BergerABAM

June 2018

Groundwater Monitoring Well Installation, Soil Investigation, and First Quarter Groundwater Sampling

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Proposed Grays Harbor Potash Export Facility
Potential Wetland Mitigation Site: IDD#1
Hoquiam, Washington

Submitted to
BHP Billiton Canada, Inc.

Submitted by
BergerABAM

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Groundwater Monitoring Well Installation, Soil Investigation, and First Quarter Groundwater Sampling – IDD#1 Site Summary Report

Proposed Grays Harbor Potash Export Facility Project
Potential Wetland Mitigation Site: IDD#1
Hoquiam, Washington

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JUNE 2018
GROUNDWATER MONITORING WELL INSTALLATION, SOIL INVESTIGATION AND FIRST QUARTER GROUNDWATER SAMPLING –IDD#1 SITE SUMMARY REPORT

Proposed Grays Harbor Potash Export Facility Project
Potential Wetland Mitigation Site: IDD#1
Hoquiam, Washington

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JUNE 2018
GROUNDWATER MONITORING WELL INSTALLATION, SOIL INVESTIGATION, AND FIRST QUARTER GROUNDWATER SAMPLING – IDD#1 SITE SUMMARY REPORT
PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY PROJECT
HOQUIAM, WASHINGTON

1.0 INTRODUCTION

This report summarizes the site conditions, groundwater monitoring well installation, and groundwater/soil sampling activities completed at the IDD#1 site (herein referred to as "the site," see Figure 1) in Hoquiam, Washington, on behalf of BHP Billiton Canada, Inc. (BHP). BHP is considering redevelopment of the IDD#1 site (Tax Parcels 056400600102 and 056400400100) for potential compensatory mitigation for wetland impacts related to development of the Proposed Grays Harbor Potash Export Terminal at Terminal 3 and surrounding parcels in Hoquiam, Washington. The proposed IDD#1 mitigation site is a Port of Grays Harbor (Port)-owned property, on the north shore of Grays Harbor.

The site is approximately 40 acres and is located at the east terminus of Earley Industrial Way in Hoquiam, Washington. The site is positioned to the immediate west of where the Hoquiam River empties into Grays Harbor. The site is former tidelands that were backfilled with material dredged from the Hoquiam and Chehalis River channels. The site's history is summarized in Section 1.1.

The majority of the site is undeveloped with a gravel road, which runs around the perimeter of the site along the berm that bounds the property on the west, south, and east sides. Previous wetland delineations revealed at least four on-site wetlands, the largest of which spans approximately 26 acres (Parametrix 2006). Culverts on the west and east sides of the site allow for tidal influence to the on-site wetlands. Tide gates do not appear to be fully operational and may only allow partial flow. The current site conditions are shown in Figure 2.

BergerABAM installed five new groundwater monitoring wells and collected sediment samples from 25 test pit locations at the site in June 2018 (Figure 2). The June 2018 soil and groundwater investigation was completed to evaluate subsurface conditions at the site in support of use of the site for potential wetland mitigation. Soil and groundwater samples were collected to evaluate subsurface conditions for construction and disposal purposes. Soil and groundwater samples were submitted to the chemical analytical laboratory (ESN Northwest) for the analysis of the following chemicals of concern (COCs): CRA 8 metals, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), polycyclic chlorinated biphenyls (PCBs), northwest total petroleum hydrocarbons-diesel- and gasoline-range (NWTPHDx/Gx), dioxins/furans, and cyanide.

Previous sampling efforts at the site (CH2M Hill 2009) included installation and sampling from two groundwater wells. Staff scientists were unable to locate either well during the June 2018 site investigation. Soil samples were not analyzed during the 2009 WSDOT investigation but groundwater samples collected from two monitoring wells located in the IDD#1 site at that time contained concentrations of arsenic greater than the associated Model Toxics Control Act (MTCA) Method B cleanup level (CUL). The central portion of the site was not characterized during the 2009 WSDOT investigation.

1.1 IDD#1 Site History

The IDD#1 site was tideflats until the early 1900s when a strip along the north portion of the site was filled with dredged material to create uplands. The tidelands at the site were used for log rafting and storage associated with the Northwestern Lumber Company mill since the late 1800s. The site was used for the following activities based on the information in the 2007 Cultural Resources Survey Report completed for WSDOT (WSDOT 2007).

- A shingle mill was present on the northeast portion of the site between the early 1900s and the mid-1940s when it was demolished. The shingle mill ceased operation in 1929. During this time, the site was mainly tideflat with unstable foundation so any structures for the lumber company were pile-supported or situated on fill.
- An electric plant was built near the northeast corner of the IDD#1 site in 1883 and operated until approximately 1916 and was demolished by 1928.
- A residential community occupied the north portion of the site from the 1930s to 1950s. The structures associated with this community were demolished in the mid-1960s, and associated debris was spread over the north portion of the IDD#1 site.
- A fish product reduction facility operated on the east side of the site from approximately 1945 to 1965. The facility was demolished in the late 1960s.
- The tidelands remaining at the site were filled with material dredged from the Hoquiam and Chehalis River channels in the 1970s. A quarry rock and riprap berm was built around the site at approximately the same time creating the uplands of the site as they are today.

1.2 Groundwater Monitoring Well Installation and Test Pits

Five monitoring wells (MW-1 through MW-4 and MW-6[1]) were installed in June 2018 to further evaluate groundwater conditions at the site. The new wells were developed and sampled for the first quarterly monitoring event, completed in June 2018, as described in this summary report. A total of 25 test pits were excavated with a backhoe in June 2018 to evaluate soil conditions at the site. The soil and groundwater data will be used to

[1] Identification "MW-5" was not used as we were expecting WSDOT's monitoring well MW-5 to be onsite. However, that well is no longer there.

evaluate subsurface conditions relative to handling and disposal of dewatering water and soils during construction of the proposed mitigation site.

The well installation and soil investigations are described below in Sections 2.0 and 3.0, respectively, results of the first quarter of groundwater monitoring are summarized in Section 4.0, and results of soil sampling are described in Section 5.0.

2.0 MONITORING WELL INSTALLATION AND SAMPLING METHODS

BergerABAM installed and developed five groundwater monitoring wells (MW-1 through MW-4 and MW-6) at the site on 11 through 13 June 2018 in accordance with the Groundwater Sampling and Analysis Plan (SAP) included as Appendix A. The well locations are shown on Figure 2.

2.1 Site Soil Conditions

Soil samples were collected during well installation (test pit soil investigations are summarized in Section 5.0). The samples collected and chemical analyses performed are summarized below.

The soil encountered in the five monitoring well borings (MW-1 through MW-4 and MW-6) completed at the site generally consist of poorly graded sand from 0 to 5 feet below ground surface (bgs) with alternating layers of silty sand, sandy silt, and silt from 5 feet bgs to the completed depth of borings (15 to 20 feet bgs; see Appendix B for soil boring logs).

Soil samples were collected at the groundwater interface and/or where field screening indicated the potential presence of contamination. Soil in each groundwater boring and test pit was field screened (for staining, sheen, and volatile organics using a photoionization detector [PID]). Soil was field screened every 2 feet from 1 foot bgs to 12 feet bgs, in each of the test pits. Field screening did not indicate the presence of contaminants in the soil collected from borings MW-1, MW-2, MW-4, and MW-6. Soil samples were collected from boring MW-3 from 5 feet and 10 feet bgs based on low PID readings ranging from 0.0 to 12.0 ppm.

2.2 Monitoring Well Installation and Development

Installation of the monitoring wells (MW-1 through MW-4 and MW-6) was observed by a BergerABAM field scientist, who maintained a detailed log of the materials and depths of the well. The monitoring wells were constructed to a depth of approximately 15 to 20 feet bgs to evaluate shallow groundwater conditions at the site. Well screens were installed to intersect the groundwater table during seasonal high- and low-water conditions.

Wells were constructed in accordance with WAC 173-160 using 2-inch-diameter Schedule 40 PVC well casing with 10- or 20-slot well screens. Medium sand was placed in the borehole annulus surrounding the slotted portion of the well. Each well was completed by placing a bentonite seal and aboveground monument protected by three

bollards. A lockable Thermos-type cap was installed in the top of the PVC well casing. The depth to water in the monitoring well was measured prior to development. The total depth of the well was also measured and recorded.

Each monitoring well was developed to remove water (if any) introduced into the well during drilling, stabilize the filter pack and formation materials surrounding the well screen, and restore the hydraulic connection between the well screen and the surrounding soil. The well screen was gently surged with a bailer several times during development. Groundwater monitoring wells were developed by purging the well until conventional field parameters (such as temperature, conductivity, and pH) stabilized to within 10 percent over three consecutive measurements and/or until five well volumes had been removed. The removal rate and amount of groundwater removed was recorded during well development procedures. Groundwater removed from the wells during development was collected and stored in labeled 55-gallon drums pending analytical results.

Groundwater monitoring wells were surveyed to identify their lateral position and vertical elevation of the top of well casing (aboveground completion), top of well casing (PVC), and at ground level. The vertical datum was carried from a standard U.S. Geological Survey NGVD benchmark, which was used to establish a permanent benchmark at the site. A survey reference notch was established on each monitoring well casing.

2.3 Groundwater Sampling Methods

Groundwater sampling representing the first quarter of monitoring occurred on 13 and 14 June 2018. Well installation and sampling details are discussed in the SAP (Appendix A).

Groundwater levels were measured in each monitoring well prior to purging during each sampling event. Groundwater levels were measured relative to the casing rim elevations to the nearest 0.01 foot using an electric water level indicator. The direction of shallow groundwater flow at the site was interpreted based on field measurements and site topography.

Groundwater samples were collected from monitoring wells using a peristaltic pump and dedicated Teflon-lined polyethylene tubing.

The wells were purged prior to sample collection using low-flow/low-turbidity sampling techniques to minimize the suspension of sediment in the groundwater. The flow rate was less than 1 liter per minute. A water quality measuring system was used to monitor the following water quality parameters during purging.

- Electrical Conductivity
- Dissolved Oxygen
- pH

- Salinity
- Turbidity
- Temperature

Groundwater samples were collected after these parameters stabilized so that measured values varied less than 10 percent for three consecutive measurements. The stabilized field measurements were documented in the field log book. Soil cuttings from well installation, development water, and purge water were stored in secured, labeled 55-gallon drums pending analytical results.

Groundwater samples were collected into laboratory-provided sample containers (no preservative) for dissolved metals (to be lab filtered) and the other COCs identified in Section 1.0 after the wells were purged. The samples were collected directly from water flowing from the sampler tubing using the low-flow methodology described above. Each sample container was securely capped, labeled, and placed in a cooler with ice immediately upon collection. The well casing plug and monument cover lid were secured after each sampling event.

3.0 TEST PIT EXCAVATION AND SAMPLING METHODS

Excavation activities were monitored by a technical representative from BergerABAM and an archaeologist from ICF. The cultural resources specialist from the Quinault Indian Nation was also present during the first day of test pit investigations, 11 June. Field observations (including soil classification and logs) were detailed in daily field notes. Soil samples were evaluated for the potential presence of contamination using field screening techniques and for the potential presence of cultural resources. Observations of soil and conditions and soil field screening results for each test pit were included in the field notes. The archaeologist did not identify cultural artifacts of significance in any of the excavations completed for this site investigation.

3.1 Soil Sampling Methods

Soil samples were collected every 2 feet between 1 foot and 12 feet bgs using a track-mounted excavator. Samples were collected for analysis of the COCs identified in Section 1.0 if signs of contamination were observed during field screening (e.g., PID, sheen, and staining). Soil samples were collected from just above apparent groundwater level in each test pit if no indications (e.g., sheen, staining, and elevated PID readings) of contamination were observed.

Sample containers were labeled in the field and stored in an iced cooler prior to and during shipment to the chemical analytical laboratory. Incidental waste generated during this investigation (including discarded nitrile gloves, aluminum foil, tubing, and paper towels) was placed in plastic garbage bags and disposed of as solid waste.

Test pits were backfilled with the soil removed after the target depth was reached or if test pits could be excavated no farther (e.g., pits caving in). Each test pit was compacted to previous contours and conditions after they were backfilled.

4.0 RESULTS - GROUNDWATER MONITORING JUNE 2018

Groundwater samples collected from MW-1 through MW-4 and MW-6 (including a field duplicate from MW-6) were submitted for analysis of dissolved RCRA 8 metals, VOCs, PAHs, PCBs, NWTPHDx/Gx, dioxins/furans, and cyanide (see Appendix C for chemical analytical methods). Groundwater elevations were measured in each well at the time of sampling to evaluate current depth to groundwater and flow direction, as discussed below.

4.1 Groundwater Flow Conditions

Groundwater was measured at depths ranging from 2.33 feet bgs (Elevation 10.27 mean lower low water [MLLW]) to 6.77 feet bgs (Elevation 4.37 MLLW). The observed groundwater elevations indicated the groundwater surface generally follows topography except for an apparent groundwater mound in the western portion of the site. The general groundwater flow direction was to the south/southeast at the time of the sampling event. Groundwater elevations are shown in Table A and Figure 3.

4.2 Chemical Analytical Results

4.2.1 Groundwater

Groundwater samples were collected from the five new wells (MW-1 through MW-4 and MW-6) located throughout the site and submitted to the chemical analytical laboratory (Environmental Services Network Northwest [ESN Northwest] of Olympia, Washington) for analysis of dissolved RCRA 8 metals, VOCs, PAHs, PCBs, NWTPHDx/Gx, dioxins/furans, and cyanide.

The chemical analytical results were compared to the following.

- MTCA Methods A, B, and/or C CULs for groundwater
- Acute and chronic marine water aquatic life criteria
- Acute and chronic freshwater aquatic life criteria

The evaluation of acute and chronic marine and freshwater aquatic life criteria is needed for potential dewatering water disposal requirements and potential surface water quality conditions in the tidal channel proposed to be constructed on site for mitigation.

The laboratory did not complete cyanide analyses on the groundwater samples due to the laboratory preserving the samples in error prior to sending them to the cyanide analytical laboratory. Cyanide was not detected in any soil samples collected at the site. We have no reason to believe that cyanide is a COC at the IDD#1 site based on the 2018 soil results.

The groundwater chemical analytical results from the June 2018 sampling event are summarized below and in Tables 1, 5, and 7. The laboratory chemical analytical data report is included as Appendix C.

4.2.1.1 Results Relative to MTCA Criteria for Groundwater Quality

The following is a summary of the analytical results from the June 2018 (first quarter) of groundwater sampling at the site evaluated relative to MTCA criteria.

- Dissolved arsenic was detected in the groundwater samples collected from the monitoring wells at concentrations ranging from 3.2 µg/L (MW-1) to 58 µg/L (MW-3). The concentrations of arsenic in four of the groundwater samples (MW-2, MW-3, MW-4, and MW-6) were greater than MTCA Methods A, B, and C CULs for arsenic (18 µg/L, 58 µg/L, 34 µg/L, 34 µg/L, and 32 µg/L, respectively).
- Selenium was detected in the groundwater samples collected from the monitoring wells at concentrations ranging from <10 µg/L to 160 µg/L. The concentrations in two of the groundwater samples (MW-3 and MW-4) were greater then MTCA Method B CULs for selenium (160 µg/L and 110 µg/L, respectively).
- Isopropyltoluene was detected at 7.3 µg/L in samples collected at MW-3; however, no MTCA CULs have been established for this analyte. All other VOC samples were not detected in any of the groundwater samples collected.

The remaining dissolved metals analyzed (barium, cadmium, chromium, lead, mercury, and silver); dioxins/furans; PCBs; PAHs; and diesel-, heavy oil-, and gasoline-range petroleum hydrocarbons were either not detected or detected at concentrations less than the applicable MTCA CULs in all of the groundwater samples collected.

4.2.1.2 Results Relative to Acute and Chronic Marine and Freshwater Aquatic Life Criteria

The following is a summary of the analytical results from the June 2018 (first quarter) of groundwater sampling at the site evaluated relative to acute and chronic marine and freshwater aquatic life criteria.

- Dissolved arsenic concentrations were either not detected or detected at concentrations less than the applicable acute and chronic marine and freshwater aquatic life criteria in all of the monitoring wells sampled except MW-3. Dissolved arsenic concentrations in the sample collected from MW-3 (58 µg/L) is less than the applicable acute and chronic freshwater aquatic life criteria and the acute marine aquatic life criteria (360, 190, and 69 µg/L, respectively) but greater than the applicable chronic marine aquatic life criteria (36 µg/L).
- Dissolved chromium concentrations were either not detected or detected at concentrations less than the applicable acute and chronic marine and freshwater aquatic life criteria in all of the monitoring wells sampled except MW-2. Dissolved chromium concentrations in the sample collected from MW-2 (31 µg/L) is less than the applicable acute and chronic marine aquatic life criteria (1100 and 50 µg/L,

respectively) but greater than the applicable acute and chronic freshwater aquatic life criteria (15 and 10 µg/L, respectively).

Speciation of the total chromium results from MW-2 were requested from the laboratory to evaluate the relative presence of hexavalent chromium or chromium III. However, due to the sample preservation error, the lab could not accurately complete the speciation on that sample. However, we have no reason to believe that chromium is a COC at the IDD#1 site due the lack of chromium exceedances in the other groundwater samples collected and the lack of chromium exceedances in soil samples collected at the site (as noted in Section 5.0)

- Dissolved selenium concentrations were either not detected or detected at concentrations less than the applicable acute and chronic marine and freshwater aquatic life criteria in all of the monitoring wells sampled except MW-3 and MW-4. Dissolved selenium concentrations in the samples collected from MW-3 (160 µg/L) and MW-4 (110 µg/L) are less than the applicable acute marine aquatic life criteria (290 µg/L) but greater than the applicable acute and chronic freshwater aquatic, and chronic marine life criteria (20 µg/L, 5 µg/L, and 71 µg/L, respectively).

Acute and chronic marine and freshwater aquatic life criteria have not been established for dioxins/furans or isopropyltoluene (the only VOC detected in any of the samples).

The remaining dissolved metals analyzed (barium, cadmium, lead, mercury, and silver); dioxins/furans; PCBs; PAHs; and diesel-, heavy oil-, and gasoline-range petroleum hydrocarbons were either not detected or detected at concentrations less than the acute and chronic marine and freshwater aquatic life criteria (where established).

5.0 RESULTS – SOILS

Soil samples were collected from 25 test pits (TP1 through TP25) and the 5 new monitoring well borings (MW-1 through MW-4 and MW-6) and submitted to the chemical analytical laboratory (ESN Northwest) for analysis of RCRA 8 metals, VOCs, PAHs, PCBs, NWTPHDx/Gx, dioxins/furans, and cyanide. The soil chemical analytical results from the June 2018 sampling event are summarized below and in Tables 2, 3, 4, and 6.

5.1.1.1 Results Relative to MTCA Criteria for Soils

The following is a summary of the analytical results from soil samples collected from monitoring well borings and test pits completed at the site evaluated relative to MTCA criteria.

- cPAHs were either not detected or detected at concentrations less than the applicable MTCA CULs in all of the samples collected, except for TP16-1@5.5', in which the total toxic equivalency quotient (TEQ) MTCA Method A CUL of 0.1 mg/kg was exceeded. The TEQ concentration detected in sample TP16-1@5.5' was 0.1734 mg/kg.
- Total TEQ of dioxins/furans was detected in the soil samples collected from the test pits at concentrations ranging from 0.0267 ng/kg (TP21-1@4.5') to 39 ng/kg

(TP9-1@6.5'). The concentrations of total TEQ in three of the 39 soil samples (MW-1@6', MW-4@5', and TP9-1@6.5') were greater than MTCA Methods B CULs for total TEQ (12.8 ng/kg). Total TEQ of dioxins/furans was detected in those samples (MW-1@6', MW-4@5', and TP9-1@6.5') at concentrations of 13.8, 13.4, and 39.6 ng/kg, respectively.

Gasoline-, heavy oil- and diesel-range petroleum hydrocarbons; arsenic; chromium; barium; cadmium; lead; mercury; selenium; silver; VOCs; PCBs; and cyanide were either not detected or detected at concentrations less than the applicable MTCA CULs in all of the samples collected.

6.0 POTENTIAL SOURCES OF CONTAMINANTS IN SOIL AND GROUNDWATER

6.1 Metals in Groundwater

Potential sources of the arsenic and selenium detected in groundwater at the site could include non-point off-site sources, such as the use of agricultural fertilizers and pesticides that migrated through rainwater and groundwater from upgradient of the site. The soil sampling results did not indicate the presence of an on-site source for arsenic and selenium as there were no metals exceedances of applicable criteria in any of the soil samples collected at the site.

6.2 COCs in Soil

Historical facilities that operated or were present on the north and northeast portion of the site include a former wood mill, electric plant, and shantytown. The cPAHs exceedance in one soil sample (TP-16) may be the result of treated wood debris and/or historic fires (e.g., associated with the shantytown cooking, heating or waste burning fires, and/or hog fuel burning associated with the mill). Similarly, dioxins/furans in soil could result from historical burning of wood or wood waste either associated with the mill operations or the shantytown.

The COC exceedances in the soil samples at the site are likely the result of the incorporation of wood waste and/or demolition debris from the former shantytown into the backfill on portions of the site.

7.0 RECOMMENDATIONS

We recommend that the investigation results be reported to the Washington State Department of Ecology (Ecology) in order to begin coordination with Ecology with regards to potential remediation of contamination encountered at the site in conjunction with the construction of the mitigation. Potential cleanup requirements may include

- Focused of removal of contaminated soil
- Potential placement of impermeable material to "cap" remaining contaminated soil, if any.
- Quarterly groundwater monitoring

8.0 LIMITATIONS

This report has been prepared for BHP for their use in evaluating and documenting the groundwater conditions at the proposed Grays Harbor Potash Export Facility. Environmental conditions may vary between the locations sampled or with time. The conditions described in this evaluation represent the areas sampled at the time of the investigation.

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

9.0 REFERENCES

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Proposed Grays Harbor Potash Export Facility, IDD#1 Site
Hoquiam, Washington

Tables

TABLE A. SUMMARY OF GROUNDWATER ELEVATIONS

PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY

HOQUIAM, WASHINGTON

Monitoring Well[1] and TOC Elevation	Date Monitored	Time Sampled	Tide Stage (ft MLLW)	Depth of Water from TOC (feet)	Groundwater Elevation (feet)
MW-1 - 15.61 ft	06/14/18	10:36 AM	1.23	9.21	6.4
MW-2 - 15.39 ft	06/14/18	10:45 AM	2.50	5.12	10.27
MW-3 - 15.22 ft	06/14/18	9:51 AM	-0.60	9.34	5.88
MW-4 - 14.82 ft	06/14/18	10:16 AM	0.60	8.1	6.72
MW-6 - 14.60 ft	06/14/18	10:25 AM	1.23	9.87	4.73

Notes:

[1]Sampled by BergerABAM, see Figure 2 for well locations.

TOC = top of casing

Tide stage obtained from NOAA Tide predictions for station 9441187:
https://tidesandcurrents.noaa.gov/noaatidepredictions.html?id=9441187&units=standard&bdate=20180328&edate=20180328&timezone=LST/LDT&clock=12hour&datum=MLLW&interval=hilo&action=dailychart

TABLE 1. METALS IN GROUNDWATER[1]

PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY

HOQUIAM, WASHINGTON

Sample Identification	Date	Metals (µg/L)							
		Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
MW-1	6/13/2018	**3.2**	<20	<2.0	<10	<2.0	<1.0	<10	<10
MW-2	6/13/2018	**18**	<20	<2.0	**31**	<2.0	<1.0	<10	<10
MW-3	6/14/2018	**58**	**30**	<2.0	<10	<2.0	<1.0	**160**	<10
MW-4	6/13/2018	**34**	**74**	<2.0	<10	<2.0	<1.0	**110**	<10
MW-6	6/13/2018	**34**	**99**	<2.0	<10	<2.0	<1.0	<10	<10
MTCA Method A Cleanup Level[2]		5	NE	5	50	15	2	NE	NE
MTCA Method B Cleanup Level[2]		4.8	3,200	8	NE[3]	NE	NE	80	80
MTCA Method C (Industrial) Cleanup Level[3]		10.5	7,000	17.5	50*	15*	2*	175	175
Marine Water Aquatic Life Criteria - Acute[4]		69	NE	42	1,100	210	1.8	290	1.9
Marine Water Aquatic Life Criteria - Chronic[4]		36	NE	9.3	50	8.1	0.025	71	NE
Freshwater Aquatic Life Criteria - Acute[4]		360	NE	(l,c, dd)	15	(q, c, dd)	2.1	20	(y, a, dd)
Freshwater Aquatic Life Criteria - Chronic[4]		190	NE	(j, d, dd)	10	(r, d, dd)	0.012	5	NE

Notes:

[1]Chemical Analysis was performed by Environmental Services Network Northwest; The laboratory report is included as Appendix C.

[2] = samples were lab filtered

[3]Washington State Department of Ecology Model Toxics Control Act (MTCA) Cleanup Levels. Non cancer values are used unless otherwise noted. https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx

[4]Washington State Department of Ecology Toxics Substances Criteria. https://fortress.wa.gov/ecy/publications/SummaryPages/0610091.html

* MTCA Method A clean up level for unrestricted site use is listed because the MTCA Method C industrial clean up level is not established.

µg/l = microgram per liter

Bold indicates the analyte was detected at a concentration greater than the laboratory method reporting limits

NE = Not established

<2 = The The analyte was not detected. The associated numerical value is the sample quantitation limit.

-- = not analyzed

Highlight indicates the detected concentration is greater than the applicable MTCA cleanup level.

Footnotes**:

a An instantaneous concentration not to be exceeded at any time.

c A 1-hour average concentration not to be exceeded more than once every three years on the average.

d A 4-day average concentration not to be exceeded more than once every three years on the average.

l ≤ (0.944)(e(1.128[ln(hardness)]-3.828)) at hardness = 100. Conversion factor (CF) of 0.944 is hardness dependent. CF is calculated for other hardnesses as follows: CF = 1.136672 - [(ln hardness)(0.041838)].

j ≤ (0.909)(e(0.7852[ln(hardness)]-3.490)) at hardness = 100. Conversions factor (CF) of 0.909 is hardness dependent. CF is calculated for other hardnesses as follows: CF = 1.101672 - [(ln hardness)(0.041838)].

q ≤ (0.791)(e(1.273[ln(hardness)] - 1.460)) at hardness = 100. Conversion factor (CF) of 0.791 is hardness dependent. CF is calculated for other hardnesses as follows: CF = 1.46203 - [(ln hardness)(0.145712)].

r ≤ (0.791)(e(1.273[ln(hardness)] - 4.705)) at hardness = 100. Conversion factor (CF) of 0.791 is hardness dependent. CF is calculated for other hardnesses as follows: CF = 1.46203 - [(ln hardness)(0.145712)].

y ≤ (0.85)(e(1.72[ln(hardness)] - 6.52))

limits unless the seasonal partitioning of the dissolved to total metals in the ambient water are known. When this information is absent, these metals criteria shall be applied as total recoverable values, determined by

** Footnotes extracted from Table 240 of Washington State Department of Ecology Toxics Substances Criteria. https://fortress.wa.gov/ecy/publications/SummaryPages/0610091.html

TABLE 2. METALS AND CYANIDE IN SOIL[1]

PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY

HOQUIAM, WASHINGTON

Sample Identification	Depth (feet below the ground surface)	Sample Date	Total Metals (mg/kg)								
			Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver	Cyanide
MW-1@6'	6	6/11/2018	<5.0	<50	<1.0	**56**	<5.0	<0.5	<20	<20	<0.1
MW-2@6'	6	6/11/2018	<5.0	<50	<1.0	**18**	<5.0	<0.5	<20	<20	<0.1
MW-3@5'	5	6/11/2018	<5.0	<50	<1.0	**50.5**	**6.5**	<0.5	<20	<20	<0.1
MW-3@10'	10	6/11/2018	<5.0	<50	<1.0	**67.2**	**92**	<0.5	<20	<20	No Sample
MW-4@5'	5	6/11/2018	<5.0	**190**	<1.0	**53.8**	**76**	<0.5	<20	<20	0.12
MW-6@6'	6	6/11/2018	<5.0	<50	<1.0	**43.2**	<5.0	<0.5	<20	<20	<0.1
TP1-1@4'	4	6/11/2018	**14**	**92**	<1.0	**37**	**23**	<0.5	<20	<20	0.12
TP1-2@9'	9	6/13/2018	**9.2**	**99**	<1.0	**37.8**	**19**	<0.5	<20	<20	<0.1
TP2-1@12'	12	6/13/2018	**6.3**	**51**	<1.0	**48.4**	**9.4**	<0.5	<20	<20	<0.1
TP3-1@6'	6	6/13/2018	**6.8**	<50	<1.0	**55.1**	**5.0**	<0.5	<20	<20	<0.1
TP4-1@5'	5	6/11/2018	<5.0	**99**	<1.0	**39.6**	**5.7**	<0.5	<20	<20	<0.1
TP4-2@12'	12	6/11/2018	<5.0	<50	<1.0	**15**	<5.0	<0.5	<20	<20	<0.1
TP5-1@10'	10	6/13/2018	**7.7**	**54**	<1.0	**54.8**	**13**	<0.5	<20	<20	<0.1
TP6-1@12'	12	6/13/2018	**6.8**	<50	<1.0	**53.8**	**6.7**	<0.5	<20	<20	<0.1
TP7-1@6'	6	6/13/2018	<5.0	**50**	<1.0	**62.7**	**16**	<0.5	<20	<20	<0.1
TP7-2@10'	10	6/13/2018	**5.3**	<50	<1.0	**43.8**	**22**	<0.5	<20	<20	<0.1
TP8-1@7'	7	6/12/2018	**6.3**	**62**	<1.0	**55.8**	**9.6**	<0.5	<20	<20	<0.1
TP8-2@8'	8	6/12/2018	**5.9**	<50	<1.0	**42.6**	<5.0	<0.5	<20	<20	<0.1
TP8-3@11'	11	6/12/2018	**7.6**	<50	<1.0	**42**	**6.1**	<0.5	<20	<20	<0.1
TP9-1@6.5'	6.5	6/12/2018	<5.0	**160**	<1.0	**63.1**	**64**	<0.5	<20	<20	<0.1
TP10-1@12'	12	6/11/2018	**9.1**	**79**	<1.0	**43.2**	**13**	<0.5	<20	<20	<0.1
TP10-2@4'	4	6/11/2018	<5.0	<50	<1.0	**13**	<5.0	<0.5	<20	<20	<0.1
TP11-1@9'	9	6/13/2018	**8.3**	**55**	<1.0	**53.6**	**9.7**	<0.5	<20	<20	<0.1
TP12-1@12'	12	6/13/2018	**7.1**	<50	<1.0	**44.2**	**5.4**	<0.05	<20	<20	<0.1
TP13-1@12'	12	6/12/2018	**7.2**	<50	<1.0	**44.2**	**6**	<0.5	<20	<20	<0.1
TP14-1@6.5'	6.5	6/11/2018	<5.0	<50	<1.0	**7.1**	<5.0	<0.5	<20	<20	<0.1
TP15-1@5'	5	6/11/2018	**8.5**	**66**	<1.0	**66.6**	**11**	<0.5	<20	<20	<0.1
TP-16-1@5.5'	5.5	6/12/2018	**6.5**	<50	<1.0	**47.7**	**5.8**	<0.5	<20	<20	<0.1
TP17-1@4'	4	6/13/2018	**6.7**	<50	<1.0	**51**	**6.1**	<0.5	<20	<20	<0.1
TP17-2@8'	8	6/13/2018	**6.9**	<50	<1.0	**57.1**	**7.3**	<0.5	<20	<20	<0.1
TP18-1@12'	12	6/11/2018	**6.3**	<50	<1.0	**42.4**	**5.5**	<0.5	<20	<20	<0.1
TP19-1@5'	5	6/12/2018	**10**	**52**	<1.0	**15.7**	**26**	<0.5	<20	<20	<0.1
TP20-1@6'	6	6/11/2018	<5.0	<50	<1.0	**5.5**	<5.0	<0.5	<20	<20	<0.1
TP21-1@4.5'	4.5	6/11/2018	<5.0	<50	<1.0	**78.4**	<5.0	<0.5	<20	<20	<0.1
TP22-1@6'	6	6/12/2018	<5.0	<50	<1.0	**72.6**	<5.0	<0.5	<20	<20	<0.1
TP23-1@6'	6	6/12/2018	<5.0	<50	<1.0	**77.8**	<5.0	<0.5	<20	<20	<0.1
TP24-1@5.5'	5.5	6/12/2018	**8.5**	**50**	<1.0	**48.2**	**9.6**	<0.5	<20	<20	<0.1
TP24-2@10'	10	6/12/2018	**6.2**	<50	<1.0	**51.4**	**22**	<0.5	<20	<20	<0.1
TP25-1@5.5'	5.5	6/12/2018	<5.0	<50	<1.0	**47.8**	**5**	<0.5	<20	<20	<0.1
MTCA Method A UnrestrictedSoil Cleanup Level[2]			20	NE	2	2,000	250	2	NE	NE	NE
MTCA Method B Soil Cleanup Level[2]			24	16000	80	120,000	NE	NE	400	400	48
MTCA Method A Industrial Soil Cleanup Level[2]			20	700,000*	2	5,250,000*	1000	2	17,500*	17,500*	2,100*

Notes:

[1]Chemical Analysis was performed by Environmental Services Network Northwest; The laboratory report is included as Appendix C.

