0
Benzo(b)fluoranthene	8270D-SIM	5.0
Benzo(g,h,i)perylene	8270D-SIM	5.0
Benzo(j)fluoranthene	8270D-SIM	5.0
Benzo(k)fluoranthene	8270D-SIM	5.0
Chrysene	8270D-SIM	5.0
Dibenzo(a,h)anthracene	8270D-SIM	5.0
Fluoranthene	8270D-SIM	5.0
Fluorene	8270D-SIM	5.0
Indeno(1,2,3-c,d)pyrene	8270D-SIM	5.0
Naphthalene	8270D-SIM	5.0
Phenanthrene	8270D-SIM	5.0
Pyrene	8270D-SIM	5.0
Total Benzofluoranthenes (b,j,k)	8270D-SIM	15
Total HPAH	8270D-SIM	5.0
Total LPAH	8270D-SIM	5.0
Total PAH	8270D-SIM	5.0

Table 4
Full Suite MTCA Soil Cleanup Level Analyte List, Analytical Methods, and Reporting Limits

Analyte	Analytical Method	PQL[a]
Semivolatile organic compounds (µg/kg)		
1,2,4,5-Tetrachlorobenzene	8270D	20
1,2,4-Trichlorobenzene	8270D	20
1,2-Dichlorobenzene	8270D	20
1,3-Dichlorobenzene	8270D	20
1,4-Dichlorobenzene	8270D	20
2,2'-Oxybis (1-chloropropane)	8270D	20
2,3,4,6-Tetrachlorophenol	8270D	20
2,4,5-Trichlorophenol	8270D	100
2,4,6-Trichlorophenol	8270D	100
2,4-Dichlorophenol	8270D	100
2,4-Dimethylphenol	8270D	100
2,4-Dinitrophenol	8270D	200
2,4-Dinitrotoluene	8270D	100
2,6-Dinitrotoluene	8270D	100
2-Chloronaphthalene	8270D	20
2-Chlorophenol	8270D	20
2-Methylphenol (o-Cresol)	8270D	20
2-Nitroaniline	8270D	100
2-Nitrophenol	8270D	20
3,3'-Dichlorobenzidine	8270D	100
3-Methylphenol & 4-Methylphenol (m&p-Cresol)	8270D	20
3-Methylphenol (m-Cresol)	8270D	20
3-Nitroaniline	8270D	100
4-Bromophenyl-phenyl ether	8270D	20
4-Chloro-3-methylphenol	8270D	100
4-Chloroaniline	8270D	100
4-Methylphenol (p-Cresol)	8270D	20
4-Nitroaniline	8270D	20
4-Nitrophenol	8270D	100
Acetophenone	8270D	20
Aniline	8270D	100
Atrazine	8270D	20
Benzaldehyde	8270D	20
Benzidine	8270D	20
Benzoic acid	8270D	20
Benzyl alcohol	8270D	20
Biphenyl (1,1'-Biphenyl)	8270D	20
bis(2-Chloroethoxy)methane	8270D	20
bis(2-Chloroethyl)ether	8270D	20
bis(2-Ethylhexyl)phthalate	8270D	50
Butylbenzyl phthalate	8270D	20
Caprolactam	8270D	20

Table 4
Full Suite MTCA Soil Cleanup Level Analyte List, Analytical Methods, and Reporting Limits

Analyte	Analytical Method	PQL[a]
Dibenzofuran	8270D	20
Diethyl phthalate	8270D	20
Dimethyl phthalate	8270D	20
Di-n-butyl phthalate	8270D	20
Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)	8270D	20
Di-n-octyl phthalate	8270D	20
Hexachlorobenzene	8270D	20
Hexachlorocyclopentadiene	8270D	100
Hexachloroethane	8270D	20
Isophorone	8270D	20
Nitrobenzene	8270D	20
n-Nitrosodimethylamine	8270D	40
n-Nitrosodi-n-propylamine	8270D	20
n-Nitrosodiphenylamine	8270D	20
Pentachlorophenol	8270D	100
Phenol	8270D	20
Volatile organic compounds (µg/kg)[b]		
1,1,1,2-Tetrachloroethane	8260C	1.0
1,1,1-Trichloroethane	8260C	1.0
1,1,2,2-Tetrachloroethane	8260C	1.0
1,1,2-Trichloroethane	8260C	1.0
1,1,2-Trichlorotrifluoroethane (Freon 113)	8260C	2.0
1,1-Dichloroethane	8260C	1.0
1,1-Dichloroethene	8260C	1.0
1,2,3-Trichlorobenzene	8260C	5.0
1,2,3-Trichloropropane	8260C	2.0
1,2,4-Trimethylbenzene	8260C	1.0
1,2-Dibromo-3-chloropropane	8260C	5.0
1,2-Dichloroethane	8260C	1.0
1,2-Dichloroethene, cis-	8260C	1.0
1,2-Dichloroethene, trans-	8260C	1.0
1,2-Dichloropropane	8260C	1.0
1,3,5-Trimethylbenzene (Mesitylene)	8260C	1.0
1,3-Dichloropropane	8260C	1.0
1,3-Dichloropropene, cis-	8260C	1.0
1,3-Dichloropropene, trans-	8260C	1.0
1,4-Dichloro-2-butene, trans-	8260C	1.0
1,4-Dioxane	8260C	1.0
2-Butanone (MEK)	8260C	5.0
2-Chlorotoluene	8260C	1.0
2-Hexanone (Methyl butyl ketone)	8260C	5.0
4-Chlorotoluene	8260C	1.0
4-Isopropyltoluene (4-Cymene)	8260C	1.0