[2]Washington State Department of Ecology Model Toxics Control Act (MTCA) Cleanup Levels. Non cancer values are used unless otherwise noted. https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx

[3] Analyzed for chromium VI which was not detected; Therefore the reported value represents total chromium as chromium III

[4] There is no industrial MTCA Method A or Method C clean up level for total chromium. The MTCA Method A clean up level for unrestricted use (19 mg/kg) is specific to chromium VI. The MTCA Method C clean up level for iunrestricted use (2,000 mg/kg) is specific to chromium III.

* The MTCA Method C industrial clean up level is listed because the MTCA Method A industrial clean up level is not established.

Bold indicates the analyte was detected at a concentration greater than the laboratory method reporting limits

ND = The analyte was not detected

NE = Not established

<5 = The analyte was not detected. The associated numerical value is the sample quantitation limit.

mg/kg = milligram per kilogram

TABLE 3. POLYCYCLIC AROMATIC HYDROCARBONS IN SOIL[1]

PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY

HOQUIAM, WASHINGTON

Sample Identification	MW-1@6'	MW-2@6'	MW-3@5'	MW-3@10'	MW-4@5'	MW-5@10'	MW-6@6'	TP1-1@4'	TP1-2@9'	TP2-1@12'	TP3-1@6'	TP4-1@5'	TP4-2@12'	TP5-1@10'	TP6-1@12'	TP7-1@6'
Sample Depth (feet below the ground surface)	6	6	5	10	5	10	6	4	9	12	6	5	12	10	12	6
PAHs (mg/kg)																
Acenaphthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Anthracene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo (ghi) perylene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzofuran																
Fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluorene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Naphthalene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phenanthrene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Pyrene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
cPAHs (mg/kg)																
Benzo (a) anthracene (TEF 0.1)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo (a) pyrene (TEF 1.0)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo (b+k) fluoranthene (TEF 0.1)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chrysene (TEF 0.01)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenz (a,h) anthracene (TEF 0.1)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Indeno (1,2,3-cd) pyrene (TEF 0.1)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Total TEQ of cPAHs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

[1]Chemical Analysis was performed by Environmental Services Network Northwest; The laboratory report is included as Appendix C.

[2]Washington State Department of Ecology Model Toxics Control Act (MTCA) Cleanup Levels. https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx

PAHs = polycyclic aromatic hydrocarbons

cPAHs = carcinogenic polycyclic aromatic hydrocarbons.

NE = not established

TEF = toxic equivalency factor

Toxic Equivalency Quotient or TEQ = the sum of the TEF-modified cPAH constituents concentrations

Bold indicates the analyte was detected at a concentration greater than the laboratory method reporting limits.

<0.02 = The analyte was not detected. The associated numerical value is the sample quantitation limit.

mg/kg = milligram per kilogram

TABLE 3. POLYCYCLIC AROMATIC HYDROCARBONS IN SOIL[1]

PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY

HOQUIAM, WASHINGTON

TP7-2@10'	TP8-1@7'	TP8-2@8'	TP8-3@11'	TP9-1@6.5'	TP10-1@12'	TP10-2@4'	TP11-1@9'	TP12-1@12'	TP13-1@12'	TP14-1@6.5'	TP15-1@5'	TP-16-1@5.5'	TP17-1@4'	TP17-2@8'	TP18-1@12'	TP19-1@5'	TP20-1@6'
10	7	8	11	6.5	12	4	9	12	12	6.5	5	5.5	4	8	12	5	6
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.78**	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**1.42**	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.62**	<0.02	<0.02	<0.02	<0.02	<0.02
0.14	<0.02	<0.02	<0.02	**0.14**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**3.21**	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.68**	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.16**	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.15**	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**4.01**	<0.02	<0.02	<0.02	<0.02	<0.02
0.16	<0.02	<0.02	<0.02	**0.16**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**3.22**	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.72**	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**2.14**	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.5**	<0.02	<0.02	<0.02	<0.02	<0.02
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.1734**	ND	ND	ND	ND	ND

TABLE 3. POLYCYCLIC AROMATIC HYDROCARBONS IN SOIL[1]

PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY

HOQUIAM, WASHINGTON

TP21-1@4.5'	TP22-1@6'	TP23-1@6'	TP24-1@5.5'	TP24-2@10'	TP25-1@5.5'	**MTCA Method A Unrestricted Soil Cleanup Level[2]**	**MTCA Method B Soil Cleanup Level[2]**	**MTCA Method C Soil Cleanup Level[2]**
4.5	6	6	5.5	10	5.5			
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE	4,800	210,000
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE	NE	NE
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE	24,000	1,050,000
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE	NE	NE
						NE	80	3,500
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE	3,200	140,000
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE	3,200	140,000
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE	5,600	245,000
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE	320	14,000
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	5	1,600	70,000
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE	NE	NE
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE	2,400	105,000
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			**MTCA Method A cPAH cleanup level for the TEQ sum**
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			
<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			
ND	ND	ND	ND	ND	ND	0.1		

TABLE 4. SELECT VOLATILE ORGANIC COMPOUNDS IN SOIL[1,2]

PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY

HOQUIAM, WASHINGTON

Sample Identification	Depth (feet below the ground surface)	Date	VOCs (mg/kg)	
			Toluene	Isopropyltoluene
MW-1@6'	6	6/11/2018	<0.05	<0.05
MW-2@6'	6	6/11/2018	<0.05	<0.05
MW-3@5'	5	6/11/2018	<0.05	<0.05
MW-3@10'	10	6/11/2018	<0.05	<0.05
MW-4@5'	5	6/11/2018	<0.05	<0.05
MW-6@6'	6	6/11/2018	<0.05	<0.05
TP1-1@4'	4	6/11/2018	<0.05	<0.05
TP1-2@9'	9	6/13/2018	<0.05	<0.05
TP2-1@12'	12	6/13/2018	<0.05	<0.05
TP3-1@6'	6	6/13/2018	<0.05	<0.05
TP4-1@5'	5	6/11/2018	**0.07**	<0.05
TP4-2@12'	12	6/11/2018	<0.05	<0.05
TP5-1@10'	10	6/13/2018	<0.05	<0.05
TP6-1@12'	12	6/13/2018	<0.05	<0.05
TP7-1@6'	6	6/13/2018	<0.05	<0.05
TP7-2@10'	10	6/13/2018	<0.05	<0.05
TP8-1@7'	7	6/12/2018	<0.05	**0.06**
TP8-2@8'	8	6/12/2018	<0.05	<0.05
TP8-3@11'	11	6/12/2018	<0.05	<0.05
TP9-1@6.5'	6.5	6/12/2018	<0.05	<0.05
TP10-1@12'	12	6/11/2018	<0.05	<0.05
TP10-2@4'	4	6/11/2018	<0.05	<0.05
TP11-1@9'	9	6/13/2018	<0.05	<0.05
TP12-1@12'	12	6/13/2018	<0.05	<0.05
TP13-1@12'	12	6/12/2018	<0.05	<0.05
TP14-1@6.5'	6.5	6/11/2018	<0.05	<0.05
TP15-1@5'	5	6/11/2018	<0.05	<0.05
TP-16-1@5.5'	5.5	6/12/2018	<0.05	<0.05
TP17-1@4'	4	6/13/2018	<0.05	<0.05
TP17-2@8'	8	6/13/2018	<0.05	<0.05
TP18-1@12'	12	6/11/2018	<0.05	<0.05
TP19-1@5'	5	6/12/2018	<0.05	<0.05
TP20-1@6'	6	6/11/2018	<0.05	<0.05
TP21-1@4.5'	4.5	6/11/2018	<0.05	<0.05
TP22-1@6'	6	6/12/2018	<0.05	<0.05
TP23-1@6'	6	6/12/2018	<0.05	<0.05
TP24-1@5.5'	5.5	6/12/2018	<0.05	<0.05
TP24-2@10'	10	6/12/2018	<0.05	<0.05
TP25-1@5.5'	5.5	6/12/2018	<0.05	<0.05
MTCA Method A Unrestricted Soil Cleanup Level[3]			**7**	NE
MTCA Method B Soil Cleanup Level[3]			**6,400**	NE
MTCA Method C Soil Cleanup Level[3]			**280,000**	NE

Notes:

[1]Chemical analysis was performed by Environmental Services Network Northwest; The laboratory report is included as Appendix C.

[2]Volatile organic compounds (VOCs) were analyzed by EPA Method 5035/8260B. The full list of VOCs were analyzed but only the detected VOCs are listed.

[3]Washington State Department of Ecology Model Toxics Control Act (MTCA) Cleanup Levels. https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx

NE = not established

mg/kg = milligrams per kilogram

Bold indicates the analyte was detected at a concentration greater than the laboratory method reporting limits.

<0.05 = The analyte was not detected. The associated numerical value is the sample quantitation limit.

TABLE 5. SELECT VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER[1,2]

PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY

HOQUIAM, WASHINGTON

Sample Identification	Date	VOCs (ug/L)
		Isopropyltoluene
MW-1	6/11/2018	<1.0
MW-2	6/11/2018	<1.0
MW-3	6/11/2018	**7.3**
MW-4	6/11/2018	<1.0
MW-6	6/11/2018	<1.0
MTCA Method A Groundwater Cleanup Level[3]		NE
MTCA Method B Groundwater Cleanup Level[3]		NE
MTCA Method C Groundwater Cleanup Level[3]		NE

[1]Chemical analysis was performed by Environmental Services Network Northwest; The laboratory report is included as Appendix C.

[2]Volatile organic compounds (VOCs) were analyzed by EPA Method 5035/8260B. The full list of VOCs were analyzed but only the detected VOCs are listed.

[3]Washington State Department of Ecology Model Toxics Control Act (MTCA) Cleanup Levels. https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx

NE = not established

ug/L = micrograms per liter

Bold indicates the analyte was detected at a concentration greater than the laboratory method reporting limits.

<1.0 = The analyte was not detected. The associated numerical value is the sample quantitation limit.

TABLE 6. SELECT DIOXINS/FURANS IN SOIL[1]

PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY

HOQUIAM, WASHINGTON

Sample Identification	Depth (feet below the ground surface)	Date	DIOXINS/FURANS (ng/kg)	
			2,3,7,8-TCDD	Total TEQ of dioxins/furans[3]
MW-1@6'	6	6/11/2018	<0.462	**13.8**
MW-2@6'	6	6/11/2018	<0.463	**0.539**
MW-3@5'	5	6/11/2018	**2.95**	**9.57**
MW-3@10'	10	6/11/2018	No Sample	No Sample
MW-4@5'	5	6/11/2018	**3.22**	**13.4**
MW-6@6'	6	6/11/2018	**1.46**	**4.5**
TP1-1@4'	4	6/11/2018	**2.77**	**10.2**
TP1-2@9'	9	6/13/2018	**1.69**	**6.46**
TP2-1@12'	12	6/13/2018	**1.92**	**4.91**
TP3-1@6'	6	6/13/2018	**1.39**	**2.85**
TP4-1@5'	5	6/11/2018	**0.597**	**2.39**
TP4-2@12'	12	6/11/2018	**1.67**	**6.34**
TP5-1@10'	10	6/13/2018	**3.17**	**10.3**
TP6-1@12'	12	6/13/2018	**1.23**	**2.71**
TP7-1@6'	6	6/13/2018	**2.28**	**8.98**
TP7-2@10'	10	6/13/2018	<0.412	**7.35**
TP8-1@7'	7	6/12/2018	**2.76**	**5.26**
TP8-2@8'	8	6/12/2018	**1.8**	**4.76**
TP8-3@11'	11	6/12/2018	**1.71**	**4.08**
TP9-1@6.5'	6.5	6/12/2018	**5.45**	**39.6**
TP10-1@12'	12	6/11/2018	**1.18**	**4.28**
TP10-2@4'	4	6/11/2018	<0.394	**0.15**
TP11-1@9'	9	6/13/2018	**3.74**	**10**
TP12-1@12'	12	6/13/2018	**3.28**	**3.99**
TP13-1@12'	12	6/12/2018	**1.58**	**3.1**
TP14-1@6.5'	6.5	6/11/2018	<0.300	**0.219**
TP15-1@5'	5	6/11/2018	<0.425	**0.178**
TP-16-1@5.5'	5.5	6/12/2018	<0.417	**3.55**
TP17-1@4'	4	6/13/2018	**1.44**	**4.89**
TP17-2@8'	8	6/13/2018	**3.47**	**7.87**
TP18-1@12'	12	6/11/2018	**1.75**	**3.85**
TP19-1@5'	5	6/12/2018	**2.44**	**8.38**
TP20-1@6'	6	6/11/2018	<0.438	**0.307**
TP21-1@4.5'	4.5	6/11/2018	<0.374	**0.0267**
TP22-1@6'	6	6/12/2018	<0.340	**0.0564**
TP23-1@6'	6	6/12/2018	<0.367	**0.336**
TP24-1@5.5'	5.5	6/12/2018	**3.05**	**8.44**
TP24-2@10'	10	6/12/2018	**2.1**	**4.95**
TP25-1@5.5'	5.5	6/12/2018	<0.473	**0.68**
MTCA Method A Soil Cleanup Level[2]			NE	NE
MTCA Method B Soil Cleanup Level[2]			12.8	12.8
MTCA Method C Soil Cleanup Level*			16.8	16.8

Notes:

[1]Chemical Analysis was performed by Environmental Services Network Northwest; The laboratory report is included as Appendix C.

[2]Washington State Department of Ecology Model Toxics Control Act (MTCA) Cleanup Levels. Cancer values are used unless otherwise noted. https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx

* The MTCA Method C industrial clean up level is listed because the MTCA Method A industrial clean up level is not established.

Bold indicates the analyte was detected at a concentration greater than the laboratory method reporting limits

ND = The analyte was not detected

NE = Not established

<.3 = The analyte was not detected. The associated numerical value is the sample quantitation limit.

ng/kg = nanogram per kilogram

TABLE 7. SELECT DIOXINS/FURANS IN GROUNDWATER[1]

PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY

HOQUIAM, WASHINGTON

Sample Identification	Date	DIOXINS/FURANS (pg/L)	
		2,3,7,8-TCDD	Total TEQ of dioxins/furans[3]
MW-1	6/11/2018	<6.13	0.0
MW-2	6/11/2018	<4.99	**0.186**
MW-3	6/11/2018	<7.83	0.0
MW-4	6/11/2018	<6.96	0.0
MW-5	6/11/2018	<5.05	0.0
MW-6	6/11/2018	<6.77	0.0
MTCA Method A Groundwater Cleanup Level[2]		NE	NE
MTCA Method B Groundwater Cleanup Level[2]		0.673	0.673
MTCA Method C Groundwater Cleanup Level*		6.73	6.73

[1]Chemical Analysis was performed by Environmental Services Network Northwest; The laboratory report is included as Appendix C.

[2]Washington State Department of Ecology Model Toxics Control Act (MTCA) Cleanup Levels. Cancer values are used unless otherwise noted. https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx

* The MTCA Method C clean up level is listed because the MTCA Method A industrial clean up level is not established.

pg/L = pictogram per liter

<5 = The analyte was not detected. The associated numerical value is the sample quantitation limit.

Figures

PURPOSE: Investigation of potential mitigation for construction of a bulk potash export/outbound logistics

IN: Hoquiam
COUNTY OF: Grays Harbor
STATE: WA
APPLICANT: BHP Billiton Canada Inc.

Figure 1: Vicinity Map

BHP BergerABAM

USACE Reference No:NWS-2017-715

PROJECT: Proposed Grays Harbor Potash Export Facility- IDD #1 Investigation
LATITUDE: 46° 58' 42"
LONGITUDE: -123° 54' 44"
DATUM: NAD_1983_StatePlane_Washington

July 2018

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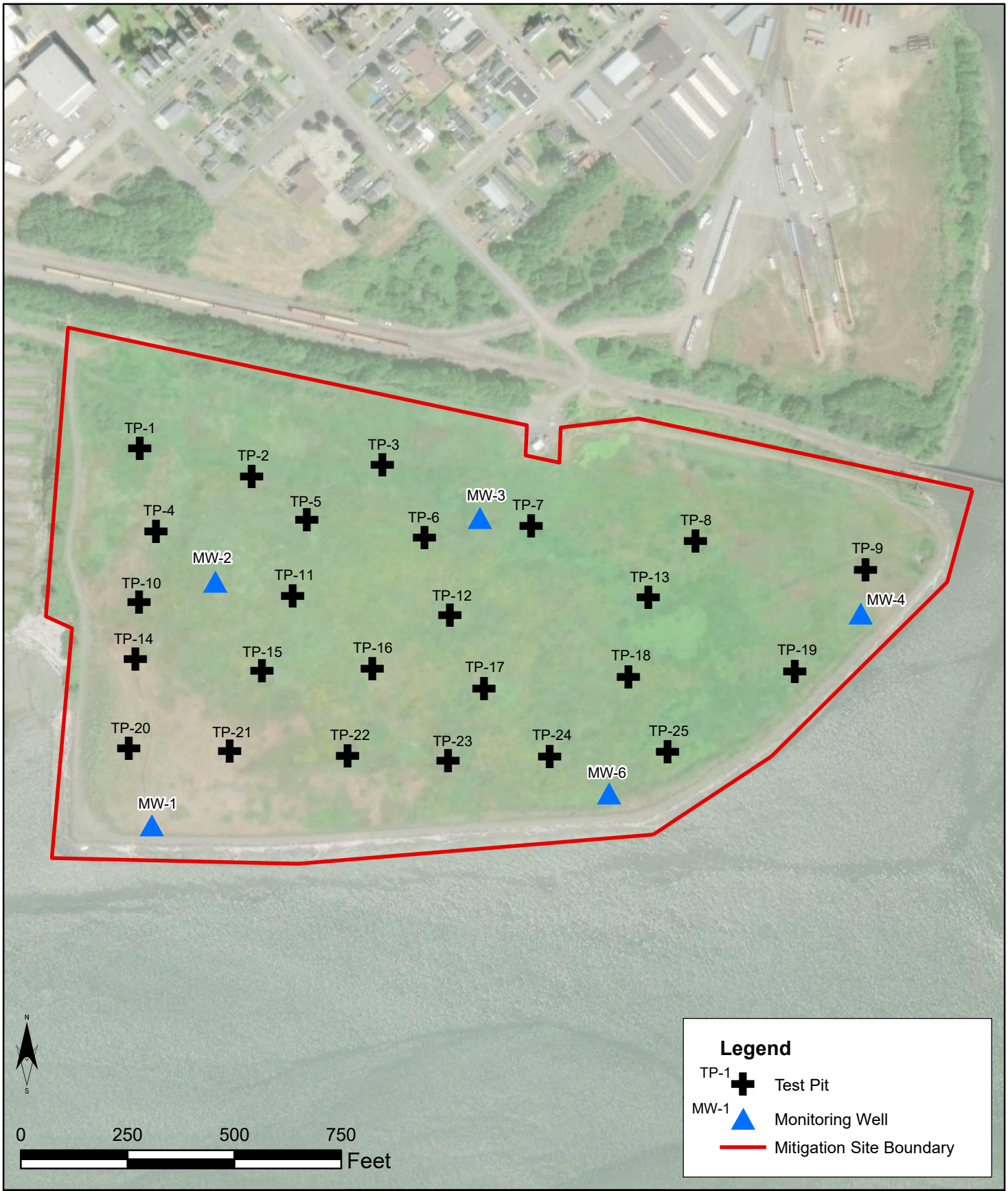

PURPOSE: Investigation of potential mitigation for construction of a bulk potash export/outbound logistics

IN: Hoquiam
COUNTY OF: Grays Harbor
STATE: WA
APPLICANT: BHP Billiton Canada Inc.

Figure 2: Site Plan - Test Pit and Monitoring Well Locations

BHP BergerABAM

USACE Reference No:NWS-2017-715

PROJECT: Proposed Grays Harbor Potash Export Facility- IDD #1 Investigation
LATITUDE: 46° 58' 16.81"
LONGITUDE: -123° 52' 54.61"
DATUM: NAD_1983_StatePlane_Washington

July 2018

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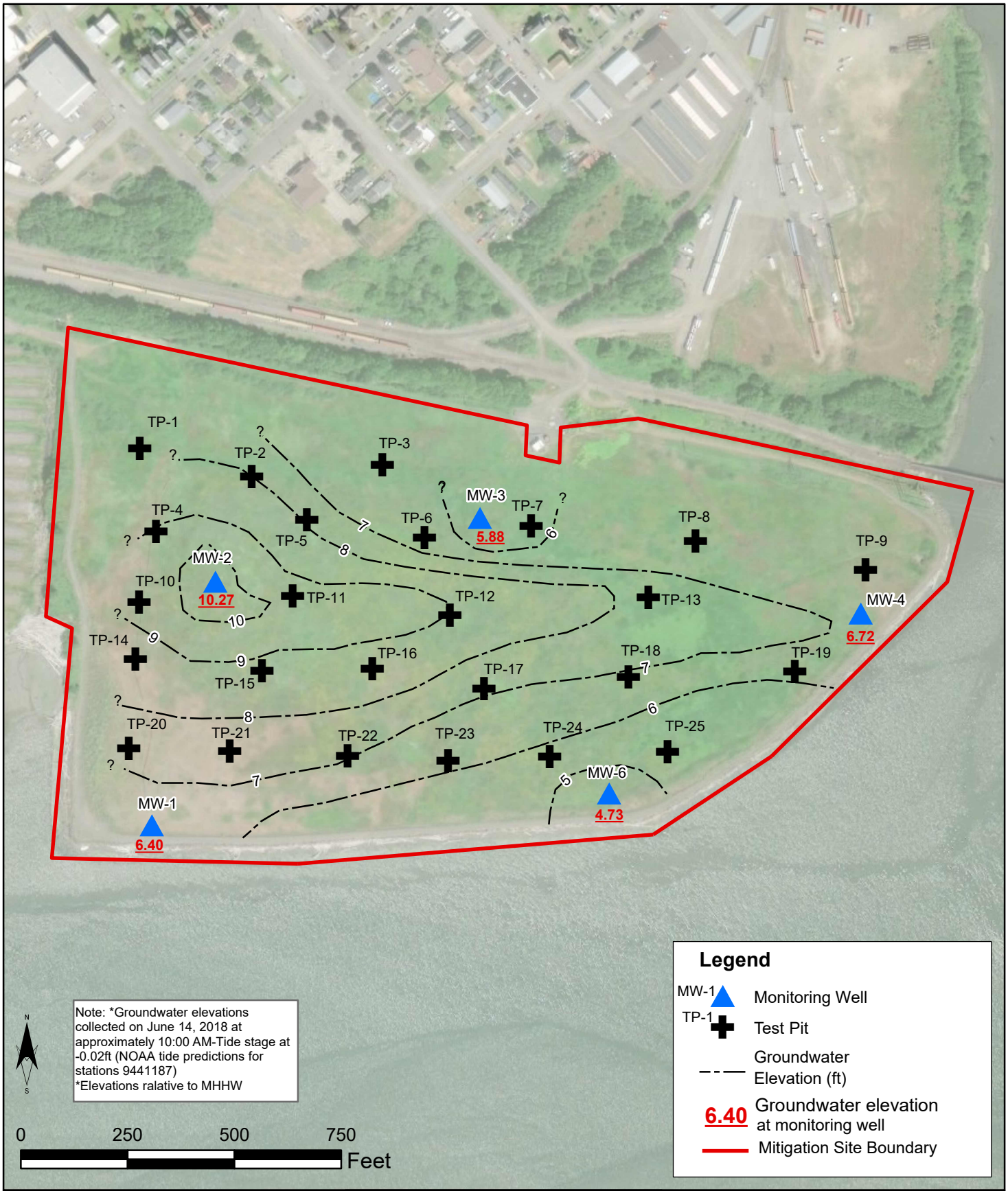

PURPOSE: Investigation of potential mitigation for construction of a bulk potash export/outbound logistics

IN: Hoquiam
COUNTY OF: Grays Harbor
STATE: WA
APPLICANT: BHP Billiton Canada Inc.

Figure 3: Groundwater Elevations & Estimated Groundwater Elevation Contours

BHP BergerABAM

USACE Reference No:NWS-2017-715

PROJECT: Proposed Grays Harbor Potash Export Facility- IDD #1 Investigation
LATITUDE: 46° 58' 16.81"
LONGITUDE: -123° 52' 54.61"
DATUM: NAD_1983_StatePlane_Washington

July 2018

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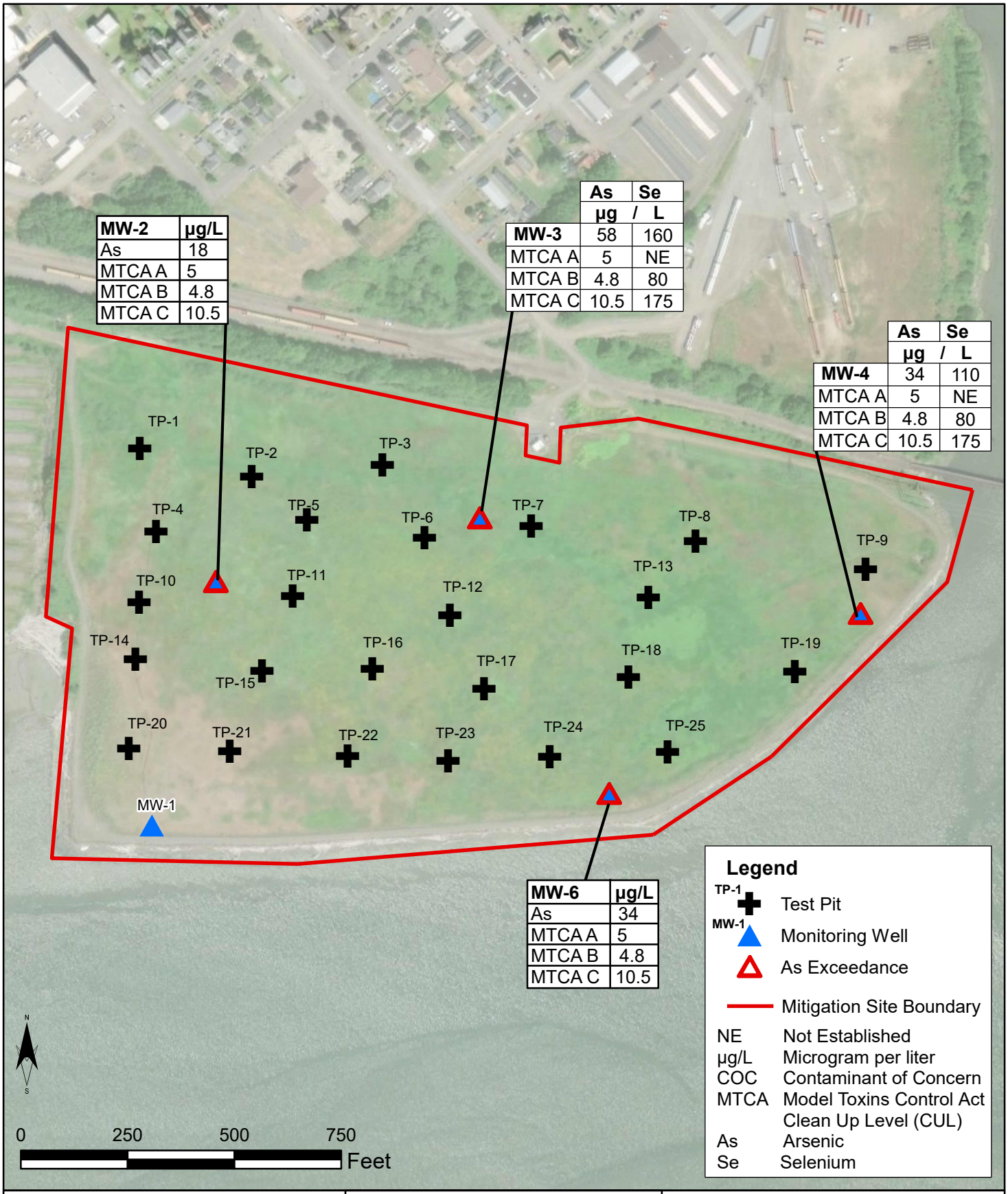


PURPOSE: Investigation of potential mitigation for construction of a bulk potash export/outbound logistics

IN: Hoquiam
COUNTY OF: Grays Harbor
STATE: WA
APPLICANT: BHP Billiton Canada Inc.

Figure 4: Groundwater COC Exceedances of MTCA CULS

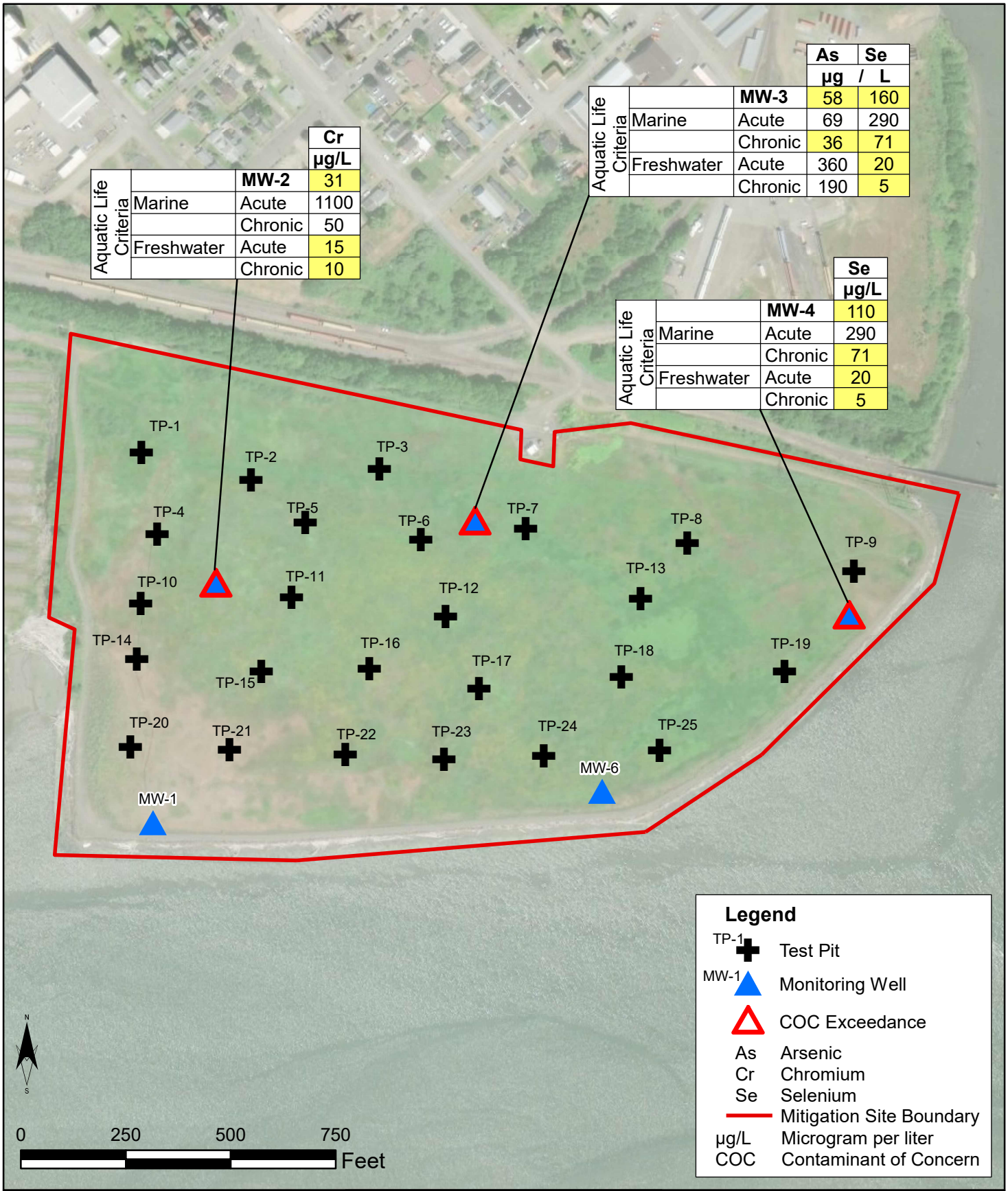
BHP BergerABAM

USACE Reference No:NWS-2017-715

PROJECT: Proposed Grays Harbor Potash Export Facility- IDD #1 Investigation
LATITUDE: 46° 58' 16.81"
LONGITUDE: -123° 52' 54.61"
DATUM: NAD_1983_StatePlane_Washington

July 2018

Path: Q:\Vancouver\2017\A17.0202\00\GIS\02_MXD\Mitigation\Groudwater\Groundwater Sampling\IDD Site\Fig4_IDD_GroundwaterCOCExceedances.mxd



PURPOSE: Investigation of potential mitigation for construction of a bulk potash export/outbound logistics

IN: Hoquiam
COUNTY OF: Grays Harbor
STATE: WA
APPLICANT: BHP Billiton Canada Inc.

Figure 5: COC Exceedances of Marine and/or Freshwater Aquatic Life Criteria

BHP BergerABAM

USACE Reference No:NWS-2017-715

PROJECT: Proposed Grays Harbor Potash Export Facility- IDD #1 Investigation
LATITUDE: 46° 58' 16.81"
LONGITUDE: -123° 52' 54.61"
DATUM: NAD_1983_StatePlane_Washington

July 2018

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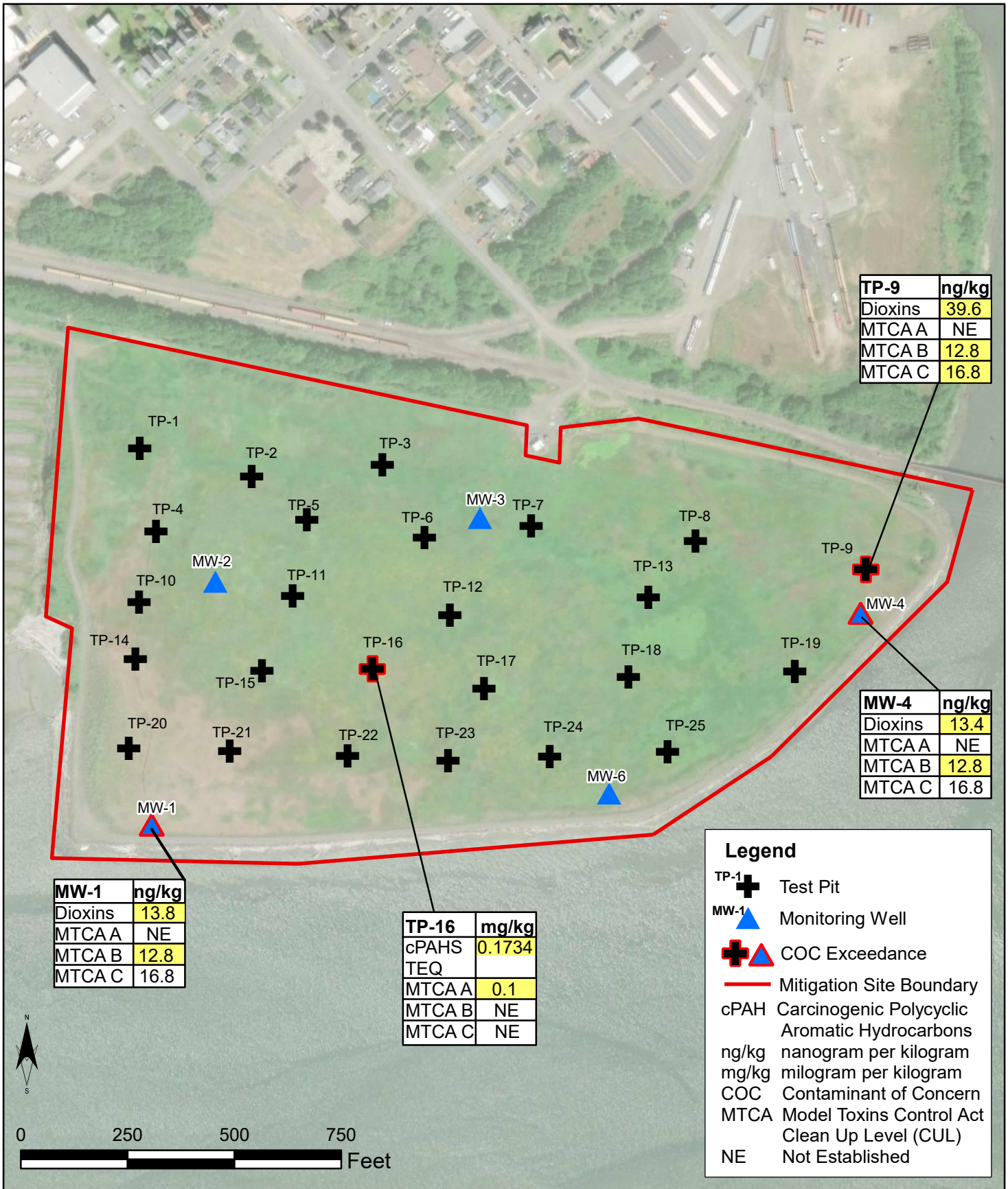

TP-9	ng/kg
Dioxins	39.6
MTCA A	NE
MTCA B	12.8
MTCA C	16.8

MW-4	ng/kg
Dioxins	13.4
MTCA A	NE
MTCA B	12.8
MTCA C	16.8

MW-1	ng/kg
Dioxins	13.8
MTCA A	NE
MTCA B	12.8
MTCA C	16.8

TP-16	mg/kg
cPAHS TEQ	0.1734
MTCA A	0.1
MTCA B	NE
MTCA C	NE

Legend

TP-1 Test Pit

MW-1 Monitoring Well

COC Exceedance

Mitigation Site Boundary

cPAH Carcinogenic Polycyclic Aromatic Hydrocarbons

ng/kg nanogram per kilogram

mg/kg milogram per kilogram

COC Contaminant of Concern

MTCA Model Toxins Control Act Clean Up Level (CUL)

NE Not Established

PURPOSE: Investigation of potential mitigation for construction of a bulk potash export/outbound logistics

IN: Hoquiam
COUNTY OF: Grays Harbor
STATE: WA
APPLICANT: BHP Billiton Canada Inc.

Figure 6: Soil COC Exceedances of MTCA CULS

BHP BergerABAM

USACE Reference No:NWS-2017-715

PROJECT: Proposed Grays Harbor Potash Export Facility- IDD #1 Investigation
LATITUDE: 46° 58' 16.81"
LONGITUDE: -123° 52' 54.61"
DATUM: NAD_1983_StatePlane_Washington

July 2018

Path: Q:\Vancouver\2017\A17.0202\00\GIS\02_MXD\Mitigation\Groudwater\Groundwater Sampling\IDD Site\Fig6_IDD_SoilCOCExceedances.mxd

Appendix A
Groundwater Sampling and Analysis Plan

BergerABAM

Proposed Grays Harbor Potash Export Facility – Potential Wetland Mitigation Site: IDD #1 Groundwater and Soil Sampling and Analysis Plan

A17.0202.00

June 2018

Groundwater and Soil Sampling and Analysis Plan

Proposed Grays Harbor Potash Export Facility
Potential Wetland Mitigation Site: IDD #1
Hoquiam, Washington

June 2018

GROUNDWATER AND SOIL SAMPLING AND ANALYSIS PLAN

Proposed Grays Harbor Potash Export Facility
Potential Wetland Mitigation Site: IDD #1
Hoquiam, Washington

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GROUNDWATER AND SOIL SAMPLING AND ANALYSIS PLAN
PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY
POTENTIAL WETLAND MITIGATION SITE: IDD #1
HOQUIAM, WASHINGTON

1.0 INTRODUCTION

BHP Billiton Canada, Inc. (BHP) is considering redevelopment of the IDD #1 site (tax parcels #056400600102, #056400400100) in Hoquiam, Washington, for potential compensatory mitigation for proposed wetland impacts related to development of the Port of Grays Harbor (Port) Terminal 3 and surrounding parcels in Hoquiam, Washington. The proposed IDD #1 mitigation site (herein referred to as "the site," see Figure 1) is a Port-owned property, on the north shore of Grays Harbor.

This Sampling and Analysis Plan (SAP) describes the monitoring well installation, ground water sampling and test pit excavations for soil sampling where existing ground water and soil will be encountered if the site is developed as compensatory mitigation, and the associated sampling and analysis for hazardous materials characterization. BergerABAM will be installing four new groundwater monitoring wells, and collecting sediment samples at 25 test pit locations at the site (Figure 2). Soil samples will also be collected during monitoring well installation. There is the potential that a fifth well will be installed if the previously installed wells (WSDOT) are no longer usable at the site. The purpose of the investigation is to evaluate soil and groundwater conditions for disposal purposes and to evaluate for the potential presence of chemicals of concern (COCs) at the site including RCRA 8 metals, volatile organic compounds (VOCs), PAHs, polycyclic chlorinated biphenyls (PCBs), northwest total petroleum hydrocarbons-diesel- and gasoline-range (NWTPHDx/Gx), dioxins/furans and cyanide.

Previous sampling efforts at the IDD site (WSDOT, 2009) included installation and sampling from two groundwater wells (MW-1 and MW-5 on Figure 2). Soil samples were not analyzed at that time but the groundwater samples showed concentraitons of arsenic in groundwater at concentraitons greater than the associated Model Toxics Control Act (MTCA) Method B cleanup level (CUL) for arsenic. The central portion of the site was not characterized during the 2009 investigation.

2.0 PURPOSE

The purpose of the groundwater sampling is to establish baseline groundwater conditions, and evaluate dissolved metals concentrations over time (e.g., seasonal fluctuations). Soil sampling and analysis is being conducted to identify and characterize subsurface conditions including the potential presence of COCs at the site. These studies are being completed to evaluate subsurface conditions at the site in support of use of the site for potential wetland mitigation.

3.0 SITE DESCRIPTION

3.1 Location and Use

The site is approximately 42 acres and is located south of K Street and the Puget Sound and Pacific Rail Road, and east of Earley Industrial Way, in Hoquiam, Washington. The site is situated on the north shore of Grays Harbor, at the mouth, and just west of, the Hoquiam River. The site is owned by the Port. The site is currently vacant; aerial imagery indicates that vegetation is managed by mowing.

3.2 Subsurface Conditions

3.2.1 Geology

The site is located in the Puget-Willamette Lowland - Chehalis River Basin physiographic province. Site soil generally consists of very loose to very dense fill over estuarine and alluvial deposits (BergerABAM 2017b).

3.2.2 Hydrogeology

Shallow groundwater is present in the site area at approximately 4 to 8 feet below ground surface (bgs), based on previous investigations at the site (WSDOT, 2009). Groundwater aquifers in the study area occur primarily in shallow alluvium. Regional groundwater flow direction is anticipated to be to the southwest toward Grays Harbor.

Groundwater flow is expected to be tidally influenced and may fluctuate seasonally.

4.0 SAMPLING AND ANALYSIS PLAN

4.1 Analytical Program

The proposed laboratory analytical plan has been designed to fulfill the following data collection needs.

- Evaluate groundwater conditions at the site (including dissolved metals concentrations)
  Evaluate subsurface soil conditions at the site for disposal, handling and mitigation design.

The soil samples will be submitted for chemical analysis in accordance with Washington Administrative Code (WAC) 173-340-830.

The following analytical methods will be used for the study.

- volatile organic compounds (VOCs) by EPA method 8260
- PAHs and polycyclic chlorinated biphenyls (PCBs) by EPA method 8270/8082
- diesel- and gasoline-range petroleum hydrocarbons by Ecology method Northwest Total Petroleum Hydrocarbons NWTPH Dx/Gx

- dioxins/furans
- cyanide
- RCRA 8 metals (including total chromium and speciation, if needed) using Environmental Protection Agency Method 6020.

Method reporting limit goals for chemical analyses will be based on MTCA Method A CULs, or standard Method B CULs, when Method A CULs have not been established.

4.2 Well Installation

Groundwater quality will be assessed by installing up to five monitoring wells and sampling groundwater from the new monitoring wells on a quarterly basis.

The proposed groundwater assessment will consist of the following specific tasks.

- An underground utility locate will be conducted in the area of the proposed boring locations prior to drilling to identify any subsurface utilities and/or potential underground physical hazards.
- Installation of four 2-inch-diameter groundwater monitoring wells using direct push drilling equipment in accordance with WAC 173-160. The 2-inch-diameter groundwater monitoring wells will be constructed with Schedule 40 polyvinyl chloride (PVC) casing and screens and pre-packed sand filter systems. We anticipate that the wells will be approximately 15 to 20 feet deep and include a 10-foot screened interval. The completed well depth will be based on the groundwater elevations and soil conditions encountered in each boring. The wells will be completed in aboveground monuments. The proposed well locations are shown on Figure 2.
- Field screen the soil from the surface to the bottom of each boring.
- Prepare field logs for each exploration in general accordance with American Society for Testing and Materials (ASTM) D 2488-90 and document sample collection depth.
- Survey the ground surface elevations and top-of-casing elevations for new monitoring wells, relative to an arbitrary site datum.
- Measure depth to water and check for the presence of light non-aqueous phase liquid in the monitoring wells.
- Collect groundwater samples from the monitoring wells using the procedures described in Section 5.2.2.
- Submit the samples to an analytical laboratory for chemical analysis of the COCs noted above.

4.3 Soil Sampling

Test pit investigation will be completed by an experienced environmental backhoe operator (Green Earthworks of Tacoma, Washington) and sampled by a qualified BergerABAM scientist. BergerABAM will coordinate and oversee all test pit activities. A licensed archaeologist (ICF) will be present during all test pit excavations to evaluate the

material for the presence of cultural artifacts. A brief summary of BergerABAM's task items follows.

- Conduct a standard one-call underground utility locate and a subcontracted on-site underground utility locate prior to beginning work.
- Complete up to 25 test pits in coordination with the backhoe operator at the approximate locations shown in Figure 2.
- Log the test pits from the surface to approximately 12 feet bgs.
- A minimum of one soil sample will be collected from each test pit (up to a total of 30 soil samples).
- Submit up to 30 soil samples that show the most field evidence of contamination (e.g., heavy sheen, staining or high photoionization detector reading) to an analytical laboratory for chemical analysis of: RCRA 8 metals, volatile organic compounds (VOCs), PAHs, polycyclic chlorinated biphenyls (PCBs), northwest total petroleum hydrocarbons-diesel- and gasoline-range (NWTPH Dx/Gx), dioxins/furans and cyanide.
- Prepare field logs for each exploration in general accordance with American Society for Testing and Materials D 2488-90 and document sample collection depth.
- Record the position of each exploration location using a submeter grade GPS instrument.

5.0 GENERAL SAMPLING PROCEDURES AND EQUIPMENT

This section specifies the field procedures, field quality assurance/quality control (QA/QC) protocol, and the chemical testing program to be implemented during the site assessment. The field and sampling procedures will include the following:

- Collection of soil and sediment samples
- Decontamination procedures
- Handling of investigation-derived waste

Disposable latex/nitrile gloves will be used and will be rinsed with distilled water before and after handling each individual sample (as appropriate) to prevent sample contamination during soil and groundwater sample collection. Gloves will be disposed of between samples to prevent cross contamination.

Logs and field notes of all samples will be maintained during sampling activities. The following will be included in the log:

- Station location determined in latitude and longitude using GPS
- Date and time of collection of each sample
- Names of field person(s) collecting and logging in the sample
- Sample characteristics, including grain size, density, presence of staining, and moisture for soil
- Sample characteristics, including appearance, odor, and presence/absence of sheen
- Weather conditions.

- Sample station number as derived from this sampling plan
- Depth intervals of each sample
- Depth of groundwater
- Any deviation from the sampling plan

5.1 Monitoring Well Construction and Development

Installation of the monitoring wells will be observed by a BergerABAM field scientist, who will maintain a detailed log of the materials and depths of the well. The monitoring wells will be constructed to a depth of approximately 15 to 20 feet to evaluate groundwater conditions. BergerABAM will attempt to install the well screens to intersect the groundwater table during seasonal high- and low-water conditions.

Wells will be constructed in accordance with WAC 173-160 using 2-inch-diameter Schedule 40 PVC well casing with 10- or 20-slot well screens. Medium sand will be placed in the borehole annulus surrounding the slotted portion of the well. Each well will be completed by placing a bentonite seal and aboveground monument protected by three bollards. A lockable Thermos-type cap will be installed in the top of the PVC well casing. The depth to water in the monitoring well will be measured prior to development. The total depth of the well will also be measured and recorded. Each monitoring well will be developed to remove water introduced into the well during drilling (if any), stabilize the filter pack and formation materials surrounding the well screen, and restore the hydraulic connection between the well screen and the surrounding soil. The well screen will be gently surged with a bailer several times after installation. Groundwater monitoring wells will be developed by purging the well until conventional field parameters (such as temperature, conductivity, and pH) stabilize to within 10 percent over three consecutive measurements and/or until five well volumes have been removed. The removal rate and amount of groundwater removed will be recorded during well development procedures. Groundwater removed from the wells during development will be collected and stored in labeled 55-gallon drums for subsequent characterization.

Groundwater monitoring wells will be surveyed to identify their lateral position and vertical elevation of the top of well casing (aboveground completion), top of well casing (PVC), and at ground level. The vertical datum will be carried from a standard U.S. Geological Survey NGVD benchmark, which will be used to establish a permanent benchmark at the site. A survey reference notch will be established on each monitoring well casing.

5.2 Soil and Groundwater Sampling

5.3 Soil Sampling

Excavation activities will be monitored by a technical representative from BergerABAM. Field observations (including soil classification and logs) will be detailed in daily field notes. Soil samples will be evaluated for the potential presence of contamination using

field screening techniques (see Section 5.6). Observations of soil and conditions and soil field screening results for each test pit will be included in the field notes.

Soil samples will be collected using a track mounted excavator, every 2-feet, between 1 foot and 12 feet bgs. Samples will be collected for analysis of the COCs identified above if signs of contamination are observed (PID, sheen, odor, etc.). Soil samples will be collected from just above apparent groundwater level in each boring if no indications of petroleum hydrocarbon contamination are observed.

Sample containers will be labeled in the field and stored in an iced cooler prior to and during shipment to the chemical analytical laboratory. Incidental trash generated during this investigation (including discarded nitrile gloves, aluminum foil, tubing, and paper towels) will be placed in plastic trash bags and disposed of as solid waste. Soil removed from test pits will be replaced and compacted to previous contours and conditions.

5.3.1 Groundwater

Groundwater levels will be measured in each monitoring well prior to purging during each sampling event. Groundwater levels will be measured relative to the casing rim elevations to the nearest 0.01 foot using an electric water level indicator. The direction of shallow groundwater flow at the site will be interpreted based on field measurements and site topography.

Groundwater samples will be collected from monitoring wells using a peristaltic pump and dedicated Teflon-lined polyethylene tubing.

The wells will be purged prior to sample collection using low-flow/low-turbidity sampling techniques to minimize the suspension of sediment in the groundwater. The flow rate will be less than 1 liter per minute. A water quality measuring system will be used to monitor the following water quality parameters during purging: electrical conductivity, dissolved oxygen, pH, salinity, turbidity and temperature. Samples will be collected after these parameters stabilize so that measured values vary less than 10 percent for three consecutive measurements. The stabilized field measurements will be documented in the field log book. Soil cuttings from well installation, development water and purge water will be stored in secured, labeled 55-gallon drums for subsequent characterization and disposal. Section 5.8 addresses the disposal of investigation-derived waste, such as purge water.

Groundwater samples will be collected into laboratory-provided sample containers (NO PRESERVATIVE) for dissolved metals (to be lab filtered) and the other COCs identified above after the wells are purged. The samples will be collected directly from water flowing from the sampler tubing using the low-flow methodology described above. Each sample container will be securely capped, labeled, and placed in a cooler with ice immediately upon collection. The well casing plug and monument cover lid will be secured after each sampling event.

5.4 Decontamination

All reusable samplers and miscellaneous sampling tools will be thoroughly cleaned prior to use according to the following procedure.

- Water rinse
- Wash with brush and phosphate-free detergent
- Triple rinse with distilled water

After cleaning, all sampling equipment not used immediately will be wrapped in aluminum foil and/or stored in plastic bags. The rule of "potential for contaminants" will be used such that any sampling equipment suspected of contamination will be rejected and decontaminated prior to use.

Tubing used for sampling will be single use Teflon-lined polyethylene tubing dedicated for a single monitoring well during a single monitoring event. The dedicated tubing will be discarded after use.

5.5 Field Sampling Schedule

Monitoring well installation will be completed using direct push drilling equipment owned and operated by Environmental Services Network Northwest. Installation will begin on 11 June 2018 and completed no later than 14 June 2018. The first quarter of groundwater samples will be collected 24 hours after installation/development is complete.

Excavation of test pits will be completed using a track mounted backhoe and other earth moving equipment owned and operated by Green Earthworks Inc. Excavation will begin on 11 June 2018 and will be completed no later than 14 June 2018.

5.6 Sample Handling

Sample handling procedures, including labeling, container and preservation requirements, and holding times are described in Table 1.

Table 1. Analytical Methods, Containers, and Holding Times

Parameter	Method Reference	Container		Preservation	Holding Time	
		Water	Soil		Water	Solid
Petroleum Hydrocarbons						
Gasoline-range	NWTPH-G/AK101	2 ea 40-mL amber glass vial(1)	1 ea 5035 Kit	HCl to pH < 2.0 Cool ≤ 6ºC	14 Days 7 Days(2)	14 Days
Diesel-range	NWTPH-Dx/AK102	1 ea 500-mL AG	4-oz WMG	Cool ≤ 6ºC	7 days	14 days
Lube oil-range		1 ea 500-mL AG	4-oz WMG	Cool ≤ 6ºC	7 days	14 days
Volatile Organic Compounds						
Benzene	8021/8260	2 ea 40-mL vial(1)	1 ea 5035 Kit	HCl to pH < 2.0 Cool ≤ 6ºC	14 Days 7 Days(2)	14 Days
Toluene						
Ethylbenzene						
Total Xylenes						
Polycyclic Aromatic Hydrocarbons						
Naphthalene	8270 and 8270 SIM	1 ea 500-mL AG	4-oz WMG	Cool ≤ 6ºC	7 Days	14 Days
2-Methylnaphthalene						
Total naphthalenes						
Acenaphthylene						
Acenaphthene						
Anthracene						
Pyrene						
Benzo[g,h,i]perylene						
Benzo[a]anthracene						
Chrysene						
Benzo[b]fluoranthene						
Benzo[k]fluoranthene						
Benzo(a)pyrene						
Indeno[1,2,3-cd]pyrene						
Dibenz[a,h]anthracene						
Total TEF-modified cPAHs						
RCRA Metals						
Arsenic	7470 and 7471	500-mL HDPE	4-oz WMG	Cool ≤ 6ºC	28 Days	28 Days
Cadmium						
Chromium						
Lead						
Mercury						
Zinc						
PCBs	8082	500-mL AG	4-oz WMG	Cool ≤ 6ºC	7 Days	7 Days
Dioxins/Furans	8290A	500-mL AG	4-oz WMG	Cool ≤ 6ºC	30 Days	30 Days

Notes:
(1) = No Headspace
(2) = When Unpreserved
(3) = Total Metals or Field-filtered Samples only
AG = Amber Glass Boston Round Bottle
WMG = Wide Mouth Glass Jar
WMGS = Wide Mouth Glass Jar with Septa
HDPE = High-Density Polypropylene
AHDPE= Amber HDPE

5.7 Field Screening

Soil samples collected from the test pits will be field screened for evidence of possible contamination. Field screening results will be recorded on the field logs. Screening results will be used to aid in the selection of soil samples to be submitted for chemical analysis. The following screening methods will be used: (1) visual screening; (2) water sheen screening; and (3) headspace vapor screening.

Visual Screening. The soil will be observed for unusual color and stains and/or odor indicative of possible contamination.

Water Sheen Screening. A portion of the soil sample will be placed in a pan containing distilled water. The water surface will be observed for signs of sheen. The following sheen classifications will be used.

Classification	Identifier	Description
No Sheen	(NS)	No visible sheen on the water surface
Slight Sheen	(SS)	Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly
Moderate Sheen	(MS)	Light to heavy sheen; may have some color/iridescence; spread is irregular to flowing, may be rapid; few remaining areas of no sheen on the water surface
Heavy Sheen	(HS)	Heavy sheen with color/iridescence; spread is rapid; entire water surface may be covered with sheen

Headspace Vapor Screening. A portion of the soil sample will be placed into a resealable plastic bag for headspace vapor screening. Ambient air will be captured in the bag; the bag will be sealed and then shaken gently to expose the soil to the air trapped in the bag. The bag will remain closed for approximately 5 minutes at ambient temperature before the headspace vapors are measured. Vapors present within the sample bag's headspace will be measured by inserting the probe of a PID in a small opening in the bag. A PID measures the concentration of organic vapors ionizable by a 10.6 electron volt lamp in parts per million (ppm) and quantifies organic vapor concentrations in the range between 0.1 ppm and 2,000 ppm (isobutylene equivalent) with an accuracy of 1 ppm between 0 ppm and 100 ppm. The maximum value on the instrument and the ambient air temperature will be recorded on the field log for each sample. The PID will be calibrated to 100 ppm isobutylene.

5.8 Location Control

Station positions will be determined in latitude and longitude using a hand-held GPS unit (North American Datum 83) to the nearest 0.1 second. The accuracy of measured and recorded horizontal coordinates will be within 3 meters.

The top of casing and location of each completed monitoring well will be surveyed by a licensed surveyor (Berglund and Schmidt).

5.9 Investigation-Derived Waste

Incidental trash generated during this investigation (including discarded nitrile gloves, aluminum foil, tubing, and paper towels) will be placed in plastic trash bags and disposed of as solid waste.

A designated, on-site waste storage area will be established prior to initiating field activities. Soil cuttings, purge water, and decontaminated water generated from the well installation will be placed in secured, labeled 55-gallon drums and temporarily stored on site. The waste will be profiled for disposal based on subsurface soil samples. BergerABAM will procure a waste handler to transport all the waste to an appropriate off-site disposal/recycling facility after analytical results from the soil samples are received and evaluated.

6.0 SUMMARY REPORT

A written report will be prepared by BergerABAM documenting all activities associated with collection, transportation of samples, and chemical analysis. The chemical analytical report will be included as an appendix. At a minimum, the following will be included in the summary report.

- Type of sampling equipment used
- Protocols used during sampling and testing and an explanation of any deviations from the sampling plan protocols
- Methods used to locate the sampling positions with an accuracy of 3 meters
- Locations of the monitoring well borings
- A plan view of the site showing the monitoring well locations and inferred groundwater flow direction
- Chain-of-custody procedures used and explanation of any deviations from the sampling plan procedures
- Description of sampling procedures
- Data results relative to MTCA criteria for industrial land use

7.0 STUDY TEAM AND RESPONSIBILITIES

The SAP includes (1) project planning and coordination, (2) field sample collection, (3) laboratory preparation and analyses, (4) QA/QC management, and (5) final data report. The program will use the following team members and responsibilities.

7.1 Project Planning and Coordination

Ms. Victoria England of BergerABAM is the primary technical representative for characterization activities.

7.2 Field Sample Collection

Ms. April Ryckman of BergerABAM will provide overall direction to the field and laboratory programs and will coordinate field activities. She will be responsible for assuring that all the required logistics elements and protocols are followed, including accurate sample positioning, sample handling and field decontamination procedures,

physical evaluation and logging of samples, and chain-of-custody of the samples until delivered to the analytical laboratory.

7.3 Laboratory Analysis

Environmental Services Network Northwest in Olympia, Washington, will perform chemical analysis for this project.

7.4 Quality Assurance/Quality Control Management

Ms. Roesler will be the QA/QC representative. She will provide oversight for the field-sampling program and will be responsible for QA/QC oversight of the laboratory programs. Ms. Ryckman will also review laboratory QA/QC data to assure validity of data and conformance to QA/QC requirements and will provide a written QA/QC report.

7.5 Final Data Report

Ms. Roesler will be responsible for preparation of the final sampling data report identifying sample locations, field and laboratory methods, QA/QC, and data results.

8.0 LIMITATIONS

This work plan has been prepared for use by BHP. This work plan is not intended for use by others, and the information contained herein is not applicable to other sites.

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

9.0 BIBLIOGRAPHY

CH2MHill, 2009. "Phase II Environmental Site Assessment, Anderson & Middleton Property, Aberdeen Log Yard Property Prepared fro Washington State Department of Transportation. Novembery 2009

10.0 ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
bgs	below ground surface
BHP	BHP Billiton Canada, Inc.
City	City of Hoquiam
COC	chemical of concern
CUL	cleanup level
MTCA	Model Toxics Control Act
PID	photoionization detector
Port	Port of Grays Harbor
ppm	parts per million
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
SAP	Sampling and Analysis Plan
WAC	Washington Administrative Code

June 2018
Groundwater Monitoring Well Installation, Soil Investigation, and First Quarter Groundwater Sampling – IDD#1 Site Summary Report

Proposed Grays Harbor Potash Export Facility, IDD#1 Site
Hoquiam, Washington

Appendix B
Boring Logs

SOIL CLASSIFICATION CHART

MAJOR DIVISONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% RETAINED ON NO. 200 SIEVE)	GRAVEL AND GRAVELY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SAND
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% PASSING NO. 200 SIEVE)	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC SILTS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	INORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	CC	CEMENT CONCRETE
	AC	ASPHALT CONCRETE
	CR	CRUSHED ROCK/QUARRY SPALLS
	TS	TOPSOILS/FOREST DUFF/SOD

MEASURED GROUNDWATER LEVEL IN EXPLORATION, WELL, OR PIEZOMETER

GROUNDWATER OBSERVED AT TIME OF EXPLORATION

MEASURED FREE PRODUCT IN WELL OR PIEZOMETER

MEASURED FREE PRODUCT IN WELL OR PIEZOMETER

STRATIGRAPHIC CONTACT

DISTINCT CONTACT BETWEEN SOIL STRATA OR GEOLOGIC UNITS

GRADUAL CHANGE BETWEEN SOIL STRATA OR GEOLOGIC UNITS

APPROXIMATE LOCATION OF SOIL STRATA CHANGE WITHIN A GEOLOGIC SOIL UNIT

SHEEN CLASSIFICATION

NS	NO VISIBLE SHEEN
SS	SLIGHT SHEEN
MS	MODERATE SHEEN
HS	HIGH SHEEN
NT	NOT TESTED

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be represented of subsurface conditions at other locations or times.