Table 4
Full Suite MTCA Soil Cleanup Level Analyte List, Analytical Methods, and Reporting Limits

Analyte	Analytical Method	PQL[a]
Acetone	8260C	5.0
Acrolein	8260C	50.0
Acrylonitrile	8260C	5.0
Benzene	8260C	1.0
Bromobenzene	8260C	1.0
Bromochloromethane	8260C	1.0
Bromodichloromethane	8260C	1.0
Bromoform (Tribromomethane)	8260C	1.0
Bromomethane (Methyl bromide)	8260C	2.0
Carbon disulfide	8260C	1.0
Carbon tetrachloride (Tetrachloromethane)	8260C	1.0
Chlorobenzene	8260C	1.0
Chloroethane	8260C	1.0
Chloroform	8260C	1.0
Chloromethane	8260C	1.0
Cyclohexane	8260C	1.0
Dibromochloromethane	8260C	1.0
Dibromomethane	8260C	1.0
Dichlorodifluoromethane	8260C	1.0
Dichloromethane (Methylene chloride)	8260C	2.0
Ethylbenzene	8260C	1.0
Ethylene dibromide (1,2-Dibromoethane)	8260C	1.0
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	8260C	5.0
Isopropylbenzene (Cumene)	8260C	1.0
Methyl acetate	8260C	1.0
Methyl iodide (Iodomethane)	8260C	1.0
Methyl isobutyl ketone (4-Methyl-2-pentanone or (MIBK))	8260C	5.0
Methyl tert-butyl ether (MTBE)	8260C	1.0
n-Butylbenzene	8260C	1.0
n-Propylbenzene	8260C	1.0
o-Xylene	8260C	1.0
sec-Butylbenzene	8260C	1.0
Styrene	8260C	1.0
tert-Butylbenzene	8260C	1.0
Tetrachloroethene (PCE)	8260C	1.0
Toluene	8260C	1.0
Total xylene (reported, not calculated)	8260C	2.0
Total Xylene	8260C	1.0
Trichloroethene (TCE)	8260C	1.0
Trichlorofluoromethane (Fluorotrichloromethane)	8260C	1.0
Vinyl acetate	8260C	5.0
Vinyl chloride	8260C	1.0

Table 4
Full Suite MTCA Soil Cleanup Level Analyte List, Analytical Methods, and Reporting Limits

Analyte	Analytical Method	PQL[a]
Pesticides (µg/kg)		
2,4'-DDD (o,p'-DDD)	8081B	1.0
2,4'-DDE (o,p'-DDE)	8081B	1.0
2,4'-DDT (o,p'-DDT)	8081B	1.0
4,4'-DDD (p,p'-DDD)	8081B	1.0
4,4'-DDE (p,p'-DDE)	8081B	1.0
4,4'-DDT (p,p'-DDT)	8081B	1.0
Aldrin	8081B	0.5
Chlordane, alpha- (Chlordane, cis-)	8081B	0.5
Chlordane, beta- (Chlordane, trans-)	8081B	0.5
Dieldrin	8081B	1.0
Endosulfan sulfate	8081B	1.0
Endosulfan-alpha (I)	8081B	0.5
Endosulfan-beta (II)	8081B	1.0
Endrin	8081B	1.0
Endrin aldehyde	8081B	1.0
Endrin ketone	8081B	1.0
Heptachlor	8081B	0.5
Heptachlor epoxide	8081B	0.5
Hexachlorocyclohexane, alpha (BHC)	8081B	0.5
Hexachlorocyclohexane, beta- (BHC)	8081B	0.5
Hexachlorocyclohexane, delta (BHC)	8081B	0.5
Hexachlorocyclohexane, gamma- (BHC) (Lindane)	8081B	0.5
Methoxychlor	8081B	5.0
Mirex	8081B	1.0
Oxychlordane	8081B	1.0
Nonachlor, cis-	8081B	1.0
Nonachlor, trans-	8081B	1.0
Toxaphene	8081B	25.0
Polychlorinated biphenyl Aroclors (µg/kg)		
Aroclor 1016	8082A	4.0
Aroclor 1221	8082A	4.0
Aroclor 1232	8082A	4.0
Aroclor 1242	8082A	4.0
Aroclor 1248	8082A	4.0
Aroclor 1254	8082A	4.0
Aroclor 1260	8082A	4.0
Aroclor 1262	8082A	4.0
Aroclor 1268	8082A	4.0
Total PCB Aroclors	8082A	4.0

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Full Suite MTCA Soil Cleanup Level Analyte List, Analytical Methods, and Reporting Limits

Analyte	Analytical Method	PQL[a]
Total Petroleum Hydrocarbons (mg/kg)		
TPH-Dx	NWTPH-Dx	5.0 (10.0 for motor oil)
TPH-Gx	NWTPH-Gx	5.0

Notes:

[a]Estimated PQL was obtained from Analytical Resources Inc. PQLs may vary based on lab selection. In some instances lab reporting limits may exceed the PQL due to matrix interferences, which will be addressed as part of data validation.

µg/kg – micrograms per kilogram

HPAH – high-molecular-weight polycyclic aromatic hydrocarbon

LPAH – low-molecular-weight polycyclic aromatic hydrocarbon

mg/kg – milligrams per kilogram

NA – not applicable to this analyte

ng/kg – nanograms per kilogram

PAH – polycyclic aromatic hydrocarbon

PQL – Practical Quantitation Limit

NWTPH-Dx (Northwest total petroleum hydrocarbons – diesel range extended)

NWTPH-Gx (Northwest total petroleum hydrocarbons – gasoline range extended)