Date Drilled: 6/11/18	Logged By: AR	Checked By: GR
Drilling Contractor: ESN	Drilling Method: Auger - direct push	Sampling Methods:
Auger Data: N/A	Hammer Data: N/A	Groundwater Level (ft bgs): 6
Total Depth (ft bgs): 15	Surface Elevation (ft): N/A	Datum:

Depth (ft)	Graphic Log	Standard Penetration Test (SPT)	Water Level (ft)	Group Symbol	Material Description	Sheen	Headspace Vapor PID (ppm)	Notes/Sample ID
0								
				TS	Organic material - topsoil and grass	NS	0.0	
				SP	Brown to gray poorly graded coarse sand (dry to moist)	NS	0.0	
5								
		▽				NS	0.0	
10								
				SM	Gray poorly graded medium sand with silt (wet)	NS	0.0	
15				ML	Gray silt with fine sand (stiff)	NS	0.0	
					End of boring = 15 feet bgs			

LOG OF BORING # MW-1

BergerABAM

Project: Proposed Grays Harbor Potash Export Facility

Project Location: IDD#1, Hoquiam, WA

Project Number: A17.0202.00

bgs = below ground surface

ft = feet

Date Drilled: 6/11/18	Logged By: AR	Checked By: GR
Drilling Contractor: ESN	Drilling Method: Auger - direct push	Sampling Methods:
Auger Data: N/A	Hammer Data: N/A	Groundwater Level (ft bgs): 7
Total Depth (ft bgs): 15	Surface Elevation (ft): N/A	Datum:

Depth (ft)	Graphic Log	Standard Penetration Test (SPT) Blows/foot	Water Level (ft)	Group Symbol	Material Description	Sheen	Headspace Vapor PID (ppm)	Notes/Sample ID
0								
				TS	Organic material - topsoil and grass	NS	0.0	
				SP	Brown to gray poorly graded coarse sand (dry to moist)	NS	0.0	
5								
						NS	0.0	
			▽					
				SM	Gray medium sand with silt (wet)	NS	0.0	
10				SM	Gray medium sand (dense)	NS	0.0	
				SM	Gray medium sand with silt (wet, soft)	NS	0.0	
				ML	Gray silt with fine sand (wet)	NS	0.0	
15				ML	Gray silt (wet, stiff) with 1-inch lens of organic material at 52in.	NS	0.0	
					End of boring = 15 feet bgs			

LOG OF BORING # MW-2

BergerABAM

Project: Proposed Grays Harbor Potash Export Facility	bgs = below ground surface
	ft = feet
Project Location: IDD#1, Hoquiam, WA	
Project Number: A17.0202.00	

Date Drilled: 6/11/18	Logged By: AR	Checked By: GR
Drilling Contractor: ESN	Drilling Method: Auger - direct push	Sampling Methods:
Auger Data: N/A	Hammer Data: N/A	Groundwater Level (ft bgs): 5
Total Depth (ft bgs): 15	Surface Elevation (ft): N/A	Datum:

Depth (ft)	Graphic Log	Standard Penetration Test (SPT) Blows/foot	Water Level (ft)	Group Symbol	Material Description	Sheen	Headspace Vapor PID (ppm)	Notes/Sample ID
0								
				TS	Organic material - topsoil and grass	NS		
				CL	Brown clay with coarse sand and gray coarse sand lens (dry to moist)	NS		Rust-orange areas of oxidation noted in brown clay
						NS		
				CL	Dark gray clay with silt (wet)	NS		
5			▽					
				CL	Brown silt with clay (wet)	NS		
10								
					Wood debris	NS	12.0	Wood debris with strong creosote odor
15				ML	Dark gray silt (wet)	NS	0.8	
					End of boring = 15 feet bgs			

LOG OF BORING # MW-3

BergerABAM

Project: Proposed Grays Harbor Potash Export Facility

Project Location: IDD#1, Hoquiam, WA

Project Number: A17.0202.00

bgs = below ground surface

ft = feet

Date Drilled: 6/11/18	Logged By: AR	Checked By: GR
Drilling Contractor: ESN	Drilling Method: Auger - direct push	Sampling Methods:
Auger Data: N/A	Hammer Data: N/A	Groundwater Level (ft bgs): 5
Total Depth (ft bgs): 15	Surface Elevation (ft): N/A	Datum:

Depth (ft)	Graphic Log	Standard Penetration Test (SPT) Blows/foot	Water Level (ft)	Group Symbol	Material Description	Sheen	Headspace Vapor PID (ppm)	Notes/Sample ID
0								
				TS	Organic material - topsoil and grass	NS	0.0	
				CR	Cobble lens	NS	0.0	
				SC	Clayey sand with gravel (dry)	NS	0.0	
				CL	Brown clay (dry, stiff)	NS	0.0	
				CR	Cobble lens	NS	0.0	
5			▽	CL	Gray to black clayey silt	NS	0.0	
					No recovery			Hit brick at 5- 10 ft and no further recovery possible. MW-4 sample taken at 5 ft bgs
10					Brick			
					No recovery			Material falling out of sampler, no recovery possible
15								
					End of boring = 15 feet bgs			

LOG OF BORING # MW-4

BergerABAM

Project: Proposed Grays Harbor Potash Export Facility

Project Location: IDD#1, Hoquiam, WA

Project Number: A17.0202.00

bgs = below ground surface

ft = feet

Date Drilled: 6/11/18	Logged By: AR	Checked By: GR
Drilling Contractor: N/A	Drilling Method: Auger - direct push	Sampling Methods:
Auger Data: N/A	Hammer Data: N/A	Groundwater Level (ft bgs): 6
Total Depth (ft bgs): 14	Surface Elevation (ft): N/A	Datum:

Depth (ft)	Graphic Log	Standard Penetration Test (SPT) Blows/foot	Water Level (ft)	Group Symbol	Material Description	Sheen	Headspace Vapor PID (ppm)	Notes/Sample ID
0				TS	Organic material - topsoil and grass	NS	0.0	
5				SP	Brown coarse sand (dry)	NS	0.0	
10				ML	Gray silt with brown coarse sand lens (moist)	NS	0.0	
15				ML	Gray silt (wet, stiff)	NS	0.0	
					End of boring = 15 feet bgs			

LOG OF BORING # MW-6

BergerABAM

Project: Proposed Grays Harbor Potash Export Facility

Project Location: IDD#1, Hoquiam, WA

Project Number: A17.0202.00

bgs = below ground surface

ft = feet

Date: 11 June 2018	Depth to Water: 9.5'	Sample Station Number: TP1
Time: 10:00	Tide Stage & Info: 6.04'	Sampling Number: TP1-1@4'; TP1-2@9'
Temperature: 55°F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.972033	Longitude: -123.885325	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SP	Brown coarse sand with silt (dry to moist)			
2'				NS	0.6ppm	Logs and old piles present within the first 2'
						Significant milled timber and wood debris between 3' and 4'
4'		ML	Brown silt with coarse brown sand (dry to moist)	SS	2.1ppm	
4.5'-5'		ML	dark gray silt with coarse sand (dry to moist)	SS	1.9ppm	Hydraulic fill. Sampled (TP1-1@4') beneath a creosote treated log/pile
6'						
7'		ML	Silt with wood debris (moist)	SS	2.2ppm	
8'						
9'		ML	Silt with coarse sand and wood debris (wet)	SS	3.0ppm	Sampled (TP1-2@9'). Groundwater at 9.5' bgs
10'		ML	dark grey silt (stiff, moist to wet) Bottom of test pit 12.0 ft bgs	NS	2.7ppm	
12'				NS		Hydraulic fill

BergerABAM

Project: Proposed Grays Harbor Potash Export Facility
Project Location: IDD#1, Hoquiam, WA

Project Number: A17.0202.00

bgs = below ground surface
ft = feet
ppm= parts per million

Date: 13 June 2018	Depth to Water: >12'	Sample Station Number: TP2
Time: 8:13	Tide Stage & Info: -1.58'	Sampling Number: TP2-1@12'
Temperature: 54^{0}F	Tide Station:	Sampling Methods: Excavator
Weather: Light Rain	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.971885	Longitude: -123.884268	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		ML	Brown silt with coarse brown and grey sand (dry to moist)			
2'				NS	0.6ppm	
		ML	Dark grey soft silt with coarse sand (dry to moist)			
4'				NS	0.9ppm	
		ML	dark grey soft silt with sand and wood waste (moist)			
6'				NS	0.9ppm	significant wood waste/mill debris
8'		ML	Dark grey stiff silt with sand (dry to moist)	NS	1.3ppm	
10'		ML	Dark grey stiff silt with sand and wood waste (dry to moist)	NS	1.3ppm	
12'				NS	1.7ppm	Sampled (TP2-1@12')

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Project: Proposed Grays Harbor Potash Export Facility
Project Location: IDD#1, Hoquiam, WA
Project Number: A17.0202.00

bgs = below ground surface
ft = feet
ppm= parts per million

Date: 13 June 2018	Depth to Water: 7'	Sample Station Number: TP3
Time: 9:07	Tide Stage & Info: 0.04'	Sampling Number: TP3-1@6'
Temperature: 54°F	Tide Station:	Sampling Methods: Excavator
Weather: Light rain	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.971993	Longitude: -123.883048	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		ML	Reddish brown soft silt with gray coarse sand (dry to moist)			
2'				NS	1.0ppm	
4'				NS	0.4ppm	
6'		ML	dark grey soft silt with coarse sand (moist to saturated)	NS	1.1ppm	Sampled (TP3-1@6')
7'						Ground water at 7' bgs
8'		ML	Grey stiff silt with coarse gray and coarse brown sand (saturated)	NS	0.5ppm	
10'		ML	Grey stiff silt with significant wood debris (saturated)	NS	0.7ppm	
12'		ML	Grey stiff silt (moist)	NS	0.7ppm	

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Date: 11 June 2018	Depth to Water: >12'	Sample Station Number: TP4
13:30:00 AM	Tide Stage & Info: 8.01'	Sampling Number: TP4-1@5', TP4-2@12'
Temperature: 60^{0}F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.971505	Longitude: -123.885141	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SP	Loose brown coarse sand with silt (dry to moist)			
2'				NS	0.5ppm	
3'		SP	Dark grey fill (coarse sand and silt) (dry to moist)			
4'		SP	Dark grey coarse sand with soft silt (dry to moist)	NS	0.5ppm	TP4-1@5'
5'		SP	Coarse sand with wood waste/ dimensional lumber and gravel (dry to moist)	NS	0.7ppm	Slight sheen observed on water at bottom of the pit
6'						
		SP	Coarse gray sand, loose/unconsolidated (dry to moist)			
8'				NS	0.4	hydraulic fill
9.5'		ML	Dense silt with compacted coarse sand (dry to moist)	NS		
10'						
		ML	Stiff silt with coarse sand (moist) Bottom of test pit = 12ft bgs			
12'				NS	0.4ppm	TP4-2@12'

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Date: 13 June 2018	Depth to Water: 11'	Sample Station Number: TP5
Time: 10:29	Tide Stage & Info: 3.33'	Sampling Number: TP5-1@10'
Temperature: 56°F	Tide Station:	Sampling Methods: Excavator
Weather: Light rain	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.971622	Longitude: -123.883734	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		ML	Brown and grey silt with coarse sand (dry to moist)			
2'				NS	1.0ppm	
		SC	Grey coarse sand with silt and wood waste			
4'				NS	1.0ppm	
		ML	Grey silt with coarse sand (dry to moist)			
6'				NS	1.2ppm	
8'				NS	1.0ppm	
		ML	Grey silt with coarse sand (moist to saturated)			
10'				NS	1.0ppm	Sampled (TP5-1@10")
11'	▽	ML	Grey silt with coarse sand (Saturated) Bottom of test pit = 12ft bgs			Groundwater at 11' bgs
12'				NS	1.0ppm	

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Date: 13 June 2018	Depth to Water: >12'	Sample Station Number: TP6
Time: 11:13	Tide Stage & Info: 5.06'	Sampling Number: TP6-1@12'
Temperature: 58°F	Tide Station:	Sampling Methods: Excavator
Weather: Overcast	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.97154	Longitude: -123.882623	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		ML	Brown silt with brown and grey coarse sand (dry to moist)			
2'				SS	1.1ppm	
		ML	Very dark grey soft silt (dry to moist)			
4'				SS	0.9ppm	
6'				NS	0.9ppm	
		ML	Gray silt with wood debris and organic material (dry to moist)			
8'				NS	0.6ppm	
10'				NS	0.00ppm	
		ML	grey silt with coarse sand (moist) Bottom of test pit = 12ft bgs			
12'				NS	1.4ppm	Sampled (TP6-1@12')

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Date: 13 June 2018	Depth to Water: 10.5'	Sample Station Number: TP7
Time: 10:00	Tide Stage & Info:	Sampling Number: TP7-1@6'; TP7-2@10'
Temperature: 76^{0}F	Tide Station:	Sampling Methods: Excavator
Weather:Mostly Cloudy	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.971642	Longitude: -123.881629	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		ML	Reddish brown silt with coarse sand (dry to moist)			
2'				NS	0.6ppm	
4'		ML	Reddish brown to grey silt with coarse sand and wood debris (dry to moist)	NS	0.2ppm	
6'		ML	Gray silt with organics (moist)	NS	2.2ppm	
6.5'						Perched water above wood waste at 6.5'
7'						Significant wood waste at 7'
8'		ML	Silt and coarse sand with wood waste (Saturated)	NS	0.4ppm	
10'		ML	Gray silt Bottom of test pit = 12ft bgs	NS	2.8ppm	Sampled (TP7-2@10')
10.5'						Groundwater at 10.5' bgs
12'				SS	2.1ppm	

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Date: 12 June 2018	Depth to Water: 12'	Sample Station Number: TP8
14:13:00 AM	Tide Stage & Info: 8.62'	Sampling Number: TP8-1@7'; TP8-2@8'; TP8-3@11'
Temperature: 67^{0}F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.971592	Longitude: -123.880083	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		ML	Brown silt with coarse sand (dry to moist)			
2'				NS	2.2ppm	
4'		ML	Gray silt with coarse sand and wood waste (dry to moist)	NS	4.4ppm	
6'		ML	Dark grey stiff silt with wood waste (dry to moist)	NS		
7'		ML	Grey silt with wood waste (dry to moist)	NS	2.2ppm	Sampled (TP8-1@7') Wood waste/mill waste consists of sawdust and dimensional lumber
8'				NS	4.4ppm	Sampled (TP8-2@8') Sample taken from beneath possible creosote treated pile
10'		ML	Stiff gray silt (moist) Bottom of test pit = 12ft bgs	NS	3.3ppm	
11'				NS	3.1ppm	Sampled (TP8-3@11')
12'	▽					Groundwater at 12'

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Date: 12 June 2018	Depth to Water: 7'	Sample Station Number: TP9
15:37:00 AM	Tide Stage & Info: 6.75'	Sampling Number: TP9-1@6.5'
Temperature: 70^{0}F	Tide Station:	Sampling Methods: Excavator
Weather:Scattered Clouds	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.971456	Longitude: -123.87848	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		ML	Grey, brown, and red silt, very stiff (dry to moist)			
2'				NS	2.5ppm	
		ML	Soft reddish brown silt with coarse sand and very dark grey highly compacted silt (dry to moist)			
4'				NS	1.7ppm	Old brick and mortar
5'		SP-SM	Brown and gray coarse sand with silt and brick and mortor (dry to moist)			
6'				NS	0.9ppm	Charcoal and ash observed
6.5'		ML	Stiff brown silt with coarse sand and fine gravel (dry to moist)	NS	1.8ppm	Sampled (TP9-1@6.5')
7'	▽					Groundwater at 7' bgs
8'		ML	Dark grey silt with coarse sand and mill/wood debris	NS	1.9ppm	
10'				NS	2.3ppm	
		ML	Dark grey laminated silt Bottom of test pit = 12ft bgs			
12'				NS	2.3ppm	

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Date: 11 June 2018	Depth to Water: 12.5'	Sample Station Number: TP10
Time: 12:05	Tide Stage & Info: 8.52'	Sampling Number: TP10-1@12'; TP10-2@4'
Temperature: 57^{0}F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.971047	Longitude: -123.88527	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SP-S,	Coarse brown sand with silt (dry to moist)			
2'				NS	1.7ppm	
3.5'		SP-SM	Dark grey coarse sand with silt (dry to moist)			Hydraulic fill
4'		SP	Dark brown and grey coarse sand (moist)	NS	2.0ppm	Sampled (TP10-2@4')
4.5						Perched water above impermeable later below
6'		SP	Dark grey coarse sand (moist) loose/unconsolidated fill sand	NS	2.2ppm	
8'				NS	2.1ppm	loose/unconsolidated fill sand
9'						Layer of wood waste (dimensional lumber) at 9'
10'		SP-SM	Coarse sand with silt fill Bottom of test pit = 12.5ft bgs	NS	2.0ppm	
12'	▽			NS	2.6ppm	Sampled (TP10-1@12') Groundwater at 12.5'

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Date: 13 June 2018	Depth to Water: >9'	Sample Station Number: TP11
Time: 10:00	Tide Stage & Info: 2.16'	Sampling Number: TP11-1@9'
Temperature: 56°F	Tide Station:	Sampling Methods: Excavator
Weather:Mostly cloudy	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.97113	Longitude: -123.883833	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		ML	Brown and grey silt with coarse sand (dry to moist)			
2'				NS	0.7ppm	
4'		SP-SM	Grey coarse sand with silt (dry to moist)	NS	0.8ppm	
6'		ML	Grey silt with coarse sand (wet)	NS	0.9ppm	Soils damp at 6'
8'				NS	0.8ppm	Soils wet but not saturated
9'		ML	Dense/compacted grey silt with coarse sand (wet)	NS	1.0ppm	Soils saturated. Sampled (TP11-1@9') Groundwater below 9'
10'			Bottom of test pit = 9ft bgs			Could not excavate below 9' because side walls of the pit were collapsing in on the pit
12'						

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Date: 13 June 2018	Depth to Water: >12'	Sample Station Number: TP12
14:07:00 AM	Tide Stage & Info: 9.32	Sampling Number: TP12-1@12'
Temperature: 62°F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.971047	Longitude: -123.882355	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SM/ML	Brown coarse sand with silt over gray soft silt with sand			
2'				NS	1.0ppm	
4'		ML	Grey silt with coarse sand	SS	1.6ppm	
6'		ML	Grey silt with coarse sand and organics/rotting wood waste	SS	2.7ppm	
8'		ML	Grey silt Bottom of test pit = 12ft bgs	SS	2.5ppm	
10'				NS	1.9ppm	
12'				NS	1.4ppm	Sampled (TP12-1@12').

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Date: 12 June 2018	Depth to Water: >12'	Sample Station Number: TP13
13:05:00 AM	Tide Stage & Info: 8.95'	Sampling Number: TP13-1@12'
Temperature: 66°F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.971219	Longitude: -123.880504	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		ML	Brown silt with coarse sand (dry to moist)			
2'				NS	0.6ppm	
4'		ML	Brown silt with coarse sand and wood waste (moist)	NS	0.5ppm	
6'		SM	Dark grey coarse sand with silt and wood waste (moist)	NS	1.7ppm	
8'		ML	Dark grey silt with coarse sand (moist)	NS	1.4ppm	
10'		SM	Dary grey coarse sand with silt lenses	NS	1.2ppm	
12'		ML	Dark grey silt Bottom of test pit = 12ft bgs	NS		Sampled (TP13-1@12')

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Date: 11 June 2018	Depth to Water: 7'	Sample Station Number: TP14
15:00:00 AM	Tide Stage & Info: 5.98'	Sampling Number: TP14-1@6.5'
Temperature: 62^{0}F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.97068	Longitude: -123.885283	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SP	Loose reddish brown coarse sand (dry to moist)			
2'				NS	1.7ppm	
4'				NS	1.4ppm	
6'		SP	Dark grey coarse sand with silt (moist to saturated)	NS	1.9ppm	
6.5'-7'	▽			NS	3.0ppm	Sampled (TP14-1@6.5'). Soil composed of hydraulic fill. Groundwater at 7'
8'		SP	Dark grey coarse sand (coarse, saturated)	NS	1.5ppm	
10'		SP	Dark brown coarse sand	NS	1.4ppm	
12'		ML	Silts with coarse sand and clay Bottom of test pit = 12ft bgs	NS	1.4ppm	

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Date: 11 June 2018	Depth to Water: 5'	Sample Station Number: TP15
Time: 17:45	Tide Stage & Info: 2.29'	Sampling Number: TP15-1@5'
Temperature: 63°F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.970639	Longitude: -123.884092	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SP-SM	Brown coarse sand with silt (dry to moist)			
2'				NS	1.4ppm	
5'		SP	Dark grey coarse sand (loose, moist) Bottom of test pit = 6ft bgs	NS	2.3ppm	Sampled (TP15-1@5')
6'	▽					Groundwater at 6' bgs
						Unable to dig below 6'. Soils consist of loose/unconsolidated sands and side walls of the pit continue to collapse in on the pit.
8'						
10'						
12'						

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Date: 12 June 2018	Depth to Water: >8'	Sample Station Number: TP16
Time: 16:54	Tide Stage & Info: 4.58'	Sampling Number: TP-16-1@5.5'
Temperature: 67^{0}F	Tide Station:	Sampling Methods: Excavator
Weather: Mostly cloudy	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.970683	Longitude: -123.88306	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SP	Reddish brown coarse sand with silt (dry to moist)			
2'				NS	1.8ppm	
4'		SM	Dark grey, coarse sand with silt (wet) Bottom of test pit = 8ft bgs	NS	2.5ppm	
5.5'				NS	2.0ppm	
6'						Perched water above impermeable layer at 6'
8'				NS	1.8ppm	Unable to excavate below 8' because side walls of the pit continue to collapse in on the pit.

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Date: 13 June 2018	Depth to Water: 8.5'	Sample Station Number: TP17
Time: 13:15	Tide Stage & Info: 8.77	Sampling Number: TP17-1@4'; TP17-2@8'
Temperature: 61°F	Tide Station:	Sampling Methods: Excavator
Weather: Partly Cloudy	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.970587	Longitude: -123.882007	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SP	Grey and brown coarse sand with silt			
2'				NS	3.7ppm	
4'		ML	Grey silt with grey and brown coarse sand and organic material (wet)	SS	2.3ppm	Sampled (TP17-1@4')
5'						Perched water above impermeable layer at 5'
6'		ML	Grey silt with coarse sand and organics (moist)	SS	6.9ppm	
7.5			Dark black decomposing organic material			1.5 feet thick
8'		ML	Grey silt with coarse sand and organics (wet)	SS	1.8ppm	Sampled (TP17-2@8')
8.5'	▽					Groundwater at 8.5' bgs
10'		ML	Dark grey stiff silt (wet)	NS	3.9ppm	
12'		ML	Grey silt with stratified brown coarse sand lenses Bottom of test pit = 12ft bgs	NS	2.1ppm	

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Date: 11 June 2018	Depth to Water: >12'	Sample Station Number: TP18
Time: 12:15	Tide Stage & Info: 8.56'	Sampling Number: TP18-1@12'
Temperature: 57^{0}F	Tide Station:	Sampling Methods: Excavator
Weather: Partly cloudy	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.970704	Longitude: -123.880657	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SP-SM	Reddish brown coasre silty sand (dry to moist)			
2'				NS	0.6ppm	
4'				NS	0.4ppm	
6'		ML	Very dark stiff grey silt (dry to moist)	NS	0.7ppm	
8'		ML	Very dark grey silt and organics (dry to moist)	NS	0.5ppm	Sulfur-like odor. High organic content
10'				NS	0.6ppm	Sulfur-like odor. High organic content
12'		ML	Very dark grey silt with wood waste. (moist) Bottom of test pit = 12ft bgs	NS	0.7ppm	Sampled (TP18-1@12'). Soils damp. Likely just above the watertable.

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Date: 12 June 2018	Depth to Water: 6'	Sample Station Number: TP19
Time: 11:15	Tide Stage & Info: 6.84'	Sampling Number: TP19-1@5'
Temperature: 64°F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.970782	Longitude: -123.879101	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		ML	Brown silt with coarse sand			
2'				NS	1.5ppm	
3'			Wood waste with quarry spals			
4'		SP	grey and brown coarse sand (loose) with silt	NS	1.2ppm	
5'			Brown silt with extensive rotting wood waste	NS	2.0ppm	Sampled (TP19-1@5'). Smells of rotting wood/organic material
6'						Groundwater at 6'
8'		ML	Very fine dark grey saturated silt with dimensional lumber Bottom of test pit = 12ft bgs	NS	0.6ppm	Large amount of mill waste/dimensional lumber
10'				NS	0.6ppm	Still signficant amount of mill waste/dimensional lumber, but less so than at 8'
12'				NS	0.5ppm	More mill waste/dimensional lumber

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Date: 11 June 2018	Depth to Water: 7'	Sample Station Number: TP20
Time: 15:50	Tide Stage & Info: 4.69	Sampling Number: TP20-1@6'
Temperature: 63°F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.970105	Longitude: -123.885308	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		ML	Brown silt with coarse sand and gravel (moist to dry)			
2'				NS	1.4ppm	
4'		SP	Brown coarse sand (loose) (wet)	NS	1.5ppm	
6'				NS	0.5ppm	Sampled (TP20-1@6')
7'						Groundwater at 7' bgs
7.5''		SP-SM	Dark grey, coarse sand with silt (wet)	NS	1.4ppm	
10'		SP	Dark grey and brow n coarse sand (wet)	NS	1.2ppm	
12'		SP	Dark grey coarse sand (wet) Bottom of test pit = 12ft bgs	NS	1.2ppm	

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Project: Proposed Grays Harbor Potash Export Facility
Project Location: IDD#1, Hoquiam, WA
Project Number: A17.0202.00

bgs = below ground surface
ft = feet
ppm= parts per million

Date: 11 June 2018	Depth to Water: 6'	Sample Station Number: TP21
Time: 17:00	Tide Stage & Info: 2.95'	Sampling Number: TP21-1@4.5'
Temperature: 63°F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.970116	Longitude: -123.884362	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SP	Brown to reddish brown coarse sand (loose, dry to moist)			
2'				NS	2.2ppm	
4'				NS	1.6ppm	
4.5'		SP	Dark brown coarse sand (loose, wet)	NS	1.1ppm	Sampled (TP21-1@4.5')
6'						Groundwater at 6'
		SP	Reddish brown coarse sand (wet) Bottom of test pit = 8ft bgs			
8'				NS	0.8ppm	Could not excavate below 8'. Side walls of pit continue to collapes into pit.

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Project: Proposed Grays Harbor Potash Export Facility
Project Location: IDD#1, Hoquiam, WA
Project Number: A17.0202.00

bgs = below ground surface
ft = feet
ppm= parts per million

Date: 12 June 2018	Depth to Water: 7'	Sample Station Number: TP22
Time: 7:26	Tide Stage & Info: -0.88	Sampling Number: TP22-1@6'
Temperature: 50^{0}F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.970117	Longitude: -123.883256	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SP-SM	Brown coarse sand (loose) with silt (dry to moist)			
2'				NS	1.5ppm	
		SP-SM	Brown coarse sand (loose) with soft grey silt (moist)			
4'				NS	1.2ppm	
		SP	Grey coarse sand with silt (moist) Bottom of test pit = 7ft bgs			
6'				NS	0.7ppm	
7'						Groundwater at approximately 7' bgs. Unnable to excavate below 7' side walls of pit continue to collapse into the pit

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Project: Proposed Grays Harbor Potash Export Facility
Project Location: IDD#1, Hoquiam, WA
Project Number: A17.0202.00

bgs = below ground surface
ft = feet
ppm= parts per million

Date: 12 June 2018	Depth to Water: 7'	Sample Station Number: TP23
Time: 8:11	Tide Stage & Info: 0.32'	Sampling Number: TP23-1@6'
Temperature: 52°F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.970114	Longitude: -123.882314	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SP-SM	Coarse brown sand (loose) with silt			
2'				NS	1.1ppm	
4'		SP	Dark grey, coarse sand (loose)	NS	1.1ppm	
6'				NS	1.0ppm	Sampled (TP23-1@6')
7'	▽					Groundwater at 7' bgs
8'		SP-SM	Dark grey coarse sand with silt lenses Bottom of test pit = 8ft bgs	NS	1.0ppm	Unable to excavate below 8'. Side walls of pit continue to collape into the pit.

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Project: Proposed Grays Harbor Potash Export Facility
Project Location: IDD#1, Hoquiam, WA
Project Number: A17.0202.00

bgs = below ground surface
ft = feet
ppm= parts per million

Date: 12 June 2018	Depth to Water: approx. 11'	Sample Station Number: TP24
Time: 9:00	Tide Stage & Info: 2.03	Sampling Number: TP24-1@5.5'; TP24-2@10'
Temperature: 57°F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.970167	Longitude: -123.881363	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		ML	Brown silt with coarse sand (dry to moist)			
2'				NS	0.8ppm	
4'		ML	Grey silt with brown coarse sand (wet)	NS	1.1ppm	
5'						Perched water above laminated silt layer at 5'
5.5'		ML	Very fine dark grey silt (moist)	NS	1.8ppm	Sampled (TP24-1@5.5')
8'		ML	Dark grey silt with brown coarse sand and wood waste/debris/sawdust	NS	1.6ppm	
10'		ML	Dark grey silt with wood waste/debris/sawdust Bottom of test pit = 10ft bgs	NS	1.2ppm	Sampled (TP24-2@10'). Soils damp but not completely saturated, likely just above the water table.
						Unable to excavate deeper than 10'. Side walls continue to collapse into the pit

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Project: Proposed Grays Harbor Potash Export Facility

Project Location: IDD#1, Hoquiam, WA

Project Number: A17.0202.00

bgs = below ground surface

ft = feet

ppm= parts per million

Date: 12 June 2018	Depth to Water: 6'	Sample Station Number: TP25
Time: 10:05	Tide Stage & Info: 4.41'	Sampling Number: TP25-1@5.5'
Temperature: 60°F	Tide Station:	Sampling Methods: Excavator
Weather: Clear	9441187 Aberdeen, WA	Sampled By: Allison Kinney
Latitude: 46.970233	Longitude: -123.880261	Datum: D_North_American_1983

DEPTH - FT	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION (characteristics, density, grain size)	SHEEN	HEADSPACE VAPOR PID (ppm)	NOTES (odor, etc.)/Sample ID
0'		SP	Grey and brown silt with coarse sand (moist to dry)			
2'				NS	1.0ppm	plant debris present
4'		ML	Dark grey silt (moist to dry)	NS	1.9ppm	
5.5'		SP-SC	Dark grey coarse sand with silt (wet)	NS	0.4ppm	Sampled (TP25-1@5.5')
6'						Groundwater at 6' bgs
8'		SP	Dark grey coarse sand (loose) Bottom of test pit = 9ft bgs	NS		
9'				NS	0.8ppm	Unable to excavate below 9'. Side walls continue to collapse into the pit.
10'						
12'						

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Project: Proposed Grays Harbor Potash Export Facility
Project Location: IDD#1, Hoquiam, WA
Project Number: A17.0202.00

bgs = below ground surface
ft = feet
ppm= parts per million

June 2018
Groundwater Monitoring Well Installation, Soil Investigation, and First Quarter Groundwater Sampling – IDD#1 Site Summary Report

Proposed Grays Harbor Potash Export Facility, IDD#1 Site
Hoquiam, Washington

Appendix C
Environmental Services Network Northwest Chemical Analytical Laboratory Report

ESN NORTHWEST
Environmental Services Network

08/01/2018

Spectra was unable to perform the Cyanide analysis on the water 06/13/18 samples and the Chromium Speciation from the IDD #1 Site due to the samples being preserved with Nitric Acid for RCRA8 analysis at ESN NW. An aliquot of the sample should have been removed from the original poly, and then forwarded to Spectra for analysis. The error was noted and performed correctly for future samples.

Thank you,

Jennifer Arnold

Lab Manager

ESN Northwest

360-459-4670

ESN NORTHWEST
Environmental
Services Network

July 20, 2018

Victoria England
BergerABAM
210 E 13th St, Ste. 300
Vancouver, WA 98660

Dear Ms. England:

Please find enclosed an analytical data report for the BHP Grays Harbor Potash Facility – IDD #1 Project in Hoquiam, Washington. Probe services were conducted on June 11, 2018. Soil and water samples were analyzed for Diesel and Oil by NWTPH-Dx/Dx Extended, Gasoline by NWTPH-Gx, VOC's by Method 8260, PAH's by Method 8270, PCB's by Method 8082, RCRA 8 Metals by Method 6020, Cyanide by Method SM4500-CN E, Hexavalent Chromium by Method SM3500-CR B, Dioxins, and water samples for Dissolved RCRA 8 Metals & Arsenic by Method 6020 on June 15 – July 9, 2018.

The results of the analyses are summarized in the attached tables. All soil values are reported on a dry weight basis. Applicable detection limits and QA/QC data are included. An invoice for this analytical work is also enclosed.

ESN Northwest appreciates the opportunity to have provided services for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Michael A Korosec

Michael A. Korosec
President

1210 Eastside Street SE, Suite 200 ■ Olympia, Washington 98501 ■ 360.459.4670 ■ FAX 360.459.3432
Web Site: *www.esnnw.com* E-Mail: *info@esnnw.com*

ESN NORTHWEST CHEMISTRY LABORATORY

BergerABAM
PROJECT PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY
PROJECT #A17.0202.00
Washington

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Analysis of Diesel Range Organics & Lube Oil Range Organics in Soil by Method NWTPH-Dx/Dx Extended

Sample Number	Date Prepared	Date Analyzed	Surrogate Recovery (%)	Diesel Range Organics (mg/kg)	Lube Oil Range Organics (mg/kg)
Method Blank 1	6/14/2018	6/14/2018	106	nd	nd
LCS 1	6/14/2018	6/14/2018	105	99%	---
TP1-1-4	6/14/2018	6/14/2018	98	nd	nd
TP1-2-9	6/14/2018	6/14/2018	93	nd	nd
TP10-1-12	6/14/2018	6/14/2018	107	nd	nd
TP10-2-4	6/14/2018	6/14/2018	101	nd	nd
TP4-1-5	6/14/2018	6/14/2018	88	nd	nd
TP14-1-6.5	6/14/2018	6/14/2018	100	nd	nd
TP20-1-6	6/14/2018	6/14/2018	95	nd	nd
TP21-1-4.5	6/14/2018	6/14/2018	120	nd	nd
TP15-1-5	6/14/2018	6/14/2018	133	nd	nd
TP4-2-12	6/14/2018	6/14/2018	121	nd	nd
TP4-2-12 Duplicate	6/14/2018	6/14/2018	120	nd	nd
Method Blank 2	6/14/2018	6/14/2018	109	nd	nd
LCS 2	6/14/2018	6/14/2018	102	109%	---
MW-2-6	6/14/2018	6/14/2018	100	nd	nd
MW-1-6	6/14/2018	6/14/2018	132	nd	nd
MW-3-5	6/14/2018	6/14/2018	119	nd	nd
MW-3-10	6/14/2018	6/14/2018	111	nd	nd
MW-4-5	6/14/2018	6/14/2018	117	nd	nd
MW-5-10	6/14/2018	6/14/2018	127	nd	nd
MW-6-6	6/14/2018	6/14/2018	121	nd	nd
MW-6-6 Duplicate	6/14/2018	6/14/2018	116	nd	nd
Reporting Limits				50	100

"---" Indicates not tested for component.
"nd" Indicates not detected at the listed detection limits.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%

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Analysis of Diesel Range Organics & Lube Oil Range Organics in Soil by Method NWTPH-Dx/Dx Extended

Sample Number	Date Prepared	Date Analyzed	Surrogate Recovery (%)	Diesel Range Organics (mg/kg)	Lube Oil Range Organics (mg/kg)
Method Blank	6/19/2018	6/19/2018	98	nd	nd
LCS	6/19/2018	6/19/2018	105	92%	---
TP8-2-8	6/19/2018	6/19/2018	132	nd	nd
TP8-3-11	6/19/2018	6/19/2018	111	nd	nd
TP9-1-6.5	6/19/2018	6/19/2018	106	nd	nd
TP8-1-7	6/19/2018	6/19/2018	109	nd	nd
TP13-1-12	6/19/2018	6/19/2018	93	nd	nd
TP18-1-12	6/19/2018	6/19/2018	86	nd	nd
TP24-2-10	6/19/2018	6/19/2018	103	nd	nd
TP25-1-5.5	6/19/2018	6/19/2018	96	nd	nd
TP19-1-5	6/19/2018	6/19/2018	112	nd	nd
TP23-1-6	6/19/2018	6/19/2018	102	nd	nd
TP22-1-6	6/19/2018	6/19/2018	102	nd	nd
TP24-1-5.5	6/19/2018	6/19/2018	102	nd	nd
TP16-1-5.5	6/19/2018	6/19/2018	99	nd	nd
TP16-1-5.5 Duplicate	6/19/2018	6/19/2018	95	nd	nd
Reporting Limits				50	100

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ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%

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Analysis of Diesel Range Organics & Lube Oil Range Organics in Soil by Method NWTPH-Dx/Dx Extended

Sample Number	Date Prepared	Date Analyzed	Surrogate Recovery (%)	Diesel Range Organics (mg/kg)	Lube Oil Range Organics (mg/kg)
Method Blank	6/20/2018	6/20/2018	94	nd	nd
LCS	6/20/2018	6/20/2018	103	101%	---
TP12-1-12	6/20/2018	6/20/2018	96	nd	nd
TP17-2-8	6/20/2018	6/20/2018	86	nd	nd
TP7-2-10	6/20/2018	6/20/2018	90	nd	nd
TP17-1-4	6/20/2018	6/20/2018	80	nd	nd
TP11-1-9	6/20/2018	6/20/2018	70	nd	nd
TP5-1-10	6/20/2018	6/27/2018	80	nd	nd
TP7-1-6	6/20/2018	6/20/2018	80	nd	nd
TP2-1-12	6/20/2018	6/20/2018	78	nd	nd
TP3-1-6	6/20/2018	6/27/2018	68	nd	nd
TP6-1-12	6/20/2018	6/27/2018	72	nd	nd
TP6-1-12 Duplicate	6/20/2018	6/27/2018	58	nd	nd
Reporting Limits				50	100

"---" Indicates not tested for component.
"nd" Indicates not detected at the listed detection limits.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%

ESN NORTHWEST CHEMISTRY LABORATORY

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Analysis of Diesel Range Organics & Lube Oil Range Organics in Water by Method NWTPH-Dx

Sample Number	Date Prepared	Date Analyzed	Surrogate Recovery (%)	Diesel Range Organics (ug/L)	Lube Oil Range Organics (ug/L)
Method Blank	6/27/2018	6/28/2018	97	nd	nd
LCS	6/27/2018	6/28/2018	72	94%	---
MW-2	6/27/2018	6/28/2018	88	nd	nd
MW-1	6/27/2018	6/28/2018	97	nd	nd
MW-5	6/27/2018	6/28/2018	100	nd	nd
MW-6	6/27/2018	6/28/2018	102	nd	nd
MW-4	6/27/2018	6/28/2018	112	nd	nd
MW-3	6/27/2018	6/28/2018	88	nd	nd
Reporting Limits				250	500

"---" Indicates not tested for component.
"nd" Indicates not detected at the listed detection limits.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%

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Analysis of Gasoline Range Organics in Soil
by Method NWTPH-Gx

Sample Number	Date Prepared	Date Analyzed	Surrogate Recovery (%)	Gasoline Range Organics (mg/kg)
Method Blank	6/15/2018	6/15/2018	119	nd
LCS	6/15/2018	6/15/2018	117	121%
TP1-1@4'	6/11/2018	6/15/2018	105	nd
TP1-2@9'	6/11/2018	6/15/2018	114	nd
TP10-1@12'	6/11/2018	6/15/2018	118	nd
TP10-1@12' Duplicate	6/11/2018	6/15/2018	113	nd
TP10-2@4'	6/11/2018	6/15/2018	113	nd
TP4-1@5'	6/11/2018	6/15/2018	114	nd
TP14-1@6.5'	6/11/2018	6/15/2018	112	nd
TP20-1@6'	6/11/2018	6/15/2018	110	nd
TP21-1@4.5'	6/11/2018	6/15/2018	110	nd
TP15-1@5'	6/11/2018	6/15/2018	104	nd
TP4-2@12'	6/11/2018	6/15/2018	111	nd
MW-2@6'	6/11/2018	6/15/2018	108	nd
MW-1@6'	6/11/2018	6/15/2018	106	nd
MW-3@5'	6/11/2018	6/15/2018	109	nd
MW-3@10'	6/11/2018	6/15/2018	110	nd
MW-4@5'	6/11/2018	6/19/2018	113	nd
MW-5@10'	6/11/2018	6/19/2018	108	nd
MW-6@6'	6/11/2018	6/15/2018	104	nd
MW-6@6' Duplicate	6/11/2018	6/15/2018	109	nd
Reporting Limits				10

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%

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Analysis of Gasoline Range Organics in Soil
by Method NWTPH-Gx

Sample Number	Date Prepared	Date Analyzed	Surrogate Recovery (%)	Gasoline Range Organics (mg/kg)
Method Blank	6/19/2018	6/19/2018	110	nd
LCS	6/19/2018	6/19/2018	121	134%
TP8-2@8'	6/12/2018	6/19/2018	107	nd
TP8-3@11'	6/12/2018	6/19/2018	110	nd
TP9-1@6.5'	6/12/2018	6/19/2018	110	nd
TP8-1@7'	6/12/2018	6/19/2018	107	nd
TP13-1@12'	6/12/2018	6/19/2018	107	nd
TP18-1@12'	6/12/2018	6/19/2018	103	nd
TP24-2@10'	6/12/2018	6/19/2018	103	nd
TP25-1@5.5'	6/12/2018	6/19/2018	106	nd
TP19-1@5'	6/12/2018	6/19/2018	106	nd
TP23-1@6'	6/12/2018	6/19/2018	108	nd
TP22-1@6'	6/12/2018	6/19/2018	113	nd
TP22-1@6' Duplicate	6/12/2018	6/19/2018	109	nd
TP24-1@5.5'	6/12/2018	6/19/2018	113	nd
TP16-1@5.5'	6/12/2018	6/19/2018	111	nd
Reporting Limits				10

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%

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Analysis of Gasoline Range Organics in Soil
by Method NWTPH-Gx

Sample Number	Date Prepared	Date Analyzed	Surrogate Recovery (%)	Gasoline Range Organics (mg/kg)
Method Blank	6/19/2018	6/19/2018	110	nd
LCS	6/19/2018	6/19/2018	121	134%
TP12-1@12'	6/13/2018	6/19/2018	109	nd
TP12-1@12'	6/13/2018	6/19/2018	109	nd
TP17-2@8'	6/13/2018	6/19/2018	107	nd
TP7-2@10'	6/13/2018	6/19/2018	107	nd
TP17-1@4'	6/13/2018	6/20/2018	112	nd
TP11-1@9'	6/13/2018	6/20/2018	113	nd
TP5-1@10'	6/13/2018	6/20/2018	110	nd
TP7-1@6'	6/13/2018	6/20/2018	111	nd
TP2-1@12'	6/13/2018	6/20/2018	110	nd
TP3-1@6'	6/13/2018	6/20/2018	113	nd
TP6-1@12'	6/13/2018	6/20/2018	110	nd
Reporting Limits				10

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%

ESN NORTHWEST CHEMISTRY LABORATORY

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Analysis of Gasoline Range Organics in Water
by Method NWTPH-Gx

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline Range Organics (ug/L)
Method Blank	6/18/2018	108	nd
LCS	6/18/2018	116	147%
MW-2	6/18/2018	113	nd
MW-1	6/18/2018	106	nd
MW-5	6/18/2018	105	nd
MW-6	6/18/2018	112	nd
MW-4	6/18/2018	108	nd
MW-3	6/18/2018	110	nd
Reporting Limits			100

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%

ESN NORTHWEST CHEMISTRY LABORATORY

BergerABAM
PROJECT PROPOSED GRAYS
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Analysis of Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	MB	LCS	LCSD	TP1-1-4	TP1-2-9	TP10-1-12	TP10-2-4
Date extracted		06/15/18	06/15/18	06/15/18	06/11/18	06/11/18	06/11/18	06/11/18
Date analyzed	(mg/Kg)	06/15/18	06/15/18	06/15/18	06/15/18	06/15/18	06/15/18	06/15/18
% Moisture					37%	36%	39%	21%
Dichlorodifluoromethane	0.05	nd			nd	nd	nd	nd
Chloromethane	0.05	nd			nd	nd	nd	nd
Vinyl chloride	0.02	nd	77%	118%	nd	nd	nd	nd
Bromomethane	0.05	nd			nd	nd	nd	nd
Chloroethane	0.05	nd			nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd			nd	nd	nd	nd
Acetone	0.25	nd			nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	101%	89%	nd	nd	nd	nd
Methylene chloride	0.05	nd			nd	nd	nd	nd
Methyl-t-butyl ether (MTBE)	0.05	nd			nd	nd	nd	nd
trans-1,2-Dichloroethene	0.05	nd			nd	nd	nd	nd
1,1-Dichloroethane	0.05	nd			nd	nd	nd	nd
2-Butanone (MEK)	0.25	nd			nd	nd	nd	nd
cis-1,2-Dichloroethene	0.05	nd			nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd			nd	nd	nd	nd
Chloroform	0.05	nd	117%	102%	nd	nd	nd	nd
Bromochloromethane	0.05	nd			nd	nd	nd	nd
1,1,1-Trichloroethane	0.05	nd			nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.05	nd			nd	nd	nd	nd
1,1-Dichloropropene	0.05	nd			nd	nd	nd	nd
Carbon tetrachloride	0.05	nd			nd	nd	nd	nd
Benzene	0.02	nd	130%	116%	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	108%	95%	nd	nd	nd	nd
1,2-Dichloropropane	0.05	nd	119%	103%	nd	nd	nd	nd
Dibromomethane	0.05	nd			nd	nd	nd	nd
Bromodichloromethane	0.05	nd			nd	nd	nd	nd
4-Methyl-2-pentanone (MIBK)	0.25	nd			nd	nd	nd	nd
cis-1,3-Dichloropropene	0.05	nd			nd	nd	nd	nd
Toluene	0.05	nd	97%	89%	nd	nd	nd	nd
trans-1,3-Dichloropropene	0.05	nd			nd	nd	nd	nd
1,1,2-Trichloroethane	0.05	nd			nd	nd	nd	nd
2-Hexanone	0.25	nd			nd	nd	nd	nd
1,3-Dichloropropane	0.05	nd			nd	nd	nd	nd
Dibromochloromethane	0.05	nd			nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	105%	94%	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	0.05	nd			nd	nd	nd	nd
Chlorobenzene	0.05	nd	100%	90%	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd			nd	nd	nd	nd
Ethylbenzene	0.05	nd	104%	98%	nd	nd	nd	nd
Xylenes	0.15	nd	76%	69%	nd	nd	nd	nd
Styrene	0.05	nd			nd	nd	nd	nd
Bromoform	0.05	nd			nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd			nd	nd	nd	nd
Isopropylbenzene	0.05	nd			nd	nd	nd	nd
1,2,3-Trichloropropane	0.05	nd			nd	nd	nd	nd
Bromobenzene	0.05	nd			nd	nd	nd	nd

ESN NORTHWEST CHEMISTRY LABORATORY

BergerABAM
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PROJECT #A17.0202.00
Washington

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Analysis of Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	MB	LCS	LCSD	TP1-1-4	TP1-2-9	TP10-1-12	TP10-2-4
Date extracted		06/15/18	06/15/18	06/15/18	06/11/18	06/11/18	06/11/18	06/11/18
Date analyzed	(mg/Kg)	06/15/18	06/15/18	06/15/18	06/15/18	06/15/18	06/15/18	06/15/18
% Moisture					37%	36%	39%	21%
n-Propylbenzene	0.05	nd			nd	nd	nd	nd
2-Chlorotoluene	0.05	nd			nd	nd	nd	nd
4-Chlorotoluene	0.05	nd			nd	nd	nd	nd
1,3,5-Trimethylbenzene	0.05	nd			nd	nd	nd	nd
tert-Butylbenzene	0.05	nd			nd	nd	nd	nd
1,2,4-Trimethylbenzene	0.05	nd			nd	nd	nd	nd
sec-Butylbenzene	0.05	nd			nd	nd	nd	nd
1,3-Dichlorobenzene	0.05	nd			nd	nd	nd	nd
1,4-Dichlorobenzene	0.05	nd			nd	nd	nd	nd
Isopropyltoluene	0.05	nd			nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd			nd	nd	nd	nd
n-Butylbenzene	0.05	nd			nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd			nd	nd	nd	nd
1,2,4-Trichlorobenzene	0.05	nd			nd	nd	nd	nd
Naphthalene	0.05	nd			nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.05	nd			nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.05	nd			nd	nd	nd	nd
Surrogate recoveries								
Dibromofluoromethane		100%	86%	82%	93%	94%	96%	92%
Toluene-d8		95%	88%	89%	97%	94%	95%	93%
4-Bromofluorobenzene		119%	118%	119%	105%	114%	118%	113%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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Analysis of Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	TP4-1-5	TP14-1-6.5	TP20-1-6	TP21-4-4.5	TP15-1-5	TP4-2-12
Date extracted		06/11/18	06/11/18	06/11/18	06/11/18	06/11/18	06/11/18
Date analyzed	(mg/Kg)	06/15/18	06/15/18	06/15/18	06/15/18	06/15/18	06/15/18
% Moisture		46%	20%	16%	19%	21%	40%
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	nd	nd
Chloromethane	0.05	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.02	nd	nd	nd	nd	nd	nd
Bromomethane	0.05	nd	nd	nd	nd	nd	nd
Chloroethane	0.05	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd	nd	nd	nd
Acetone	0.25	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
Methylene chloride	0.05	nd	nd	nd	nd	nd	nd
Methyl-t-butyl ether (MTBE)	0.05	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.05	nd	nd	nd	nd	nd	nd
2-Butanone (MEK)	0.25	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Chloroform	0.05	nd	nd	nd	nd	nd	nd
Bromochloromethane	0.05	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	0.05	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.05	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	0.05	nd	nd	nd	nd	nd	nd
Benzene	0.02	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Dibromomethane	0.05	nd	nd	nd	nd	nd	nd
Bromodichloromethane	0.05	nd	nd	nd	nd	nd	nd
4-Methyl-2-pentanone (MIBK)	0.25	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd
Toluene	0.05	**0.07**	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	0.05	nd	nd	nd	nd	nd	nd
2-Hexanone	0.25	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Dibromochloromethane	0.05	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	0.05	nd	nd	nd	nd	nd	nd
Chlorobenzene	0.05	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Ethylbenzene	0.05	nd	nd	nd	nd	nd	nd
Xylenes	0.15	nd	nd	nd	nd	nd	nd
Styrene	0.05	nd	nd	nd	nd	nd	nd
Bromoform	0.05	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Isopropylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	0.05	nd	nd	nd	nd	nd	nd
Bromobenzene	0.05	nd	nd	nd	nd	nd	nd

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Analysis of Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	**TP4-1-5**	**TP14-1-6.5**	**TP20-1-6**	**TP21-4-4.5**	**TP15-1-5**	**TP4-2-12**
Date extracted		06/11/18	06/11/18	06/11/18	06/11/18	06/11/18	06/11/18
Date analyzed	(mg/Kg)	06/15/18	06/15/18	06/15/18	06/15/18	06/15/18	06/15/18
% Moisture		46%	20%	16%	19%	21%	40%
n-Propylbenzene	0.05	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	0.05	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	0.05	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	0.05	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	0.05	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
Isopropyltoluene	0.05	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
n-Butylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
Naphthalene	0.05	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.05	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
Surrogate recoveries							
Dibromofluoromethane		94%	102%	95%	90%	96%	90%
Toluene-d8		93%	96%	95%	94%	97%	93%
4-Bromofluorobenzene		114%	112%	110%	110%	104%	111%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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Analysis of Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	MW2-6	MW-1-6	MW-3-5	MW-3-10	MW-4-5	MW-5-10	MW-6-6
Date extracted		06/11/18	06/11/18	06/11/18	06/11/18	06/11/18	06/11/18	06/11/18
Date analyzed	(mg/Kg)	06/15/18	06/15/18	06/15/18	06/15/18	06/19/18	06/19/18	06/15/18
% Moisture		34%	25%	40%	49%	28%	38%	34%
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	nd	nd	nd
Chloromethane	0.05	nd	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.02	nd	nd	nd	nd	nd	nd	nd
Bromomethane	0.05	nd	nd	nd	nd	nd	nd	nd
Chloroethane	0.05	nd	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd	nd	nd	nd	nd
Acetone	0.25	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd	nd
Methylene chloride	0.05	nd	nd	nd	nd	nd	nd	nd
Methyl-t-butyl ether (MTBE)	0.05	nd	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.05	nd	nd	nd	nd	nd	nd	nd
2-Butanone (MEK)	0.25	nd	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd	nd
Chloroform	0.05	nd	nd	nd	nd	nd	nd	nd
Bromochloromethane	0.05	nd	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	0.05	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.05	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	0.05	nd	nd	nd	nd	nd	nd	nd
Benzene	0.02	nd	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd	nd
Dibromomethane	0.05	nd	nd	nd	nd	nd	nd	nd
Bromodichloromethane	0.05	nd	nd	nd	nd	nd	nd	nd
4-Methyl-2-pentanone (MIBK)	0.25	nd	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd	nd
Toluene	0.05	nd	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	0.05	nd	nd	nd	nd	nd	nd	nd
2-Hexanone	0.25	nd	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd	nd
Dibromochloromethane	0.05	nd	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	0.05	nd	nd	nd	nd	nd	nd	nd
Chlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd	nd
Ethylbenzene	0.05	nd	nd	nd	nd	nd	nd	nd
Xylenes	0.15	nd	nd	nd	nd	nd	nd	nd
Styrene	0.05	nd	nd	nd	nd	nd	nd	nd
Bromoform	0.05	nd	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd	nd
Isopropylbenzene	0.05	nd	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	0.05	nd	nd	nd	nd	nd	nd	nd
Bromobenzene	0.05	nd	nd	nd	nd	nd	nd	nd

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Analysis of Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	**MW2-6**	**MW-1-6**	**MW-3-5**	**MW-3-10**	**MW-4-5**	**MW-5-10**	**MW-6-6**
Date extracted		06/11/18	06/11/18	06/11/18	06/11/18	06/11/18	06/11/18	06/11/18
Date analyzed	(mg/Kg)	06/15/18	06/15/18	06/15/18	06/15/18	06/19/18	06/19/18	06/15/18
% Moisture		34%	25%	40%	49%	28%	38%	34%
n-Propylbenzene	0.05	nd	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	0.05	nd	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	0.05	nd	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	0.05	nd	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	0.05	nd	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	0.05	nd	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	0.05	nd	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd
Isopropyltoluene	0.05	nd	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd
n-Butylbenzene	0.05	nd	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd
Naphthalene	0.05	nd	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.05	nd	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.05	nd	nd	nd	nd	nd	nd	nd
Surrogate recoveries								
Dibromofluoromethane		105%	97%	91%	97%	91%	97%	93%
Toluene-d8		94%	96%	93%	94%	91%	92%	97%
4-Bromofluorobenzene		108%	106%	109%	110%	113%	108%	104%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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	RL	MB	LCS	LCSD	TP8-2@8'	TP8-3@11'	TP9-1@6.5'	TP8-1@7'
Date extracted		06/19/18	06/19/18	06/19/18	06/12/18	06/12/18	06/12/18	06/12/18
Date analyzed	(mg/Kg)	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18
% Moisture					40%	47%	20%	48%
Dichlorodifluoromethane	0.05	nd			nd	nd	nd	nd
Chloromethane	0.05	nd			nd	nd	nd	nd
Vinyl chloride	0.02	nd	86%	123%	nd	nd	nd	nd
Bromomethane	0.05	nd			nd	nd	nd	nd
Chloroethane	0.05	nd			nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd			nd	nd	nd	nd
Acetone	0.25	nd			nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	107%	106%	nd	nd	nd	nd
Methylene chloride	0.05	nd			nd	nd	nd	nd
Methyl-t-butyl ether (MTBE)	0.05	nd			nd	nd	nd	nd
trans-1,2-Dichloroethene	0.05	nd			nd	nd	nd	nd
1,1-Dichloroethane	0.05	nd			nd	nd	nd	nd
2-Butanone (MEK)	0.25	nd			nd	nd	nd	nd
cis-1,2-Dichloroethene	0.05	nd			nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd			nd	nd	nd	nd
Chloroform	0.05	nd	121%	102%	nd	nd	nd	nd
Bromochloromethane	0.05	nd			nd	nd	nd	nd
1,1,1-Trichloroethane	0.05	nd			nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.05	nd			nd	nd	nd	nd
1,1-Dichloropropene	0.05	nd			nd	nd	nd	nd
Carbon tetrachloride	0.05	nd			nd	nd	nd	nd
Benzene	0.02	nd	137%	106%	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	110%	85%	nd	nd	nd	nd
1,2-Dichloropropane	0.05	nd	114%	90%	nd	nd	nd	nd
Dibromomethane	0.05	nd			nd	nd	nd	nd
Bromodichloromethane	0.05	nd			nd	nd	nd	nd
4-Methyl-2-pentanone (MIBK)	0.25	nd			nd	nd	nd	nd
cis-1,3-Dichloropropene	0.05	nd			nd	nd	nd	nd
Toluene	0.05	nd	93%	75%	nd	nd	nd	nd
trans-1,3-Dichloropropene	0.05	nd			nd	nd	nd	nd
1,1,2-Trichloroethane	0.05	nd			nd	nd	nd	nd
2-Hexanone	0.25	nd			nd	nd	nd	nd
1,3-Dichloropropane	0.05	nd			nd	nd	nd	nd
Dibromochloromethane	0.05	nd			nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	97%	76%	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	0.05	nd			nd	nd	nd	nd
Chlorobenzene	0.05	nd	93%	75%	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd			nd	nd	nd	nd
Ethylbenzene	0.05	nd	103%	84%	nd	nd	nd	nd
Xylenes	0.15	nd	73%	124%	nd	nd	nd	nd
Styrene	0.05	nd			nd	nd	nd	nd
Bromoform	0.05	nd			nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd			nd	nd	nd	nd
Isopropylbenzene	0.05	nd			nd	nd	nd	nd
1,2,3-Trichloropropane	0.05	nd			nd	nd	nd	nd
Bromobenzene	0.05	nd			nd	nd	nd	nd

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BergerABAM
PROJECT PROPOSED GRAYS
HARBOR POTASH EXPORT
PROJECT #A17.0202.00
Washington

ESN Northwest
1210 Eastside Street SE Suite 200
Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analysis of Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	MB	LCS	LCSD	TP8-2@8'	TP8-3@11'	TP9-1@6.5'	TP8-1@7'
Date extracted		06/19/18	06/19/18	06/19/18	06/12/18	06/12/18	06/12/18	06/12/18
Date analyzed	(mg/Kg)	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18
% Moisture					40%	47%	20%	48%
n-Propylbenzene	0.05	nd			nd	nd	nd	nd
2-Chlorotoluene	0.05	nd			nd	nd	nd	nd
4-Chlorotoluene	0.05	nd			nd	nd	nd	nd
1,3,5-Trimethylbenzene	0.05	nd			nd	nd	nd	nd
tert-Butylbenzene	0.05	nd			nd	nd	nd	nd
1,2,4-Trimethylbenzene	0.05	nd			nd	nd	nd	nd
sec-Butylbenzene	0.05	nd			nd	nd	nd	nd
1,3-Dichlorobenzene	0.05	nd			nd	nd	nd	nd
1,4-Dichlorobenzene	0.05	nd			nd	nd	nd	nd
Isopropyltoluene	0.05	nd			nd	nd	nd	**0.06**
1,2-Dichlorobenzene	0.05	nd			nd	nd	nd	nd
n-Butylbenzene	0.05	nd			nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd			nd	nd	nd	nd
1,2,4-Trichlorobenzene	0.05	nd			nd	nd	nd	nd
Naphthalene	0.05	nd			nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.05	nd			nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.05	nd			nd	nd	nd	nd
Surrogate recoveries								
Dibromofluoromethane		91%	96%	90%	92%	91%	92%	90%
Toluene-d8		92%	89%	82%	94%	92%	94%	95%
4-Bromofluorobenzene		110%	112%	117%	107%	110%	110%	107%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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Analysis of Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	TP13-1@12'	TP18-1@12'	TP24-2@10'	TP25-1@5.5'	TP19-1@5'	TP23-1@6'
Date extracted		06/12/18	06/12/18	06/12/18	06/12/18	06/12/18	06/12/18
Date analyzed	(mg/Kg)	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18
% Moisture		45%	41%	36%	27%	73%	15%
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	nd	nd
Chloromethane	0.05	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.02	nd	nd	nd	nd	nd	nd
Bromomethane	0.05	nd	nd	nd	nd	nd	nd
Chloroethane	0.05	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd	nd	nd	nd
Acetone	0.25	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
Methylene chloride	0.05	nd	nd	nd	nd	nd	nd
Methyl-t-butyl ether (MTBE)	0.05	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.05	nd	nd	nd	nd	nd	nd
2-Butanone (MEK)	0.25	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Chloroform	0.05	nd	nd	nd	nd	nd	nd
Bromochloromethane	0.05	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	0.05	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.05	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	0.05	nd	nd	nd	nd	nd	nd
Benzene	0.02	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Dibromomethane	0.05	nd	nd	nd	nd	nd	nd
Bromodichloromethane	0.05	nd	nd	nd	nd	nd	nd
4-Methyl-2-pentanone (MIBK)	0.25	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd
Toluene	0.05	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	0.05	nd	nd	nd	nd	nd	nd
2-Hexanone	0.25	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Dibromochloromethane	0.05	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	0.05	nd	nd	nd	nd	nd	nd
Chlorobenzene	0.05	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Ethylbenzene	0.05	nd	nd	nd	nd	nd	nd
Xylenes	0.15	nd	nd	nd	nd	nd	nd
Styrene	0.05	nd	nd	nd	nd	nd	nd
Bromoform	0.05	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Isopropylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	0.05	nd	nd	nd	nd	nd	nd
Bromobenzene	0.05	nd	nd	nd	nd	nd	nd

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	RL	**TP13-1@12'**	**TP18-1@12'**	**TP24-2@10'**	**TP25-1@5.5'**	**TP19-1@5'**	**TP23-1@6'**
Date extracted		06/12/18	06/12/18	06/12/18	06/12/18	06/12/18	06/12/18
Date analyzed	(mg/Kg)	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18
% Moisture		45%	41%	36%	27%	73%	15%
n-Propylbenzene	0.05	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	0.05	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	0.05	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	0.05	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	0.05	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
Isopropyltoluene	0.05	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
n-Butylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
Naphthalene	0.05	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.05	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
Surrogate recoveries							
Dibromofluoromethane		91%	93%	92%	92%	95%	95%
Toluene-d8		94%	93%	94%	92%	95%	96%
4-Bromofluorobenzene		107%	103%	103%	106%	106%	108%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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Analysis of Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	TP22-1@6'	TP24-1@5.5'	TP16-1@5.5'
Date extracted		06/12/18	06/12/18	06/12/18
Date analyzed	(mg/Kg)	06/19/18	06/19/18	06/19/18
% Moisture		24%	44%	39%
Dichlorodifluoromethane	0.05	nd	nd	nd
Chloromethane	0.05	nd	nd	nd
Vinyl chloride	0.02	nd	nd	nd
Bromomethane	0.05	nd	nd	nd
Chloroethane	0.05	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd
Acetone	0.25	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd
Methylene chloride	0.05	nd	nd	nd
Methyl-t-butyl ether (MTBE)	0.05	nd	nd	nd
trans-1,2-Dichloroethene	0.05	nd	nd	nd
1,1-Dichloroethane	0.05	nd	nd	nd
2-Butanone (MEK)	0.25	nd	nd	nd
cis-1,2-Dichloroethene	0.05	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd
Chloroform	0.05	nd	nd	nd
Bromochloromethane	0.05	nd	nd	nd
1,1,1-Trichloroethane	0.05	nd	nd	nd
1,2-Dichloroethane (EDC)	0.05	nd	nd	nd
1,1-Dichloropropene	0.05	nd	nd	nd
Carbon tetrachloride	0.05	nd	nd	nd
Benzene	0.02	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	nd
1,2-Dichloropropane	0.05	nd	nd	nd
Dibromomethane	0.05	nd	nd	nd
Bromodichloromethane	0.05	nd	nd	nd
4-Methyl-2-pentanone (MIBK)	0.25	nd	nd	nd
cis-1,3-Dichloropropene	0.05	nd	nd	nd
Toluene	0.05	nd	nd	nd
trans-1,3-Dichloropropene	0.05	nd	nd	nd
1,1,2-Trichloroethane	0.05	nd	nd	nd
2-Hexanone	0.25	nd	nd	nd
1,3-Dichloropropane	0.05	nd	nd	nd
Dibromochloromethane	0.05	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	nd	nd
1,2-Dibromoethane (EDB)	0.05	nd	nd	nd
Chlorobenzene	0.05	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd
Ethylbenzene	0.05	nd	nd	nd
Xylenes	0.15	nd	nd	nd
Styrene	0.05	nd	nd	nd
Bromoform	0.05	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd
Isopropylbenzene	0.05	nd	nd	nd
1,2,3-Trichloropropane	0.05	nd	nd	nd
Bromobenzene	0.05	nd	nd	nd

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	RL	**TP22-1@6'**	**TP24-1@5.5'**	**TP16-1@5.5'**
Date extracted		06/12/18	06/12/18	06/12/18
Date analyzed	(mg/Kg)	06/19/18	06/19/18	06/19/18
% Moisture		24%	44%	39%
n-Propylbenzene	0.05	nd	nd	nd
2-Chlorotoluene	0.05	nd	nd	nd
4-Chlorotoluene	0.05	nd	nd	nd
1,3,5-Trimethylbenzene	0.05	nd	nd	nd
tert-Butylbenzene	0.05	nd	nd	nd
1,2,4-Trimethylbenzene	0.05	nd	nd	nd
sec-Butylbenzene	0.05	nd	nd	nd
1,3-Dichlorobenzene	0.05	nd	nd	nd
1,4-Dichlorobenzene	0.05	nd	nd	nd
Isopropyltoluene	0.05	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd
n-Butylbenzene	0.05	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd
1,2,4-Trichlorobenzene	0.05	nd	nd	nd
Naphthalene	0.05	nd	nd	nd
Hexachloro-1,3-butadiene	0.05	nd	nd	nd
1,2,3-Trichlorobenzene	0.05	nd	nd	nd
Surrogate recoveries				
Dibromofluoromethane		93%	92%	92%
Toluene-d8		90%	91%	91%
4-Bromofluorobenzene		113%	113%	111%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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Analysis of Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	MB	LCS	LCSD	TP12-1@12'	TP17-2@8'	TP7-2@10'	TP17-1@4'
Date extracted		06/19/18	06/19/18	06/19/18	06/13/18	06/13/18	06/13/18	06/13/18
Date analyzed	(mg/Kg)	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/20/18
% Moisture					38%	39%	39%	40%
Dichlorodifluoromethane	0.05	nd			nd	nd	nd	nd
Chloromethane	0.05	nd			nd	nd	nd	nd
Vinyl chloride	0.02	nd	86%	123%	nd	nd	nd	nd
Bromomethane	0.05	nd			nd	nd	nd	nd
Chloroethane	0.05	nd			nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd			nd	nd	nd	nd
Acetone	0.25	nd			nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	107%	106%	nd	nd	nd	nd
Methylene chloride	0.05	nd			nd	nd	nd	nd
Methyl-t-butyl ether (MTBE)	0.05	nd			nd	nd	nd	nd
trans-1,2-Dichloroethene	0.05	nd			nd	nd	nd	nd
1,1-Dichloroethane	0.05	nd			nd	nd	nd	nd
2-Butanone (MEK)	0.25	nd			nd	nd	nd	nd
cis-1,2-Dichloroethene	0.05	nd			nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd			nd	nd	nd	nd
Chloroform	0.05	nd	121%	102%	nd	nd	nd	nd
Bromochloromethane	0.05	nd			nd	nd	nd	nd
1,1,1-Trichloroethane	0.05	nd			nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.05	nd			nd	nd	nd	nd
1,1-Dichloropropene	0.05	nd			nd	nd	nd	nd
Carbon tetrachloride	0.05	nd			nd	nd	nd	nd
Benzene	0.02	nd	137%	106%	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	110%	85%	nd	nd	nd	nd
1,2-Dichloropropane	0.05	nd	114%	90%	nd	nd	nd	nd
Dibromomethane	0.05	nd			nd	nd	nd	nd
Bromodichloromethane	0.05	nd			nd	nd	nd	nd
4-Methyl-2-pentanone (MIBK)	0.25	nd			nd	nd	nd	nd
cis-1,3-Dichloropropene	0.05	nd			nd	nd	nd	nd
Toluene	0.05	nd	93%	75%	nd	nd	nd	nd
trans-1,3-Dichloropropene	0.05	nd			nd	nd	nd	nd
1,1,2-Trichloroethane	0.05	nd			nd	nd	nd	nd
2-Hexanone	0.25	nd			nd	nd	nd	nd
1,3-Dichloropropane	0.05	nd			nd	nd	nd	nd
Dibromochloromethane	0.05	nd			nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	97%	76%	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	0.05	nd			nd	nd	nd	nd
Chlorobenzene	0.05	nd	93%	75%	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd			nd	nd	nd	nd
Ethylbenzene	0.05	nd	103%	84%	nd	nd	nd	nd
Xylenes	0.15	nd	73%	124%	nd	nd	nd	nd
Styrene	0.05	nd			nd	nd	nd	nd
Bromoform	0.05	nd			nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd			nd	nd	nd	nd
Isopropylbenzene	0.05	nd			nd	nd	nd	nd
1,2,3-Trichloropropane	0.05	nd			nd	nd	nd	nd
Bromobenzene	0.05	nd			nd	nd	nd	nd

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	RL	MB	LCS	LCSD	TP12-1@12'	TP17-2@8'	TP7-2@10'	TP17-1@4'
Date extracted		06/19/18	06/19/18	06/19/18	06/13/18	06/13/18	06/13/18	06/13/18
Date analyzed	(mg/Kg)	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/20/18
% Moisture					38%	39%	39%	40%
n-Propylbenzene	0.05	nd			nd	nd	nd	nd
2-Chlorotoluene	0.05	nd			nd	nd	nd	nd
4-Chlorotoluene	0.05	nd			nd	nd	nd	nd
1,3,5-Trimethylbenzene	0.05	nd			nd	nd	nd	nd
tert-Butylbenzene	0.05	nd			nd	nd	nd	nd
1,2,4-Trimethylbenzene	0.05	nd			nd	nd	nd	nd
sec-Butylbenzene	0.05	nd			nd	nd	nd	nd
1,3-Dichlorobenzene	0.05	nd			nd	nd	nd	nd
1,4-Dichlorobenzene	0.05	nd			nd	nd	nd	nd
Isopropyltoluene	0.05	nd			nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd			nd	nd	nd	nd
n-Butylbenzene	0.05	nd			nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd			nd	nd	nd	nd
1,2,4-Trichlorobenzene	0.05	nd			nd	nd	nd	nd
Naphthalene	0.05	nd			nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.05	nd			nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.05	nd			nd	nd	nd	nd
Surrogate recoveries								
Dibromofluoromethane		91%	96%	90%	94%	96%	104%	95%
Toluene-d8		92%	89%	82%	93%	92%	95%	91%
4-Bromofluorobenzene		110%	112%	117%	109%	107%	107%	112%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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Analysis of Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	TP11-1@9'	TP5-1@10'	TP7-1@6'	TP2-1@12'	TP3-1@6'	TP6-1@12'
Date extracted		06/13/18	06/13/18	06/13/18	06/13/18	06/13/18	06/13/18
Date analyzed	(mg/Kg)	06/20/18	06/20/18	06/20/18	06/20/18	06/20/18	06/20/18
% Moisture		47%	49%	41%	45%	34%	36%
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	nd	nd
Chloromethane	0.05	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.02	nd	nd	nd	nd	nd	nd
Bromomethane	0.05	nd	nd	nd	nd	nd	nd
Chloroethane	0.05	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd	nd	nd	nd
Acetone	0.25	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
Methylene chloride	0.05	nd	nd	nd	nd	nd	nd
Methyl-t-butyl ether (MTBE)	0.05	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.05	nd	nd	nd	nd	nd	nd
2-Butanone (MEK)	0.25	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Chloroform	0.05	nd	nd	nd	nd	nd	nd
Bromochloromethane	0.05	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	0.05	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.05	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	0.05	nd	nd	nd	nd	nd	nd
Benzene	0.02	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Dibromomethane	0.05	nd	nd	nd	nd	nd	nd
Bromodichloromethane	0.05	nd	nd	nd	nd	nd	nd
4-Methyl-2-pentanone (MIBK)	0.25	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd
Toluene	0.05	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	0.05	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	0.05	nd	nd	nd	nd	nd	nd
2-Hexanone	0.25	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Dibromochloromethane	0.05	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	0.05	nd	nd	nd	nd	nd	nd
Chlorobenzene	0.05	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Ethylbenzene	0.05	nd	nd	nd	nd	nd	nd
Xylenes	0.15	nd	nd	nd	nd	nd	nd
Styrene	0.05	nd	nd	nd	nd	nd	nd
Bromoform	0.05	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Isopropylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	0.05	nd	nd	nd	nd	nd	nd
Bromobenzene	0.05	nd	nd	nd	nd	nd	nd

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Analysis of Volatile Organic Compounds in Soil by Method 8260C/5035

	RL	TP11-1@9'	TP5-1@10'	TP7-1@6'	TP2-1@12'	TP3-1@6'	TP6-1@12'
Date extracted		06/13/18	06/13/18	06/13/18	06/13/18	06/13/18	06/13/18
Date analyzed	(mg/Kg)	06/20/18	06/20/18	06/20/18	06/20/18	06/20/18	06/20/18
% Moisture		47%	49%	41%	45%	34%	36%
n-Propylbenzene	0.05	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	0.05	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	0.05	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	0.05	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	0.05	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
Isopropyltoluene	0.05	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
n-Butylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
Naphthalene	0.05	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.05	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
Surrogate recoveries							
Dibromofluoromethane		94%	96%	95%	100%	94%	100%
Toluene-d8		92%	93%	92%	93%	93%	94%
4-Bromofluorobenzene		113%	110%	111%	110%	113%	110%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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Analysis of Volatile Organic Compounds in Water by Method 8260C/5030C

Analytical Results

	RL	MB	LCS	LCSD	MW-2	MW-1	MW-5	MW-6
Date analyzed	(ug/L)	06/18/18	06/18/18	06/18/18	06/18/18	06/18/18	06/18/18	06/18/18
Dichlorodifluoromethane	1.0	nd			nd	nd	nd	nd
Chloromethane	1.0	nd			nd	nd	nd	nd
Vinyl chloride	0.2	nd	107%	83%	nd	nd	nd	nd
Bromomethane	1.0	nd			nd	nd	nd	nd
Chloroethane	1.0	nd			nd	nd	nd	nd
Trichlorofluoromethane	1.0	nd			nd	nd	nd	nd
Acetone	10.0	nd			nd	nd	nd	nd
1,1-Dichloroethene	1.0	nd	100%	101%	nd	nd	nd	nd
Methylene chloride	1.0	nd			nd	nd	nd	nd
Methyl-t-butyl ether (MTBE)	1.0	nd			nd	nd	nd	nd
trans-1,2-Dichloroethene	1.0	nd			nd	nd	nd	nd
1,1-Dichloroethane	1.0	nd			nd	nd	nd	nd
2-Butanone (MEK)	10.0	nd			nd	nd	nd	nd
cis-1,2-Dichloroethene	1.0	nd			nd	nd	nd	nd
2,2-Dichloropropane	1.0	nd			nd	nd	nd	nd
Chloroform	1.0	nd	118%	122%	nd	nd	nd	nd
Bromochloromethane	1.0	nd			nd	nd	nd	nd
1,1,1-Trichloroethane	1.0	nd			nd	nd	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd			nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd			nd	nd	nd	nd
Carbon tetrachloride	1.0	nd			nd	nd	nd	nd
Benzene	1.0	nd	140%*	139%*	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	nd	111%	115%	nd	nd	nd	nd
1,2-Dichloropropane	1.0	nd	123%	122%	nd	nd	nd	nd
Dibromomethane	1.0	nd			nd	nd	nd	nd
Bromodichloromethane	1.0	nd			nd	nd	nd	nd
4-Methyl-2-pentanone (MIBK)	1.0	nd			nd	nd	nd	nd
cis-1,3-Dichloropropene	1.0	nd			nd	nd	nd	nd
Toluene	1.0	nd	146%*	116%	nd	nd	nd	nd
trans-1,3-Dichloropropene	1.0	nd			nd	nd	nd	nd
1,1,2-Trichloroethane	1.0	nd			nd	nd	nd	nd
2-Hexanone	1.0	nd			nd	nd	nd	nd
1,3-Dichloropropane	1.0	nd			nd	nd	nd	nd
Dibromochloromethane	1.0	nd			nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	111%	111%	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	1.0	nd			nd	nd	nd	nd
Chlorobenzene	1.0	nd	107%	108%	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd			nd	nd	nd	nd
Ethylbenzene	1.0	nd	130%	129%	nd	nd	nd	nd
Xylenes	3.0	nd	107%	93%	nd	nd	nd	nd
Styrene	1.0	nd			nd	nd	nd	nd
Bromoform	1.0	nd			nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd			nd	nd	nd	nd
Isopropylbenzene	1.0	nd			nd	nd	nd	nd
1,2,3-Trichloropropane	1.0	nd			nd	nd	nd	nd
Bromobenzene	1.0	nd			nd	nd	nd	nd

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Analysis of Volatile Organic Compounds in Water by Method 8260C/5030C

Analytical Results

	RL	MB	LCS	LCSD	MW-2	MW-1	MW-5	MW-6
Date analyzed	(ug/L)	06/18/18	06/18/18	06/18/18	06/18/18	06/18/18	06/18/18	06/18/18
n-Propylbenzene	1.0	nd			nd	nd	nd	nd
2-Chlorotoluene	1.0	nd			nd	nd	nd	nd
4-Chlorotoluene	1.0	nd			nd	nd	nd	nd
1,3,5-Trimethylbenzene	1.0	nd			nd	nd	nd	nd
tert-Butylbenzene	1.0	nd			nd	nd	nd	nd
1,2,4-Trimethylbenzene	1.0	nd			nd	nd	nd	nd
sec-Butylbenzene	1.0	nd			nd	nd	nd	nd
1,3-Dichlorobenzene	1.0	nd			nd	nd	nd	nd
1,4-Dichlorobenzene	1.0	nd			nd	nd	nd	nd
Isopropyltoluene	1.0	nd			nd	nd	nd	nd
1,2-Dichlorobenzene	1.0	nd			nd	nd	nd	nd
n-Butylbenzene	1.0	nd			nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	1.0	nd			nd	nd	nd	nd
1,2,4-Trichlorobenzene	1.0	nd			nd	nd	nd	nd
Naphthalene	1.0	nd			nd	nd	nd	nd
Hexachloro-1,3-butadiene	1.0	nd			nd	nd	nd	nd
1,2,3-Trichlorobenzene	1.0	nd			nd	nd	nd	nd
Surrogate recoveries								
Dibromofluoromethane		103%	84%	82%	93%	98%	93%	97%
Toluene-d8		92%	84%	84%	89%	91%	94%	92%
4-Bromofluorobenzene		108%	126%	117%	113%	106%	105%	112%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%
* Analysis of LCS/LCSD yielded high recoveries for these analytes, because these analytes were not detected in samples, no further action was taken

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Analysis of Volatile Organic Compounds in Water by Method 8260C/5030C

Analytical Results

	RL	**MW-4**	**MW-3**
Date analyzed	(ug/L)	06/18/18	06/18/18
Dichlorodifluoromethane	1.0	nd	nd
Chloromethane	1.0	nd	nd
Vinyl chloride	0.2	nd	nd
Bromomethane	1.0	nd	nd
Chloroethane	1.0	nd	nd
Trichlorofluoromethane	1.0	nd	nd
Acetone	10.0	nd	nd
1,1-Dichloroethene	1.0	nd	nd
Methylene chloride	1.0	nd	nd
Methyl-t-butyl ether (MTBE)	1.0	nd	nd
trans-1,2-Dichloroethene	1.0	nd	nd
1,1-Dichloroethane	1.0	nd	nd
2-Butanone (MEK)	10.0	nd	nd
cis-1,2-Dichloroethene	1.0	nd	nd
2,2-Dichloropropane	1.0	nd	nd
Chloroform	1.0	nd	nd
Bromochloromethane	1.0	nd	nd
1,1,1-Trichloroethane	1.0	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd
1,1-Dichloropropene	1.0	nd	nd
Carbon tetrachloride	1.0	nd	nd
Benzene	1.0	nd	nd
Trichloroethene (TCE)	1.0	nd	nd
1,2-Dichloropropane	1.0	nd	nd
Dibromomethane	1.0	nd	nd
Bromodichloromethane	1.0	nd	nd
4-Methyl-2-pentanone (MIBK)	1.0	nd	nd
cis-1,3-Dichloropropene	1.0	nd	nd
Toluene	1.0	nd	nd
trans-1,3-Dichloropropene	1.0	nd	nd
1,1,2-Trichloroethane	1.0	nd	nd
2-Hexanone	1.0	nd	nd
1,3-Dichloropropane	1.0	nd	nd
Dibromochloromethane	1.0	nd	nd
Tetrachloroethene (PCE)	1.0	nd	nd
1,2-Dibromoethane (EDB)	1.0	nd	nd
Chlorobenzene	1.0	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd	nd
Ethylbenzene	1.0	nd	nd
Xylenes	3.0	nd	nd
Styrene	1.0	nd	nd
Bromoform	1.0	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd	nd
Isopropylbenzene	1.0	nd	nd
1,2,3-Trichloropropane	1.0	nd	nd
Bromobenzene	1.0	nd	nd

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Analysis of Volatile Organic Compounds in Water by Method 8260C/5030C

Analytical Results

	RL	**MW-4**	**MW-3**
Date analyzed	(ug/L)	06/18/18	06/18/18
n-Propylbenzene	1.0	nd	nd
2-Chlorotoluene	1.0	nd	nd
4-Chlorotoluene	1.0	nd	nd
1,3,5-Trimethylbenzene	1.0	nd	nd
tert-Butylbenzene	1.0	nd	nd
1,2,4-Trimethylbenzene	1.0	nd	nd
sec-Butylbenzene	1.0	nd	nd
1,3-Dichlorobenzene	1.0	nd	nd
1,4-Dichlorobenzene	1.0	nd	nd
Isopropyltoluene	1.0	nd	**7.3**
1,2-Dichlorobenzene	1.0	nd	nd
n-Butylbenzene	1.0	nd	nd
1,2-Dibromo-3-Chloropropane	1.0	nd	nd
1,2,4-Trichlorobenzene	1.0	nd	nd
Naphthalene	1.0	nd	nd
Hexachloro-1,3-butadiene	1.0	nd	nd
1,2,3-Trichlorobenzene	1.0	nd	nd
Surrogate recoveries			
Dibromofluoromethane		94%	94%
Toluene-d8		92%	94%
4-Bromofluorobenzene		108%	110%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

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Analysis of Polynuclear Aromatic Hydrocarbons in Soil by Method 8270

Analytical Results

	RL	MB	LCS 1	TP1-1-4	TP1-2-9	TP10-1-12	TP10-2-4	TP4-1-5	TP14-1-6.5	TP20-1-6	TP21-4-4.5	TP15-1-5
Date extracted		06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18
Date analyzed		06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18
Moisture, %	(mg/kg)			0%	36%	39%	21%	46%	20%	16%	19%	21%
Naphthalene	0.02	nd	113%	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene	0.02	nd	107%	nd	nd	nd	nd	nd	nd	nd	nd	nd
1-Methylnaphthalene	0.02	nd	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthylene	0.02	nd	118%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthene	0.02	nd	120%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluorene	0.02	nd	124%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Phenanthrene	0.02	nd	110%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Anthracene	0.02	nd	108%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene	0.02	nd	109%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Pyrene	0.02	nd	104%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)anthracene*	0.02	nd	68%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene*	0.02	nd	147%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)fluoranthene*	0.02	nd	50%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(k)fluoranthene*	0.02	nd	108%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)pyrene*	0.02	nd	63%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene*	0.02	nd	97%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)anthracene*	0.02	nd	81%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(ghi)perylene	0.02	nd	65%	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total Carcinogens				nd	nd	nd	nd	nd	nd	nd	nd	nd
Surrogate recoveries:												
2-Fluorobiphenyl		101%	96%	96%	94%	89%	83%	80%	91%	65%	100%	102%
p-Terphenyl-d14		107%	90%	100%	91%	104%	98%	85%	97%	95%	121%	130%

Data Qualifiers and Analytical Comments

* - Carcinogenic Analyte
nd - not detected at listed reporting limits
ns - not spiked
Results reported on dry-weight basis
Acceptable Recovery limits: 50% TO 150%
Acceptable RPD limit: 35%

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Analysis of Polynuclear Aromatic Hydrocarbons in Soil by Method 8270

Analytical Results

	RL	MTH BLK	LCS	TP4-2-12	MW2-6	MW-1-6	MW-3-5	MW-3-10	MW-4-5	MW-5-10	MW-6-6
Date extracted		06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18
Date analyzed		06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18	06/14/18
Moisture, %	(mg/kg)			40%	34%	25%	49%	40%	28%	38%	34%
Naphthalene	0.02	nd	113%	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene	0.02	nd	100%	nd	nd	nd	nd	nd	nd	nd	nd
1-Methylnaphthalene	0.02	nd	ns	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthylene	0.02	nd	114%	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthene	0.02	nd	119%	nd	nd	nd	nd	nd	nd	nd	nd
Fluorene	0.02	nd	117%	nd	nd	nd	nd	nd	nd	nd	nd
Phenanthrene	0.02	nd	98%	nd	nd	nd	nd	nd	nd	nd	nd
Anthracene	0.02	nd	114%	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene	0.02	nd	104%	nd	nd	nd	nd	nd	nd	nd	nd
Pyrene	0.02	nd	96%	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)anthracene*	0.02	nd	45%	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene*	0.02	nd	166%	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)fluoranthene*	0.02	nd	42%	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(k)fluoranthene*	0.02	nd	51%	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)pyrene*	0.02	nd	48%	nd	nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene*	0.02	nd	70%	nd	nd	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)anthracene*	0.02	nd	76%	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(ghi)perylene	0.02	nd	76%	nd	nd	nd	nd	nd	nd	nd	nd
Total Carcinogens				nd	nd	nd	nd	nd	nd	nd	nd
Surrogate recoveries:											
2-Fluorobiphenyl		103%	94%	78%	84%	96%	91%	104%	82%	103%	105%
p-Terphenyl-d14		108%	80%	118%	96%	127%	118%	108%	116%	127%	122%

Data Qualifiers and Analytical Comments

* - Carcinogenic Analyte
nd - not detected at listed reporting limits
ns - not spiked
Results reported on dry-weight basis
Acceptable Recovery limits: 50% TO 150%
Acceptable RPD limit: 35%

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Analysis of Polynuclear Aromatic Hydrocarbons in Soil by Method 8270

Analytical Results

	RL	MB	LCS	TP8-2-8	TP8-3-11	TP9-1-6.5	TP8-1-7	TP13-1-12	TP18-1-12	TP24-2-10	TP25-1-5.5
Date extracted		06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18
Date analyzed		06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18	06/19/18
Moisture, %	(mg/kg)			40%	47%	20%	48%	45%	41%	36%	27%
Naphthalene	0.02	nd	112%	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene	0.02	nd	104%	nd	nd	nd	nd	nd	nd	nd	nd
1-Methylnaphthalene	0.02	nd	ns	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthylene	0.02	nd	112%	nd	nd	nd	nd	nd	nd	nd	nd
Acenaphthene	0.02	nd	120%	nd	nd	nd	nd	nd	nd	nd	nd
Fluorene	0.02	nd	119%	nd	nd	nd	nd	nd	nd	nd	nd
Phenanthrene	0.02	nd	105%	nd	nd	nd	nd	nd	nd	nd	nd
Anthracene	0.02	nd	103%	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene	0.02	nd	108%	nd	nd	**0.14**	nd	nd	nd	nd	nd
Pyrene	0.02	nd	103%	nd	nd	**0.16**	nd	nd	nd	nd	nd
Benzo(a)anthracene*	0.02	nd	79%	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene*	0.02	nd	131%	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)fluoranthene*	0.02	nd	77%	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(k)fluoranthene*	0.02	nd	98%	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)pyrene*	0.02	nd	71%	nd	nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene*	0.02	nd	101%	nd	nd	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)anthracene*	0.02	nd	84%	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(ghi)perylene	0.02	nd	83%	nd	nd	nd	nd	nd	nd	nd	nd
Total Carcinogens				nd	nd	nd	nd	nd	nd	nd	nd
Surrogate recoveries:											
2-Fluorobiphenyl		111%	96%	128%	64%	102%	108%	84%	61%	67%	55%
p-Terphenyl-d14		92%	83%	124%	104%	100%	105%	89%	82%	99%	91%

Data Qualifiers and Analytical Comments

* - Carcinogenic Analyte
nd - not detected at listed reporting limits
ns - not spiked
Results reported on dry-weight basis
Acceptable Recovery limits: 50% TO 150%
Acceptable RPD limit: 35%

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PROJECT PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY
PROJECT #A17.0202.00
Washington

Analysis of Polynuclear Aromatic Hydrocarbons in Soil by Method 8270

Analytical Results

	RL	TP19-1-5	TP23-1-6	TP22-1-6	TP24-1-5.5	TP16-1-5.5
Date extracted		06/19/18	06/19/18	06/19/18	06/19/18	06/19/18
Date analyzed		06/19/18	06/19/18	06/19/18	06/19/18	06/19/18
		73%	15%	24%	44%	39%
Naphthalene	0.02	nd	nd	nd	nd	nd
2-Methylnaphthalene	0.02	nd	nd	nd	nd	**0.15**
1-Methylnaphthalene	0.02	nd	nd	nd	nd	**0.16**
Acenaphthylene	0.02	nd	nd	nd	nd	nd
Acenaphthene	0.02	nd	nd	nd	nd	**0.78**
Fluorene	0.02	nd	nd	nd	nd	**0.68**
Phenanthrene	0.02	nd	nd	nd	nd	**4.01**
Anthracene	0.02	nd	nd	nd	nd	**1.42**
Fluoranthene	0.02	nd	nd	nd	nd	**3.21**
Pyrene	0.02	nd	nd	nd	nd	**3.22**
Benzo(a)anthracene*	0.02	nd	nd	nd	nd	**0.72**
Chrysene*	0.02	nd	nd	nd	nd	**2.14**
Benzo(b)fluoranthene*	0.02	nd	nd	nd	nd	nd
Benzo(k)fluoranthene*	0.02	nd	nd	nd	nd	nd
Benzo(a)pyrene*	0.02	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene*	0.02	nd	nd	nd	nd	**0.50**
Dibenzo(a,h)anthracene*	0.02	nd	nd	nd	nd	nd
Benzo(ghi)perylene	0.02	nd	nd	nd	nd	**0.62**
Total Carcinogens		nd	nd	nd	nd	nd
Surrogate recoveries:						
2-Fluorobiphenyl		78%	80%	76%	84%	104%
p-Terphenyl-d14		106%	98%	97%	96%	108%

Data Qualifiers and Analytical Comments

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Results reported on dry-weight basis
Acceptable Recovery limits: 50% TO 150%
Acceptable RPD limit: 35%

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Analysis of Polynuclear Aromatic Hydrocarbons in Soil by Method 8270

Analytical Results

	RL	MB	LCS	TP12-1-12	TP17-2-8	TP7-2-10	TP17-1-4	TP11-1-9	TP5-1-10	TP7-1-6
Date extracted		06/20/18	06/20/18	06/20/18	06/20/18	06/20/18	06/20/18	06/20/18	06/20/18	06/20/18
Date analyzed		06/20/18	06/20/18	06/20/18	06/20/18	06/20/18	06/20/18	06/20/18	06/27/18	06/20/18
Moisture, %	(mg/kg)			38%	39%	39%	40%	47%	49%	41%
Naphthalene	0.02	nd	110%	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene	0.02	nd	103%	nd	nd	nd	nd	nd	nd	nd
1-Methylnaphthalene	0.02	nd	ns	nd	nd	nd	nd	nd	nd	nd
Acenaphthylene	0.02	nd	110%	nd	nd	nd	nd	nd	nd	nd
Acenaphthene	0.02	nd	119%	nd	nd	nd	nd	nd	nd	nd
Fluorene	0.02	nd	120%	nd	nd	nd	nd	nd	nd	nd
Phenanthrene	0.02	nd	100%	nd	nd	nd	nd	nd	nd	nd
Anthracene	0.02	nd	105%	nd	nd	nd	nd	nd	nd	nd
Fluoranthene	0.02	nd	105%	nd	nd	**0.14**	nd	nd	nd	nd
Pyrene	0.02	nd	100%	nd	nd	**0.16**	nd	nd	nd	nd
Benzo(a)anthracene*	0.02	nd	69%	nd	nd	nd	nd	nd	nd	nd
Chrysene*	0.02	nd	128%	nd	nd	nd	nd	nd	nd	nd
Benzo(b)fluoranthene*	0.02	nd	83%	nd	nd	nd	nd	nd	nd	nd
Benzo(k)fluoranthene*	0.02	nd	94%	nd	nd	nd	nd	nd	nd	nd
Benzo(a)pyrene*	0.02	nd	76%	nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene*	0.02	nd	84%	nd	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)anthracene*	0.02	nd	95%	nd	nd	nd	nd	nd	nd	nd
Benzo(ghi)perylene	0.02	nd	93%	nd	nd	nd	nd	nd	nd	nd
Total Carcinogens				nd	nd	nd	nd	nd	nd	nd
Surrogate recoveries:										
2-Fluorobiphenyl		111%	93%	109%	86%	94%	79%	67%	86%	80%
p-Terphenyl-d14		91%	79%	92%	81%	87%	76%	66%	75%	76%

Data Qualifiers and Analytical Comments

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Acceptable RPD limit: 35%

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Analysis of Polynuclear Aromatic Hydrocarbons in Soil by Method 8270

Analytical Results

	RL	TP2-1-12	TP3-1-6	TP6-1-12
Date extracted		06/20/18	06/20/18	06/20/18
Date analyzed		06/20/18	06/27/18	06/27/18
		45%	34%	36%
Naphthalene	0.02	nd	nd	nd
2-Methylnaphthalene	0.02	nd	nd	nd
1-Methylnaphthalene	0.02	nd	nd	nd
Acenaphthylene	0.02	nd	nd	nd
Acenaphthene	0.02	nd	nd	nd
Fluorene	0.02	nd	nd	nd
Phenanthrene	0.02	nd	nd	nd
Anthracene	0.02	nd	nd	nd
Fluoranthene	0.02	nd	nd	nd
Pyrene	0.02	nd	nd	nd
Benzo(a)anthracene*	0.02	nd	nd	nd
Chrysene*	0.02	nd	nd	nd
Benzo(b)fluoranthene*	0.02	nd	nd	nd
Benzo(k)fluoranthene*	0.02	nd	nd	nd
Benzo(a)pyrene*	0.02	nd	nd	nd
Indeno(1,2,3-cd)pyrene*	0.02	nd	nd	nd
Dibenzo(a,h)anthracene*	0.02	nd	nd	nd
Benzo(ghi)perylene	0.02	nd	nd	nd
Total Carcinogens		nd	nd	nd
Surrogate recoveries:				
2-Fluorobiphenyl		85%	77%	85%
p-Terphenyl-d14		74%	64%	67%

Data Qualifiers and Analytical Comments

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Results reported on dry-weight basis
Acceptable Recovery limits: 50% TO 150%
Acceptable RPD limit: 35%

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Analysis of Polynuclear Aromatic Hydrocarbons in Water by Method 8270

Analytical Results

	Reporting	**MTH BLK**	**LCS**	**MW-2**	**MW-1**	**MW-5**	**MW-6**	**MW-4**	**MW-3**
Date extracted	Limits	06/27/18	06/27/18	06/27/18	06/27/18	06/27/18	06/27/18	06/27/18	06/27/18
Date analyzed	(ug/L)	06/28/18	06/28/18	06/28/18	06/28/18	06/28/18	06/28/18	06/28/18	06/28/18
Naphthalene	0.1	nd	111%	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene	0.1	nd	99%	nd	nd	nd	nd	nd	nd
1-Methylnaphthalene	0.1	nd	ns	nd	nd	nd	nd	nd	nd
Acenaphthylene	0.1	nd	109%	nd	nd	nd	nd	nd	nd
Acenaphthene	0.1	nd	119%	nd	nd	nd	nd	nd	nd
Fluorene	0.1	nd	119%	nd	nd	nd	nd	nd	nd
Phenanthrene	0.1	nd	102%	nd	nd	nd	nd	nd	nd
Anthracene	0.1	nd	104%	nd	nd	nd	nd	nd	nd
Fluoranthene	0.1	nd	102%	nd	nd	nd	nd	nd	nd
Pyrene	0.1	nd	97%	nd	nd	nd	nd	nd	nd
Benzo(a)anthracene*	0.1	nd	65%	nd	nd	nd	nd	nd	nd
Chrysene*	0.1	nd	136%	nd	nd	nd	nd	nd	nd
Benzo(b)fluoranthene*	0.1	nd	85%	nd	nd	nd	nd	nd	nd
Benzo(k)fluoranthene*	0.1	nd	97%	nd	nd	nd	nd	nd	nd
Benzo(a)pyrene*	0.1	nd	77%	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene*	0.1	nd	105%	nd	nd	nd	nd	nd	nd
Dibenzo(a,h)anthracene*	0.1	nd	83%	nd	nd	nd	nd	nd	nd
Benzo(ghi)perylene	0.1	nd	79%	nd	nd	nd	nd	nd	nd
Total Carcinogens				nd	nd	nd	nd	nd	nd
Surrogate recoveries:									
2-Fluorobiphenyl		100%	105%	105%	104%	86%	116%	111%	110%
p-Terphenyl-d14		74%	79%	78%	83%	82%	98%	88%	88%

Data Qualifiers and Analytical Comments

* - Carcinogenic Analyte
nd - not detected at listed reporting limits
ns - not spiked
Acceptable Recovery limits: 50% TO 150%
Acceptable RPD limit: 35%

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Washington

Total Metals in Soil by EPA-6020 Series

Sample Number	Date Analyzed	Lead (Pb) (mg/kg)	Cadmium (Cd) (mg/kg)	Chromium (Cr) (mg/kg)	Arsenic (As) (mg/kg)	Silver (Ag) (mg/kg)	Barium (Ba) (mg/kg)	Selenium (Se) (mg/kg)	Mercury (Hg) (mg/kg)
Method Blank	6/14/2018	nd	nd	nd	nd	nd	nd	nd	nd
TP1-1@4'	6/14/2018	**23**	nd	**71**	**14**	nd	**92**	nd	nd
TP1-2@9'	6/14/2018	**19**	nd	**72**	**9.2**	nd	**99**	nd	nd
TP1-2@9' Duplicate	6/14/2018	**19**	nd	**74**	**9.1**	nd	**110**	nd	nd
TP10-1@12'	6/14/2018	**13**	nd	**75**	**9.1**	nd	**79**	nd	nd
TP10-2@4'	6/14/2018	nd	nd	**13**	nd	nd	nd	nd	nd
TP4-1@5'	6/14/2018	**5.7**	nd	**23**	nd	nd	**99**	nd	nd
TP14-1@6.5'	6/14/2018	nd	nd	**7.1**	nd	nd	nd	nd	nd
TP20-1@6'	6/14/2018	nd	nd	**5.5**	nd	nd	nd	nd	nd
TP21-1@4.5'	6/14/2018	nd	nd	**25**	nd	nd	nd	nd	nd
TP15-1@5'	6/14/2018	**11**	nd	**100**	**8.5**	nd	**66**	nd	nd
TP4-2@12'	6/14/2018	nd	nd	**15**	nd	nd	nd	nd	nd
MW-2@6'	6/14/2018	nd	nd	**18**	nd	nd	nd	nd	nd
MW-1@6'	6/14/2018	nd	nd	**28**	nd	nd	nd	nd	nd
MW-3@5'	6/14/2018	**6.5**	nd	**29**	nd	nd	nd	nd	nd
MW-3@10'	6/14/2018	**92**	nd	**36**	nd	nd	nd	nd	nd
MW-4@5'	6/14/2018	**76**	nd	**47**	nd	nd	**190**	nd	nd
MW-5@10'	6/14/2018	**7.5**	nd	**35**	**5.5**	nd	nd	nd	nd
MW-6@6'	6/14/2018	nd	nd	**21**	nd	nd	nd	nd	nd
MW-6@6' Duplicate	6/14/2018	**5.2**	nd	**30**	nd	nd	nd	nd	nd
Reporting Limits		5.0	1.0	5.0	5.0	20	50	20	0.5

"nd" Indicates not detected at listed detection limits.

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Washington

QA/QC Data - Total Metals EPA-6020

Sample Number: TP1-2@9'

	Matrix Spike			Matrix Spike Duplicate			RPD
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	(%)
Lead	81.0	81.5	101	83.3	83.7	100	0.1
Cadmium	81.0	58.8	72.6M	83.3	62.0	74.4M	2.5
Chromium	81.0	99.5	123	83.3	93.6	112	8.9
Arsenic	81.0	71.1	87.8	83.3	75.3	90.4	2.9
Silver	81.0	60.5	74.7M	83.3	63.3	76.0	1.7
Barium	81.0	92.6	114	83.3	83.4	100	13.2
Selenium	81.0	50.9	62.8M	83.3	53.5	64.2M	2.2
Mercury	8.10	6.71	82.8	8.33	7.09	85.1	2.7

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 75%-125%
ACCEPTABLE RPD IS 20%
M - Matrix Spike recovery failed due to matrix interference.

	Laboratory Control Sample		
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)
Lead	100	104	104
Cadmium	100	88.7	88.7
Chromium	100	102	102
Arsenic	100	87.6	87.6
Silver	100	96.5	96.5
Barium	100	113	113
Selenium	100	80.0	80.0
Mercury	10.0	8.83	88.3

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 80%-120%

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Total Metals in Soil by EPA-6020 Series

Sample Number	Date Analyzed	Lead (Pb) (mg/kg)	Cadmium (Cd) (mg/kg)	Chromium (Cr) (mg/kg)	Arsenic (As) (mg/kg)	Silver (Ag) (mg/kg)	Barium (Ba) (mg/kg)	Selenium (Se) (mg/kg)	Mercury (Hg) (mg/kg)
Method Blank	6/26/2018	nd	nd	nd	nd	nd	nd	nd	nd
TP8-2@8'	6/26/2018	nd	nd	**45**	**5.9**	nd	nd	nd	nd
TP8-2@8' Duplicate	6/26/2018	nd	nd	**42**	**5.0**	nd	nd	nd	nd
TP8-3@11'	6/26/2018	**6.1**	nd	**52**	**7.6**	nd	nd	nd	nd
TP9-1@6.5'	6/26/2018	**64**	nd	**42**	nd	nd	**160**	nd	nd
TP8-1@7'	6/26/2018	**9.6**	nd	**60**	**6.3**	nd	**62**	nd	nd
TP13-1@12'	6/26/2018	**6.0**	nd	**49**	**7.2**	nd	nd	nd	nd
TP18-1@12'	6/26/2018	**5.5**	nd	**46**	**6.3**	nd	nd	nd	nd
TP24-2@10'	6/26/2018	**22**	nd	**48**	**6.2**	nd	nd	nd	nd
TP25-1@5.5'	6/26/2018	**5.0**	nd	**35**	nd	nd	nd	nd	nd
TP19-1@5'	6/26/2018	**26**	nd	**51**	**10**	nd	**52**	nd	nd
TP23-1@6'	6/26/2018	nd	nd	**31**	nd	nd	nd	nd	nd
TP22-1@6'	6/26/2018	nd	nd	**36**	nd	nd	nd	nd	nd
TP24-1@5.5'	6/26/2018	**9.6**	nd	**54**	**8.5**	nd	**50**	nd	nd
TP16-1@5.5'	6/26/2018	**5.8**	nd	**42**	**6.5**	nd	nd	nd	nd
TP16-1@5.5' Duplicate	6/26/2018	**90**	nd	**44**	**6.5**	nd	nd	nd	nd
Reporting Limits		5.0	1.0	5.0	5.0	20	50	20	0.5

"nd" Indicates not detected at listed detection limits.

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QA/QC Data - Total Metals EPA-6020

Sample Number: TP8-2@8'

	Matrix Spike			Matrix Spike Duplicate			RPD
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	(%)
Lead	95.2	90.3	94.9	93.0	93.5	101	5.8
Cadmium	95.2	82.1	86.2	93.0	81.0	87.1	1.0
Chromium	95.2	122	128M	93.0	123	132M	3.3
Arsenic	95.2	92.4	97.1	93.0	94.2	101	4.3
Silver	95.2	79.6	83.6	93.0	80.5	86.6	3.5
Barium	95.2	106	111	93.0	106	114	2.3
Selenium	95.2	86.0	90.3	93.0	87.5	94.1	4.1
Mercury	9.52	7.70	80.9	9.30	8.05	86.6	6.8

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 75%-125%
ACCEPTABLE RPD IS 20%
M - Matrix Spike recovery failed due to matrix interference.

	Laboratory Control Sample		
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)
Lead	100	90.5	90.5
Cadmium	100	90.3	90.3
Chromium	100	123	123
Arsenic	100	97.6	97.6
Silver	100	95.7	95.7
Barium	100	105	105
Selenium	100	90.8	90.8
Mercury	10.0	7.61	76.1

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 80%-120%

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Total Metals in Soil by EPA-6020 Series

Sample Number	Date Analyzed	Lead (Pb) (mg/kg)	Cadmium (Cd) (mg/kg)	Chromium (Cr) (mg/kg)	Arsenic (As) (mg/kg)	Silver (Ag) (mg/kg)	Barium (Ba) (mg/kg)	Selenium (Se) (mg/kg)	Mercury (Hg) (mg/kg)
Method Blank	6/26/2018	nd	nd	nd	nd	nd	nd	nd	nd
TP12-1@12'	6/26/2018	**5.4**	nd	**46**	**7.1**	nd	nd	nd	nd
TP17-2@8'	6/26/2018	**7.3**	nd	**47**	**6.9**	nd	nd	nd	nd
TP7-2@10'	6/26/2018	**22**	nd	**43**	**5.3**	nd	nd	nd	nd
TP7-2@10' Duplicate	6/26/2018	**13**	nd	**45**	**5.2**	nd	nd	nd	nd
TP17-1@4'	6/26/2018	**6.1**	nd	**43**	**6.7**	nd	nd	nd	nd
TP11-1@9'	6/26/2018	**9.7**	nd	**58**	**8.3**	nd	**55**	nd	nd
TP5-1@10'	6/26/2018	**13**	nd	**66**	**7.7**	nd	**54**	nd	nd
TP7-1@6'	6/26/2018	**16**	nd	**49**	nd	nd	**50**	nd	nd
TP2-1@12'	6/26/2018	**9.4**	nd	**52**	**6.3**	nd	**51**	nd	nd
TP2-1@12' Duplicate	6/26/2018	**9.9**	nd	**56**	**7.1**	nd	**53**	nd	nd
TP3-1@6'	6/26/2018	**5.0**	nd	**43**	**6.8**	nd	nd	nd	nd
TP6-1@12'	6/26/2018	**6.7**	nd	**43**	**6.8**	nd	nd	nd	nd
Reporting Limits		5.0	1.0	5.0	5.0	20	50	20	0.5

"nd" Indicates not detected at listed detection limits.

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PROJECT PROPOSED GRAYS HARBOR POTASH EXPORT FACILITY
PROJECT #A17.0202.00
Washington

QA/QC Data - Total Metals EPA-6020

Sample Number: TP7-2@10'

	Matrix Spike			Matrix Spike Duplicate			RPD
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	(%)
Lead	92.6	87.4	94.4	77.8	69.0	88.7	6.2
Cadmium	92.6	86.8	93.7	77.8	68.1	87.5	6.8
Chromium	92.6	123.0	133M	77.8	97.2	125M	6.1
Arsenic	92.6	97.1	105	77.8	78.6	101	3.7
Silver	92.6	79.9	86.3	77.8	63.2	81.2	6.0
Barium	92.6	103.0	111	77.8	81.0	104	6.6
Selenium	92.6	92.3	100	77.8	73.4	94.3	5.5
Mercury	9.26	8.50	91.8	7.78	6.91	88.8	3.3

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 75%-125%
ACCEPTABLE RPD IS 20%
M - Matrix Spike recovery failed due to matrix interference.

	Laboratory Control Sample		
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)
Lead	100	95.9	95.9
Cadmium	100	92.2	92.2
Chromium	100	108	108
Arsenic	100	95.3	95.3
Silver	100	90.8	90.8
Barium	100	107	107
Selenium	100	90.9	90.9
Mercury	10.0	8.64	86.4

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 80%-120%

ESN NORTHWEST CHEMISTRY LABORATORY

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PROJECT #A17.0202.00
Washington

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Dissolved Metals in Water by EPA-6020 Method

Sample Number	Date Analyzed	Lead (Pb) (ug/L)	Cadmium (Cd) (ug/L)	Chromium (Cr) (ug/L)	Arsenic (As) (ug/L)	Silver (Ag) (ug/L)	Barium (Ba) (ug/L)	Selenium (Se) (ug/L)	Mercury (Hg) (ug/L)
Method Blank	6/26/2018	nd	nd	nd	nd	nd	nd	nd	nd
MW-2	6/26/2018	nd	nd	**31**	**18**	nd	nd	nd	nd
MW-1	6/26/2018	nd	nd	nd	**3.2**	nd	nd	nd	nd
MW-5	6/26/2018	nd	nd	nd	**32**	nd	**73**	**100**	nd
MW-6	6/26/2018	nd	nd	nd	**34**	nd	**99**	nd	nd
MW-4	6/26/2018	nd	nd	nd	**34**	nd	**74**	**110**	nd
MW-4 Duplicate	6/26/2018	nd	nd	nd	**36**	nd	**74**	**110**	nd
MW-3	6/26/2018	nd	nd	nd	**58**	nd	**30**	**160**	nd
Reporting Limits		2.0	2.0	10	2.0	10	20	10	1.0

"nd" Indicates not detected at listed detection limits.

QA/QC Data - Dissolved Metals EPA-6020

	Laboratory Control Sample			Laboratory Control Sample Duplicate			RPD
	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	(%)
Lead	20	16.7	83.5	20	17.1	85.5	2.37
Cadmium	20	17.9	89.5	20	18.2	91.0	1.66
Chromium	20	20.4	102.0	20	19.9	99.5	2.48
Arsenic	20	18.9	94.5	20	18.4	92.0	2.68
Silver	20	16.5	82.5	20	16.7	83.5	1.20
Barium	20	17.8	89.0	20	18.1	90.5	1.67
Selenium	20	18.8	94.0	20	19.0	95.0	1.06
Mercury	2.0	1.71	85.5	2.0	1.76	88.0	2.88

ACCEPTABLE RECOVERY LIMITS FOR LABORATORY CONTROL SAMPLES: 80%-120%
ACCEPTABLE RPD IS 20%

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06/20/2018

ESN Northwest
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Attn: Julie Woods

Project: Proposed Grays Harbor Potash
Sample Matrix: Soil
Date Sampled: 06/11/2018
Date Received: 06/13/2018
Spectra Project: 2018060369

Client ID	Spectra #	Analyte	Result	Units	Method
TP1-1@4'	1	Total Cyanide	0.12	mg/Kg	SM 4500-CN⁻ E
TP1-2@9'	2	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP10-1@12'	3	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP10-2@4'	4	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP4-1@5'	5	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP14-1@6.5'	6	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP20-1@6'	7	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP21-1@4.5'	8	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP15-1@5'	9	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP4-2@12'	10	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
MW-2@6'	11	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
MW-1@6'	12	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
MW-3@5'	13	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
MW-4@5'	14	Total Cyanide	0.12	mg/Kg	SM 4500-CN⁻ E
MW-5@10'	15	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
MW-6@6'	16	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E

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June 18, 2018

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Units: mg/Kg
Spectra Project: 2018060369
Applies to Spectra # 1-4

QUALITY CONTROL RESULTS

Total Cyanide in Solid/Oil - SM4500CN-E

Method Blank

Date Digested: 6/14/2018 Date Analyzed: 6/18/2018

	Blank
Cyanide	< 0.01

Blank Spike (LCS)

Date Digested: 6/14/2018 Date Analyzed: 6/18/2018

	Spike Added	LCS Conc.	LCS %Rec
Cyanide	0.100	0.101	101.0

LCS Recovery limits 71-119%

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Date Digested: 6/14/2018 Date Analyzed: 6/18/2018
Sample Spiked: 2018060369-1

	Sample Conc.	Spike Conc.	MS Conc.	MS %Rec	MSD Conc	MSD %Rec	RPD
Cyanide	0.00	0.100	0.099	99.0	0.086	86.0	14.1

Recovery Limits 62-114%
RPD Limit 20

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Units: mg/Kg
Spectra Project: 2018060369
Applies to Spectra #: 5-10

QUALITY CONTROL RESULTS

Total Cyanide in Solid/Oil - SM4500CN-E

Method Blank

Date Digested: 6/15/2018 Date Analyzed: 6/18/2018

	Blank
Cyanide	< 0.01

Blank Spike (LCS)

Date Digested: 6/15/2018 Date Analyzed: 6/18/2018

	Spike Added	LCS Conc.	LCS %Rec
Cyanide	0.100	0.112	112.0

LCS Recovery limits 71-119%

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Date Digested: 6/14/2018 Date Analyzed: 6/18/2018
Sample Spiked: 2018060369-1

	Sample Conc.	Spike Conc.	MS Conc.	MS %Rec	MSD Conc	MSD %Rec	RPD
Cyanide	0.00	0.100	0.099	99.0	0.086	86.0	14.1

Recovery Limits 62-114%
RPD Limit 20

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June 18, 2018

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Units: mg/Kg
Spectra Project: 2018060369
Applies to Spectra # 11-15

QUALITY CONTROL RESULTS

Total Cyanide in Solid/Oil - SM4500CN-E

Method Blank

Date Digested: 6/18/2018 Date Analyzed: 6/18/2018

	Blank
Cyanide	< 0.01

Blank Spike (LCS)

Date Digested: 6/18/2018 Date Analyzed: 6/18/2018

	Spike Added	LCS Conc.	LCS %Rec
Cyanide	0.100	0.098	98.0

LCS Recovery limits 71-119%

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Date Digested: 6/14/2018 Date Analyzed: 6/18/2018
Sample Spiked: 2018060369-1

	Sample Conc.	Spike Conc.	MS Conc.	MS %Rec	MSD Conc	MSD %Rec	RPD
Cyanide	0.00	0.100	0.099	99.0	0.086	86.0	14.1

Recovery Limits 62-114%
RPD Limit 20

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06/28/2018

ESN Northwest
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Attn: Julie Woods

Project: Proposed Grays Harbor
Sample Matrix: Soil
Date Sampled: 06/12/2018
Date Received: 06/19/2018
Spectra Project: 2018060478

Client ID	Spectra #	Analyte	Result	Units	Method
TP8-2@8'	1	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP8-3@11'	2	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP9-1@6.5'	3	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP8-1@7'	4	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP13-1@12'	5	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP18-1@12'	6	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP24-2@10'	7	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP25-1@5.5'	8	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP19-1@5'	9	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP23-1@6'	10	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP22-1@6'	11	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP24-1@5.5'	12	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP16-1@5.5'	13	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E

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06/28/2018

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Attn: Julie Woods

Project: Proposed Grays Harbor
Sample Matrix: Soil
Date Sampled: 06/13/2018
Date Received: 06/19/2018
Spectra Project: 2018060477

Client ID	Spectra #	Analyte	Result	Units	Method
TP12-1@12'	1	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP17-2@8'	2	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP7-2@10'	3	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP17-1@4'	4	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP11-1@9'	5	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP5-1@10'	6	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP7-1@6'	7	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP2-1@12'	8	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP3-1@6'	9	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP6-1@12'	10	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E

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07/09/2018

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Attn: Julie Woods

Project: Proposed Grays Harbor Potash
Date Received: 06/13/2018
Spectra Project: 2018060369

Client ID	Spectra #	Analyte	Result	Units	Method	Matrix	Date Sampled
TP1-1@4'	1	Total Cyanide	0.12	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
TP1-1@4'	1	Total Chromium	37.0	mg/Kg	SW846 6010C	Soil	06/11/2018
TP1-1@4'	1	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A	Soil	06/11/2018
TP1-2@9'	2	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
TP1-2@9'	2	Total Chromium	37.8	mg/Kg	SW846 6010C	Soil	06/11/2018
TP1-2@9'	2	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A	Soil	06/11/2018
TP10-1@12'	3	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
TP10-1@12'	3	Total Chromium	43.2	mg/Kg	SW846 6010C	Soil	06/11/2018
TP10-1@12'	3	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A	Soil	06/11/2018
TP10-2@4'	4	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
TP4-1@5'	5	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
TP4-1@5'	5	Total Chromium	39.6	mg/Kg	SW846 6010C	Soil	06/11/2018
TP4-1@5'	5	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A	Soil	06/11/2018
TP14-1@6.5'	6	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
TP20-1@6'	7	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
TP21-1@4.5'	8	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
TP21-1@4.5'	8	Total Chromium	78.4	mg/Kg	SW846 6010C	Soil	06/11/2018

*Detection limit elevated due to matrix interference.

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Attn: Julie Woods

Project: Proposed Grays Harbor Potash
Date Received: 06/13/2018
Spectra Project: 2018060369

Client ID	Spectra #	Analyte	Result	Units	Method	Matrix	Date Sampled
TP21-1@4.5'	8	Hexavalent Chromium	<0.1	mg/Kg	SW846 7196A	Soil	06/11/2018
TP15-1@5'	9	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
TP15-1@5'	9	Total Chromium	66.6	mg/Kg	SW846 6010C	Soil	06/11/2018
TP15-1@5'	9	Hexavalent Chromium	<0.1	mg/Kg	SW846 7196A	Soil	06/11/2018
TP4-2@12'	10	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
MW-2@6'	11	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
MW-1@6'	12	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
MW-1@6'	12	Total Chromium	56.0	mg/Kg	SW846 6010C	Soil	06/11/2018
MW-1@6'	12	Hexavalent Chromium	<0.5*	mg/Kg	SW846 7196A	Soil	06/11/2018
MW-3@5'	13	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
MW-3@5'	13	Total Chromium	50.5	mg/Kg	SW846 6010C	Soil	06/11/2018
MW-3@5'	13	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A	Soil	06/11/2018
MW-4@5'	14	Total Cyanide	0.12	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
MW-4@5'	14	Total Chromium	53.8	mg/Kg	SW846 6010C	Soil	06/11/2018
MW-4@5'	14	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A	Soil	06/11/2018
MW-5@10'	15	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
MW-5@10'	15	Total Chromium	67.2	mg/Kg	SW846 6010C	Soil	06/11/2018

*Detection limit elevated due to matrix interference.

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Attn: Julie Woods

Project: Proposed Grays Harbor Potash
Date Received: 06/13/2018
Spectra Project: 2018060369

Client ID	Spectra #	Analyte	Result	Units	Method	Matrix	Date Sampled
MW-5@10'	15	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A	Soil	06/11/2018
MW-6@6'	16	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E	Soil	06/11/2018
MW-6@6'	16	Total Chromium	43.2	mg/Kg	SW846 6010C	Soil	06/11/2018
MW-6@6'	16	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A	Soil	06/11/2018
TP1-2@9' Dup	17	Total Chromium	37.3	mg/Kg	SW846 6010C	Soil	06/11/2018
TP1-2@9' Dup	17	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A	Soil	06/11/2018
MW-6@6' Dup	18	Total Chromium	44.8	mg/Kg	SW846 6010C	Soil	06/11/2018
MW-6@6' Dup	18	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A	Soil	06/11/2018

*Detection limit elevated due to matrix interference.

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07/05/2018

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Project: Proposed Grays Harbor
Sample Matrix: Soil
Date Sampled: 06/12/2018
Date Received: 06/19/2018
Spectra Project: 2018060478

Client ID	Spectra #	Analyte	Result	Units	Method
TP8-2@8'	1	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP8-2@8'	1	Total Chromium	42.6	mg/Kg	SW846 6010C
TP8-2@8'	1	Hexavalent Chromium	<1*	mg/Kg	SW846 7196A
TP8-3@11'	2	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP8-3@11'	2	Total Chromium	42.0	mg/Kg	SW846 6010C
TP8-3@11'	2	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A
TP9-1@6.5'	3	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP9-1@6.5'	3	Total Chromium	63.1	mg/Kg	SW846 6010C
TP9-1@6.5'	3	Hexavalent Chromium	<0.5*	mg/Kg	SW846 7196A
TP8-1@7'	4	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP8-1@7'	4	Total Chromium	55.8	mg/Kg	SW846 6010C
TP8-1@7'	4	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A
TP13-1@12'	5	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP13-1@12'	5	Total Chromium	44.2	mg/Kg	SW846 6010C
TP13-1@12'	5	Hexavalent Chromium	<1*	mg/Kg	SW846 7196A
TP18-1@12'	6	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP18-1@12'	6	Total Chromium	42.4	mg/Kg	SW846 6010C
TP18-1@12'	6	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A
TP24-2@10'	7	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP24-2@10'	7	Total Chromium	51.4	mg/Kg	SW846 6010C
TP24-2@10'	7	Hexavalent Chromium	<5*	mg/Kg	SW846 7196A
TP25-1@5.5'	8	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E

*Detection limit elevated due to matrix interference.

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2221 Ross Way • Tacoma, WA 98421 • (253) 272-4850 • Fax (253) 572-9838 • www.spectra-lab.com

07/05/2018

ESN Northwest
1210 Eastside St SE
Suite 200
Olympia, WA 98501
Attn: Julie Woods

Project: Proposed Grays Harbor
Sample Matrix: Soil
Date Sampled: 06/12/2018
Date Received: 06/19/2018
Spectra Project: 2018060478

Client ID	Spectra #	Analyte	Result	Units	Method
TP25-1@5.5'	8	Total Chromium	47.8	mg/Kg	SW846 6010C
TP25-1@5.5'	8	Hexavalent Chromium	<0.5*	mg/Kg	SW846 7196A
TP19-1@5'	9	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP19-1@5'	9	Total Chromium	15.7	mg/Kg	SW846 6010C
TP19-1@5'	9	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A
TP23-1@6'	10	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP23-1@6'	10	Total Chromium	77.8	mg/Kg	SW846 6010C
TP23-1@6'	10	Hexavalent Chromium	<0.1	mg/Kg	SW846 7196A
TP22-1@6'	11	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP22-1@6'	11	Total Chromium	72.6	mg/Kg	SW846 6010C
TP22-1@6'	11	Hexavalent Chromium	<0.1	mg/Kg	SW846 7196A
TP24-1@5.5'	12	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP24-1@5.5'	12	Total Chromium	48.2	mg/Kg	SW846 6010C
TP24-1@5.5'	12	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A
TP16-1@5.5'	13	Total Cyanide	<0.1	mg/Kg	SM 4500-CN⁻ E
TP16-1@5.5'	13	Total Chromium	47.7	mg/Kg	SW846 6010C
TP16-1@5.5'	13	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A

*Detection limit elevated due to matrix interference.

SPECTRA LABORATORIES

Jeffrey Cooper, Laboratory Manager

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7/5/2018

ESN Northwest
12010 Eastside St. SE.
Suite 200
Olympia, WA. 98501

Units: mg/Kg
Spectra Project: 2018060478
Applies to Spectra #'s 1-13
Analyst: SCJ

QUALITY CONTROL RESULTS

ICP Metals SW846 6010C - Soil/Solid

Method Blank

Date Digested: 7/3/2018 Date Analyzed: 7/5/2018

Element	Blank Result
Chromium	< 0.7

Laboratory Control Sample (LCS)

Date Digested: 7/3/2018 Date Analyzed: 7/5/2018

Element	Spike Added	LCS Conc.	LCS %Rec
Chromium	200.0	198.7	99.4

LCS Recovery limits 80-120%

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Date Digested: 7/3/2018 Date Analyzed: 7/5/2018
Sample Spiked: 2018060478-1

Element	Sample Conc.	Spike Conc.	MS Conc.	MS %Rec	MSD Conc	MSD %Rec	RPD
Chromium	85.1	200.0	276.3	95.6	274.9	94.9	0.7

Comment:
Recovery Limits 75-125%
RPD Limit 20

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Laboratory Manager

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07/05/2018

ESN Northwest
1210 Eastside St SE
Suite 200
Olympia, WA 98501
Attn: Julie Woods

Project: Proposed Grays Harbor
Sample Matrix: Soil
Date Sampled: 06/13/2018
Date Received: 06/19/2018
Spectra Project: 2018060477

Client ID	Spectra #	Analyte	Result	Units	Method
TP12-1@12'	1	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP12-1@12'	1	Total Chromium	44.2	mg/Kg	SW846 6010C
TP12-1@12'	1	Hexavalent Chromium	<0.5*	mg/Kg	SW846 7196A
TP17-2@8'	2	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP17-2@8'	2	Total Chromium	57.1	mg/Kg	SW846 6010C
TP17-2@8'	2	Hexavalent Chromium	<1*	mg/Kg	SW846 7196A
TP7-2@10'	3	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP7-2@10'	3	Total Chromium	43.8	mg/Kg	SW846 6010C
TP7-2@10'	3	Hexavalent Chromium	<0.5*	mg/Kg	SW846 7196A
TP17-1@4'	4	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP17-1@4'	4	Total Chromium	51.0	mg/Kg	SW846 6010C
TP17-1@4'	4	Hexavalent Chromium	<0.5*	mg/Kg	SW846 7196A
TP11-1@9'	5	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP11-1@9'	5	Total Chromium	53.6	mg/Kg	SW846 6010C
TP11-1@9'	5	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A
TP5-1@10'	6	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP5-1@10'	6	Total Chromium	54.8	mg/Kg	SW846 6010C
TP5-1@10'	6	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A
TP7-1@6'	7	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E
TP7-1@6'	7	Total Chromium	62.7	mg/Kg	SW846 6010C
TP7-1@6'	7	Hexavalent Chromium	<2*	mg/Kg	SW846 7196A
TP2-1@12'	8	Total Cyanide	<0.2	mg/Kg	SM 4500-CN⁻ E

*Detection limit elevated due to matrix interference.

SPECTRA LABORATORIES

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07/05/2018

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Suite 200
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Attn: Julie Woods

Project: Proposed Grays Harbor
Sample Matrix: Soil
Date Sampled: 06/13/2018
Date Received: 06/19/2018
Spectra Project: 2018060477

Client ID	Spectra #	Analyte	Result	Units	Method
TP2-1@12'	8	Total Chromium	48.4	mg/Kg	SW846 6010C
TP2-1@12'	8	Hexavalent Chromium	<1*	mg/Kg	SW846 7196A
TP3-1@6'	9	Total Cyanide	<0.2	mg/Kg	SM 4500-CN^- E
TP3-1@6'	9	Total Chromium	55.1	mg/Kg	SW846 6010C
TP3-1@6'	9	Hexavalent Chromium	<0.2*	mg/Kg	SW846 7196A
TP6-1@12'	10	Total Cyanide	<0.2	mg/Kg	SM 4500-CN^- E
TP6-1@12'	10	Total Chromium	53.8	mg/Kg	SW846 6010C
TP6-1@12'	10	Hexavalent Chromium	<1*	mg/Kg	SW846 7196A

*Detection limit elevated due to matrix interference.

SPECTRA LABORATORIES

Jeffrey Cooper, Laboratory Manager

a7/mkw

ACCU LABORATORY

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Tel: (425) 214-5858
(425) 214-5868
Email: lisa@accu-lab.com
website: www.accu-lab.com

Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0615-4**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/11/2018
Project Manager	Steve Loague	Date Received	6/15/2018
Project Name	**Proposed Grays Harbors**	Date Reported	6/20/2018
Client Project#	**A17.0202.00**		

Polychlorinated Biphenyls in Soil by EPA 8082A/3550C

Accu Lab Analytical Batch# AL061518-1

Client sample ID					**TP1-1@4'**	**TP1-2-9**	**TP10-1-12**	**TP10-2-4**	**TP4-1-5**
Lab ID	**MRL**	**Unit**	**MTH BLK**	**LCS**	18-AL0615-1-1	18-AL0615-1-2	18-AL0615-1-3	18-AL0615-1-4	18-AL0615-1-5
Matrix			Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted			6/15/2018	6/15/2018	6/15/2018	6/15/2018	6/15/2018	6/15/2018	6/15/2018
Date Analyzed			6/15/2018	6/15/2018	6/17/2018	6/17/2018	6/17/2018	6/17/2018	6/17/2018
Moiture (%)					25%	28%	31%	21%	23%
A1016	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
A1221	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
A1232	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
A1242	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
A1248	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
A1254	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
A1260	0.10	mg/Kg	nd	98%	nd	nd	nd	nd	nd
A1262	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
Surrogate Recoveries									
Decachlorobiphenyl			88%	112%	75%	68%	78%	70%	73%
Tetrachloro-m-xylene			109%	111%	72%	69%	90%	110%	125%

Acceptable Recovery Limits:

Surrogates/LCS	*60-150%*
MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0615-4**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/11/2018
Project Manager	Steve Loague	Date Received	6/15/2018
Project Name	**Proposed Grays Harbors**	Date Reported	6/20/2018
Client Project#	**A17.0202.00**		

Polychlorinated Biphenyls in Soil by EPA 8082A/3550C

Accu Lab Analytical Batch# AL061518-1

Client sample ID			**TP14-1-6.5**	**TP20-1-6**	**TP21-1-4.5**	**TP15-1-5**	**TP4-2-12**	**MW2-6**
Lab ID	**MRL**	**Unit**	18-AL0615-1-6	18-AL0615-1-7	18-AL0615-1-8	18-AL0615-1-9	18-AL0615-1-10	18-AL0615-1-11
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted			6/15/2018	6/15/2018	6/15/2018	6/15/2018	6/15/2018	6/15/2018
Date Analyzed			6/17/2018	6/17/2018	6/17/2018	6/17/2018	6/17/2018	6/17/2018
Moiture (%)			25%	26%	24%	24%	28%	27%
A1016	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1221	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1232	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1242	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1248	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1254	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1260	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1262	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
Surrogate Recoveries								
Decachlorobiphenyl			75%	74%	85%	77%	74%	72%
Tetrachloro-m-xylene			91%	85%	96%	71%	89%	93%

Acceptable Recovery Limits:

Surrogates/LCS	*60-150%*
MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0615-4**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/11/2018
Project Manager	Steve Loague	Date Received	6/15/2018
Project Name	**Proposed Grays Harbors**	Date Reported	6/20/2018
Client Project#	**A17.0202.00**		

Polychlorinated Biphenyls in Soil by EPA 8082A/3550C

Accu Lab Analytical Batch# AL061518-1

Client sample ID			**MW1-6**	**MW3-5**	**MW4-5**	**MW5-10**	**MW6-6**
Lab ID	**MRL**	**Unit**	18-AL0615-1-12	18-AL0615-1-13	18-AL0615-1-14	18-AL0615-1-15	18-AL0615-1-16
Matrix			Soil	Soil	Soil	Soil	Soil
Date Extracted			6/15/2018	6/15/2018	6/15/2018	6/15/2018	6/15/2018
Date Analyzed			6/17/2018	6/17/2018	6/17/2018	6/17/2018	6/17/2018
Moiture (%)			28%	25%	26%	28%	28%
A1016	0.10	mg/Kg	nd	nd	nd	nd	nd
A1221	0.10	mg/Kg	nd	nd	nd	nd	nd
A1232	0.10	mg/Kg	nd	nd	nd	nd	nd
A1242	0.10	mg/Kg	nd	nd	nd	nd	nd
A1248	0.10	mg/Kg	nd	nd	nd	nd	nd
A1254	0.10	mg/Kg	nd	nd	nd	nd	nd
A1260	0.10	mg/Kg	nd	nd	nd	nd	nd
A1262	0.10	mg/Kg	nd	nd	nd	nd	nd
Surrogate Recoveries							
Decachlorobiphenyl			81%	79%	71%	67%	69%
Tetrachloro-m-xylene			106%	95%	86%	86%	84%

Acceptable Recovery Limits:

Surrogates/LCS	*60-150%*
MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0615-4**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/11/2018
Project Manager	Steve Loague	Date Received	6/15/2018
Project Name	**Proposed Grays Harbors**	Date Reported	6/20/2018
Client Project#	**A17.0202.00**		

Polychlorinated Biphenyls in Soil by EPA 8082A/3550C

Accu Lab Analytical Batch# AL061518-1

Client sample ID			**MS MW6-6**	**MSD MW6-6**	**MSD MW6-6**
Lab ID	**MRL**	**Unit**	18-AL0615-1-16	18-AL0615-1-16	18-AL0615-1-16
Matrix			Soil	Soil	Soil
Date Extracted			6/15/2018	6/15/2018	6/15/2018
Date Analyzed			6/17/2018	6/17/2018	6/17/2018
Moiture (%)			28%	28%	28%
A1016	0.10	mg/Kg			
A1221	0.10	mg/Kg			
A1232	0.10	mg/Kg			
A1242	0.10	mg/Kg			
A1248	0.10	mg/Kg			
A1254	0.10	mg/Kg			
A1260	0.10	mg/Kg	95%	78%	20%
A1262	0.10	mg/Kg			
Surrogate Recoveries					
Decachlorobiphenyl			91%	84%	
Tetrachloro-m-xylene			104%	91%	

Acceptable Recovery Limits:

Surrogates/LCS	*60-150%*
MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0615-4**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/11/2018
Project Manager	**Steve Loague**	Date Received	6/15/2018
Project Name	**Proposed Grays Harbors**	Date Reported	6/20/2018
Client Project#	**A17.0202.00**		

Data Qualifiers and Comments:

Results reported on dry-weight basis for soil samples.

MRL- Method Reporting Limit

nd- Indicates the analyte is not detected at the listing reporting limit.

C- Coelution with other compounds.

M- % Recovery of surrogate, MS/MSD is out of the acceptable limit due to matrix effect.

B- Indicates the analyte is detected in the method blank associated with the sample.

J- The analyte is detected at below the reporting limit.

E- The result reported exceeds the calibration range, and is an estimate.

D- Sample required dilution due to matrix. Method Reporting Limits were elevated due to dilutions.

H- Sample was received or analyzed past holding time

Q- Sample was received with head space, improper preserved or above recommended temperature.

I- Due to insufficient sample, LCS/LCS DUP were analyzed in place of MS/MSD.

R- The recovery of this analyte in QC sample failed high, but the analyte was not detected in all related samples. No action was taken.

R-1- The RPD value for the MS/MSD was outside of QC acceptance limits however both recoveries were acceptable. All related samples were "nd". No action was taken.

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0619-6**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/12/2018
Project Manager	Steve League	Date Received	6/19/2018
Project Name	**Proposed Grays Harbor**	Date Reported	6/22/2018
Client Project#	**A17.0202.00**		

Polychlorinated Biphenyls in Soil by EPA 8082A/3550C

Accu Lab Analytical Batch# AL061918-4

Client sample ID					**TP8-2@8'**	**TP8-3@11'**	**TP9-1@6.5'**	**TP8-1@7'**	**TP13-1@12'**
Lab ID	**MRL**	**Unit**	**MTH BLK**	**LCS**	18-AL0619-6-1	18-AL0619-6-2	18-AL0619-6-3	18-AL0619-6-4	18-AL0619-6-5
Matrix			Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted			6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018
Date Analyzed			6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/20/2018
Moiture (%)					38%	40%	25%	44%	37%
A1016	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
A1221	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
A1232	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
A1242	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
A1248	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
A1254	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
A1260	0.10	mg/Kg	nd	98%	nd	nd	nd	nd	nd
A1262	0.10	mg/Kg	nd		nd	nd	nd	nd	nd
Surrogate Recoveries									
Decachlorobiphenyl			88%	112%	75%	68%	78%	70%	73%
Tetrachloro-m-xylene			109%	111%	72%	69%	90%	110%	125%

Acceptable Recovery Limits:

Surrogates/LCS	*60-150%*
MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0619-6**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/12/2018
Project Manager	Steve Loague	Date Received	6/19/2018
Project Name	**Proposed Grays Harbor**	Date Reported	6/22/2018
Client Project#	**A17.0202.00**		

Polychlorinated Biphenyls in Soil by EPA 8082A/3550C

Accu Lab Analytical Batch# AL061918-4

Client sample ID			**TP18-1@12'**	**TP24-2@10'**	**TP25-1@5.5'**	**TP19-1@5'**	**TP23-1@6'**	**TP22-1@6'**
Lab ID	**MRL**	**Unit**	18-AL0619-6-6	18-AL0619-6-7	18-AL0619-6-8	18-AL0619-6-9	18-AL0619-6-10	18-AL0619-6-11
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted			6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018
Date Analyzed			6/20/2018	6/20/2018	6/20/2018	6/20/2018	6/20/2018	6/20/2018
Moiture (%)			38%	31%	38%	56%	13%	22%
A1016	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1221	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1232	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1242	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1248	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1254	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1260	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1262	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
Surrogate Recoveries								
Decachlorobiphenyl			75%	74%	85%	77%	74%	72%
Tetrachloro-m-xylene			91%	85%	96%	71%	89%	93%

Acceptable Recovery Limits:

Surrogates/LCS	*60-150%*
MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0619-6**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/12/2018
Project Manager	Steve Loague	Date Received	6/19/2018
Project Name	**Proposed Grays Harbor**	Date Reported	6/22/2018
Client Project#	**A17.0202.00**		

Polychlorinated Biphenyls in Soil by EPA 8082A/3550C

Accu Lab Analytical Batch# AL061918-4

Client sample ID			**TP24-1@5.5'**	**TP16-1@5.5'**	**MS TP23-1@6'**	**MSD TP23-1@6'**	**MSD TP23-1@6'**
Lab ID	**MRL**	**Unit**	18-AL0619-6-12	18-AL0619-6-13	18-AL0619-6-10	18-AL0619-6-10	18-AL0619-6-10
Matrix			Soil	Soil	Soil	Soil	Soil
Date Extracted			6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018
Date Analyzed			6/20/2018	6/20/2018	6/20/2018	6/20/2018	6/20/2018
Moiture (%)			38%	40%	28%	28%	28%
A1016	0.10	mg/Kg	nd	nd			
A1221	0.10	mg/Kg	nd	nd			
A1232	0.10	mg/Kg	nd	nd			
A1242	0.10	mg/Kg	nd	nd			
A1248	0.10	mg/Kg	nd	nd			
A1254	0.10	mg/Kg	nd	nd			
A1260	0.10	mg/Kg	nd	nd	95%	78%	20%
A1262	0.10	mg/Kg	nd	nd			
Surrogate Recoveries							
Decachlorobiphenyl			81%	79%	91%	84%	
Tetrachloro-m-xylene			106%	95%	104%	91%	

Acceptable Recovery Limits:

Surrogates/LCS	*60-150%*
MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0619-6**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/13/2018
Project Manager	Steve Loague	Date Received	6/19/2018
Project Name	**Proposed Grays Harbor**	Date Reported	6/22/2018
Client Project#	**A17.0202.00**		

Polychlorinated Biphenyls in Soil by EPA 8082A/3550C

Accu Lab Analytical Batch# AL061918-3

Client sample ID					**TP12-1@12'**	**TP17-2@8'**	**TP7-2@10'**	**TP17-1@4'**
Lab ID	**MRL**	**Unit**	**MTH BLK**	**LCS**	18-AL0619-6-14	18-AL0619-6-15	18-AL0619-6-16	18-AL0619-6-17
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted			6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018
Date Analyzed			6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018
Moiture (%)					33%	31%	32%	40%
A1016	0.10	mg/Kg	nd		nd	nd	nd	nd
A1221	0.10	mg/Kg	nd		nd	nd	nd	nd
A1232	0.10	mg/Kg	nd		nd	nd	nd	nd
A1242	0.10	mg/Kg	nd		nd	nd	nd	nd
A1248	0.10	mg/Kg	nd		nd	nd	nd	nd
A1254	0.10	mg/Kg	nd		nd	nd	nd	nd
A1260	0.10	mg/Kg	nd	77%	nd	nd	nd	nd
A1262	0.10	mg/Kg	nd		nd	nd	nd	nd
Surrogate Recoveries								
Decachlorobiphenyl			88%	104%	71%	79%	76%	67%
Tetrachloro-m-xylene			90%	94%	87%	81%	83%	82%

Acceptable Recovery Limits:

Surrogates/LCS	*60-150%*
MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0619-6**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/13/2018
Project Manager	Steve Loague	Date Received	6/19/2018
Project Name	**Proposed Grays Harbor**	Date Reported	6/22/2018
Client Project#	**A17.0202.00**		

Polychlorinated Biphenyls in Soil by EPA 8082A/3550C

Accu Lab Analytical Batch# AL061918-3

Client sample ID			**TP11-1@9'**	**TP5-1@10'**	**TP7-1@6'**	**TP2-1@12'**	**TP3-1@6'**	**TP6-1@12'**
Lab ID	**MRL**	**Unit**	18-AL0619-6-18	18-AL0619-6-19	18-AL0619-6-20	18-AL0619-6-21	18-AL0619-6-22	18-AL0619-6-23
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted			6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018
Date Analyzed			6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018
Moiture (%)			39%	42%	34%	45%	29%	34%
A1016	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1221	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1232	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1242	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1248	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1254	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1260	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
A1262	0.10	mg/Kg	nd	nd	nd	nd	nd	nd
Surrogate Recoveries								
Decachlorobiphenyl			74%	68%	66%	81%	77%	74%
Tetrachloro-m-xylene			81%	86%	86%	90%	71%	89%

Acceptable Recovery Limits:

Surrogates/LCS	*60-150%*
MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0619-6**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/13/2018
Project Manager	Steve Loague	Date Received	6/19/2018
Project Name	**Proposed Grays Harbor**	Date Reported	6/22/2018
Client Project#	**A17.0202.00**		

Polychlorinated Biphenyls in Soil by EPA 8082A/3550C

Accu Lab Analytical Batch# AL061918-3

Client sample ID			**MS TP17-1@4'**	**MSD TP17-1@4'**	**MSD TP17-1@4'**
Lab ID	**MRL**	**Unit**	18-AL0619-6-17	18-AL0619-6-17	18-AL0619-6-17
Matrix			Soil	Soil	Soil
Date Extracted			6/19/2018	6/19/2018	6/19/2018
Date Analyzed			6/19/2018	6/19/2018	6/19/2018
Moiture (%)			40%	40%	40%
A1016	0.10	mg/Kg			
A1221	0.10	mg/Kg			
A1232	0.10	mg/Kg			
A1242	0.10	mg/Kg			
A1248	0.10	mg/Kg			
A1254	0.10	mg/Kg			
A1260	0.10	mg/Kg	81%	89%	10%
A1262	0.10	mg/Kg			
Surrogate Recoveries					
Decachlorobiphenyl			71%	79%	
Tetrachloro-m-xylene			87%	93%	

Acceptable Recovery Limits:

Surrogates/LCS	*60-150%*
MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0619-6**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/13,14/2018
Project Manager	Steve League	Date Received	6/19/2018
Project Name	**Proposed Grays Harbor**	Date Reported	6/22/2018
Client Project#	**A17.0202.00**		

Polychlorinated Biphenyls in Water by EPA 8082A/3510C

Accu Lab Analytical Batch# AL061918-5

Client sample ID					**MW-2**	**MW-1**	**MW-5**	**MW-6**
Lab ID	**MRL**	**Unit**	**MTH BLK**	**LCS**	18-AL0619-6-24	18-AL0619-6-25	18-AL0619-6-26	18-AL0619-6-27
Matrix			Water	Water	Water	Water	Water	Water
Date Extracted			6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018
Date Analyzed			6/22/2018	6/22/2018	6/22/2018	6/22/2018	6/22/2018	6/22/2018
A1016	0.10	mg/L	nd		nd	nd	nd	nd
A1221	0.10	mg/L	nd		nd	nd	nd	nd
A1232	0.10	mg/L	nd		nd	nd	nd	nd
A1242	0.10	mg/L	nd		nd	nd	nd	nd
A1248	0.10	mg/L	nd		nd	nd	nd	nd
A1254	0.10	mg/L	nd		nd	nd	nd	nd
A1260	0.10	mg/L	nd	76%	nd	nd	nd	nd
A1262	0.10	mg/L	nd		nd	nd	nd	nd
Surrogate Recoveries								
Decachlorobiphenyl			79%	88%	72%	92%	129%	82%
Tetrachloro-m-xylene			92%	86%	110%	105%	107%	86%

Acceptable Recovery Limits:

Surrogates/LCS	*60-150%*
MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0619-6**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/13,14/2018
Project Manager	Steve Loague	Date Received	6/19/2018
Project Name	**Proposed Grays Harbor**	Date Reported	6/22/2018
Client Project#	**A17.0202.00**		

Polychlorinated Biphenyls in Water by EPA 8082A/3510C

Accu Lab Analytical Batch# AL061918-5

Client sample ID			**MW-4**	**MW/3**
Lab ID	**MRL**	**Unit**	18-AL0619-6-28	18-AL0619-6-29
Matrix			Water	Water
Date Extracted			6/19/2018	6/19/2018
Date Analyzed			6/22/2018	6/22/2018
A1016	0.10	mg/L	nd	nd
A1221	0.10	mg/L	nd	nd
A1232	0.10	mg/L	nd	nd
A1242	0.10	mg/L	nd	nd
A1248	0.10	mg/L	nd	nd
A1254	0.10	mg/L	nd	nd
A1260	0.10	mg/L	nd	nd
A1262	0.10	mg/L	nd	nd
Surrogate Recoveries				
Decachlorobiphenyl			86%	78%
Tetrachloro-m-xylene			69%	101%

Acceptable Recovery Limits:

Surrogates/LCS	*60-150%*
MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**ESN NW, Inc**	**Acculab WO#**	**18-AL0619-6**
	1210 Eastside Street SE, Suite #200		
	Olympia, WA 98501	Date Sampled	6/12, 13,14 /2018
Project Manager	**Steve Loague**	Date Received	6/19/2018
Project Name	**Proposed Grays Harbor**	Date Reported	6/22/2018
Client Project#	**A17.0202.00**		

Data Qualifiers and Comments:

Results reported on dry-weight basis for soil samples.

MRL- Method Reporting Limit

nd- Indicates the analyte is not detected at the listing reporting limit.

C- Coelution with other compounds.

M- % Recovery of surrogate, MS/MSD is out of the acceptable limit due to matrix effect.

B- Indicates the analyte is detected in the method blank associated with the sample.

J- The analyte is detected at below the reporting limit.

E- The result reported exceeds the calibration range, and is an estimate.

D- Sample required dilution due to matrix. Method Reporting Limits were elevated due to dilutions.

H- Sample was received or analyzed past holding time

Q- Sample was received with head space, improper preserved or above recommended temperature.

I- Due to insufficient sample, LCS/LCS DUP were analyzed in place of MS/MSD.

R- The recovery of this analyte in QC sample failed high, but the analyte was not detected in all related samples. No action was taken.

R-1- The RPD value for the MS/MSD was outside of QC acceptance limits however both recoveries were acceptable. All related samples were "nd". No action was taken.

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

June 20, 2018 Ceres ID: 12138

ESN Northwest, Inc.
1210 Eastside Street SE
Olympia, WA 98501

The following report contains the results for the sixteen soil samples received on June 13, 2018. These samples were analyzed for tetra through octa chlorinated dibenzo-p-dioxins and dibenzofurans by EPA method 8290A. Routine turn-around time was provided for this work.

This work was authorized under the Project Name: Proposed Grays Harbor Potash Export & Facility.

Sample results are reported on a dry weight basis.

Continuing Calibration Verification (CCV) Requirements
All associated calibration verification standard(s) (CCV) met the acceptance criteria.

Confirmation analysis was performed on the samples which had concentrations above the method calibration limit for the 2,3,7,8-TCDF on a Quadrex Q-225 column for isomer specificity.

The report consists of a Cover Letter, Sample Inventory (Section I), Data Summary (Section II), Sample Tracking (Section VI), and Qualifiers/Abbreviations (Section VII). Raw Data (Section III), Continuing Calibration (Section IV), and Initial Calibration (Section V) are available in a full report (.pdf format) upon request.

If you have any questions regarding this report, please feel free to contact me at (916)932-5011.

Sincerely,

James M. Hedin
Director of Operations/CEO
jhedin@ceres-lab.com

Section I: Sample Inventory

Ceres Sample ID:	Sample ID	Date Received	Collection Date &Time
12138-001	TP1-1@4'	6/13/2018	6/11/2018 10:45
12138-002	TP1-2@9'	6/13/2018	6/11/2018 11:08
12138-003	TP10-1@12'	6/13/2018	6/11/2018 13:00
12138-004	TP10-2@4'	6/13/2018	6/11/2018 13:15
12138-005	TP4-1@5'	6/13/2018	6/11/2018 13:45
12138-006	TP14-1@6.5'	6/13/2018	6/11/2018 15:20
12138-007	TP20-1@6'	6/13/2018	6/11/2018 16:15
12138-008	TP21-1@4.5'	6/13/2018	6/11/2018 17:15
12138-009	TP15-1@5'	6/13/2018	6/11/2018 17:55
12138-010	TP4-2@12'	6/13/2018	6/11/2018 14:15
12138-011	MW-2@6'	6/13/2018	6/11/2018 10:30
12138-012	MW-1@6'	6/13/2018	6/11/2018 12:00
12138-013	MW-3@5'	6/13/2018	6/11/2018 18:10
12138-014	MW-4@5'	6/13/2018	6/11/2018 16:12
12138-015	MW-5@10'	6/13/2018	6/11/2018 13:45
12138-016	MW-6@6'	6/13/2018	6/11/2018 13:40

Section II: Data Summary

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Sample **Method Blank**		**Date Received:** NA
	QC Batch #: 1798	**Date Extracted:** 6/13/2018
	Matrix: Soil	**ZB-5MS Analysis:** 6/14/2018
Project ID: Proposed Grays Harbor Potash	**Sample Size:** 10.00 g	

Analyte	Conc. (pg/g)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 0.394	0.172	0.500		13C-2378-TCDD	96.0	40-135	
12378-PeCDD	DL= 0.291	0.327	2.50		13C-12378-PeCDD	97.0	40-135	
123478-HxCDD	DL= 0.785	0.327	2.50		13C-123478-HxCDD	64.5	40-135	
123678-HxCDD	DL= 0.750	0.655	2.50		13C-123678-HxCDD	75.8	40-135	
123789-HxCDD	DL= 0.749	0.315	2.50		13C-1234678-HpCDD	72.4	40-135	
1234678-HpCDD	DL= 1.77	0.409	2.50		13C-OCDD	70.1	40-135	
OCDD	DL= 1.23	1.01	5.00		13C-2378-TCDF	92.2	40-135	
2,3,7,8-TCDF	DL= 0.367	0.0886	0.500		13C-12378-PeCDF	74.4	40-135	
12378-PeCDF	DL= 0.259	0.412	2.50		13C-23478-PeCDF	87.1	40-135	
23478-PeCDF	DL= 0.200	0.422	2.50		13C-123478-HxCDF	79.5	40-135	
123478-HxCDF	DL= 0.522	0.518	2.50		13C-123678-HxCDF	98.2	40-135	
123678-HxCDF	DL= 0.449	0.533	2.50		13C-234678-HxCDF	78.8	40-135	
234678-HxCDF	DL= 0.539	0.319	2.50		13C-123789-HxCDF	63.3	40-135	
123789-HxCDF	DL= 1.06	0.425	2.50		13C-1234678-HpCDF	75.8	40-135	
1234678-HpCDF	DL= 0.574	0.279	2.50		13C-1234789-HpCDF	63.0	40-135	
1234789-HpCDF	DL= 1.20	0.378	2.50					
OCDF	DL= 1.41	0.461	5.00					

Totals	Conc. (pg/g)	EMPC
Total TCDD	DL= 0.394	
Total PeCDD	DL= 0.291	
Total HxCDD	DL= 0.785	
Total HpCDD	DL= 1.77	
Total TCDF	DL= 0.367	
Total PeCDF	DL= 0.259	
Total HxCDF	DL= 1.06	
Total HpCDF	DL= 1.20	

CRS			
37Cl4-2378-TCDD	131	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Samples **Laboratory Control Samples**		**Date Received:** NA
	QC Batch #: 1798	**Date Extracted:** 6/13/2018
	Matrix: Soil	**ZB-5MS Analysis:** 6/14/2018
Project ID: Proposed Grays Harbor Potash	**Sample Size:** 10.00 g	

Analyte	LCS1 % Rec.	LCS2 % Rec.	%RSD
2,3,7,8-TCDD	101	99.5	1.06
12378-PeCDD	111	108	1.94
123478-HxCDD	106	115	5.76
123678-HxCDD	111	117	3.72
123789-HxCDD	127	129	1.10
1234678-HpCDD	112	112	0.00
OCDD	112	114	1.25
2,3,7,8-TCDF	116	115	0.61
12378-PeCDF	114	119	3.03
23478-PeCDF	118	117	0.60
123478-HxCDF	120	121	0.59
123678-HxCDF	111	111	0.00
234678-HxCDF	108	112	2.57
123789-HxCDF	121	119	1.18
1234678-HpCDF	113	113	0.00
1234789-HpCDF	115	116	0.61
OCDF	87.7	93	4.15

Labeled Standards	LCS1 % Rec.	LCS2 % Rec	Limits (a)
13C-2378-TCDD	109	108	40-135
13C-12378-PeCDD	125	114	40-135
13C-123478-HxCDD	65.4	82.2	40-135
13C-123678-HxCDD	71.7	85.2	40-135
13C-1234678-HpCDD	85.9	98.0	40-135
13C-OCDD	77.8	98.7	40-135
13C-2378-TCDF	97.1	106	40-135
13C-12378-PeCDF	121	115	40-135
13C-23478-PeCDF	113	92.4	40-135
13C-123478-HxCDF	87.3	105	40-135
13C-123678-HxCDF	105	125	40-135
13C-234678-HxCDF	88.0	107	40-135
13C-123789-HxCDF	68.6	90.1	40-135
13C-1234678-HpCDF	89.1	96.8	40-135
13C-1234789-HpCDF	78.0	89.7	40-135
CRS			
37Cl4-2378-TCDD	127	130	40-135

(a) Limits based on method acceptance criteria.

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP1-1@4'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-001	**Date Received:** 6/13/2018
	QC Batch #: 1798	**Date Extracted:** 6/13/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/14/2018
Time Collected: 10:45	**Sample Size:** 16.42 g **% Solids:** 60.9	**Q-225 Analysis:** 6/19/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	2.77	0.172	0.500	
12378-PeCDD	3.72	0.327	2.50	
123478-HxCDD	1.97	0.327	2.50	J
123678-HxCDD	3.65	0.655	2.50	
123789-HxCDD	6.06	0.315	2.50	
1234678-HpCDD	24.8	0.409	2.50	
OCDD	127	1.01	5.00	
2,3,7,8-TCDF	7.99	0.0886	0.500	
12378-PeCDF	2.42	0.412	2.50	J
23478-PeCDF	2.67	0.422	2.50	
123478-HxCDF	2.08	0.518	2.50	J
123678-HxCDF	1.26	0.533	2.50	J
234678-HxCDF	1.07	0.319	2.50	J
123789-HxCDF	DL= 0.193	0.425	2.50	
1234678-HpCDF	10.4	0.279	2.50	
1234789-HpCDF	DL= 0.490	0.378	2.50	
OCDF	9.56	0.461	5.00	

Totals	Conc. (pg/g)	EMPC
Total TCDD	95.5	
Total PeCDD	96.5	
Total HxCDD	78.0	
Total HpCDD	49.2	
Total TCDF	125	
Total PeCDF	48.5	50.2
Total HxCDF	19.7	
Total HpCDF	26.5	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	118	40-135	
13C-12378-PeCDD	70.8	40-135	
13C-123478-HxCDD	93.9	40-135	
13C-123678-HxCDD	101	40-135	
13C-1234678-HpCDD	97.5	40-135	
13C-OCDD	75.9	40-135	
13C-2378-TCDF	115	40-135	
13C-12378-PeCDF	86.3	40-135	
13C-23478-PeCDF	87.2	40-135	
13C-123478-HxCDF	108	40-135	
13C-123678-HxCDF	116	40-135	
13C-234678-HxCDF	111	40-135	
13C-123789-HxCDF	101	40-135	
13C-1234678-HpCDF	42.6	40-135	
13C-1234789-HpCDF	91.9	40-135	

CRS

37Cl4-2378-TCDD	104	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 10.2 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP1-2@9'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-002	**Date Received:** 6/13/2018
	QC Batch #: 1798	**Date Extracted:** 6/13/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/14/2018
Time Collected: 11:08	**Sample Size:** 14.95 g **% Solids:** 66.5	**Q-225 Analysis:** 6/19/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.69	0.172	0.503	
12378-PeCDD	2.24	0.327	2.52	J
123478-HxCDD	1.25	0.327	2.52	J
123678-HxCDD	2.46	0.655	2.52	J
123789-HxCDD	4.64	0.315	2.52	
1234678-HpCDD	16.0	0.409	2.52	
OCDD	84.5	1.01	5.03	
2,3,7,8-TCDF	6.13	0.0886	0.503	
12378-PeCDF	1.58	0.412	2.52	J
23478-PeCDF	1.61	0.422	2.52	J
123478-HxCDF	1.43	0.518	2.52	J
123678-HxCDF	0.829	0.533	2.52	J
234678-HxCDF	0.552	0.319	2.52	J
123789-HxCDF	DL= 0.269	0.425	2.52	
1234678-HpCDF	8.78	0.279	2.52	
1234789-HpCDF	DL= 0.484	0.378	2.52	
OCDF	6.85	0.461	5.03	

Totals	Conc. (pg/g)	EMPC	
Total TCDD	86.5		
Total PeCDD	60.3		
Total HxCDD	52.5		
Total HpCDD	33.0		
Total TCDF	89.8		X
Total PeCDF	28.3	28.6	
Total HxCDF	12.2		
Total HpCDF	20.0		

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	108	40-135	
13C-12378-PeCDD	86.1	40-135	
13C-123478-HxCDD	84.9	40-135	
13C-123678-HxCDD	90.2	40-135	
13C-1234678-HpCDD	82.1	40-135	
13C-OCDD	61.6	40-135	
13C-2378-TCDF	106	40-135	
13C-12378-PeCDF	81.9	40-135	
13C-23478-PeCDF	85.5	40-135	
13C-123478-HxCDF	95.6	40-135	
13C-123678-HxCDF	104	40-135	
13C-234678-HxCDF	97.1	40-135	
13C-123789-HxCDF	89.2	40-135	
13C-1234678-HpCDF	44.7	40-135	
13C-1234789-HpCDF	73.9	40-135	

CRS

37Cl4-2378-TCDD	95.0	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 6.46 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP10-1@12'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-003	**Date Received:** 6/13/2018
	QC Batch #: 1798	**Date Extracted:** 6/13/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/14/2018
Time Collected: 13:00	**Sample Size:** 14.23 g **% Solids:** 70.9	**Q-225 Analysis:** 6/19/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.18	0.172	0.496	
12378-PeCDD	1.36	0.327	2.48	J
123478-HxCDD	DL= 0.499	0.327	2.48	
123678-HxCDD	2.36	0.655	2.48	J
123789-HxCDD	2.89	0.315	2.48	
1234678-HpCDD	21.6	0.409	2.48	
OCDD	165	1.01	4.96	
2,3,7,8-TCDF	DL= 0.371	0.0886	0.496	
12378-PeCDF	DL= 0.396	0.412	2.48	
23478-PeCDF	0.594	0.422	2.48	J
123478-HxCDF	1.68	0.518	2.48	J
123678-HxCDF	0.998	0.533	2.48	J
234678-HxCDF	0.694	0.319	2.48	J
123789-HxCDF	DL= 0.292	0.425	2.48	
1234678-HpCDF	42.9	0.279	2.48	
1234789-HpCDF	DL= 0.565	0.378	2.48	
OCDF	20.4	0.461	4.96	

Totals	Conc. (pg/g)	EMPC
Total TCDD	9.87	
Total PeCDD	11.6	14.8
Total HxCDD	32.7	
Total HpCDD	58.4	
Total TCDF	20.1	
Total PeCDF	15.3	16.3
Total HxCDF	36.5	
Total HpCDF	95.6	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	111	40-135	
13C-12378-PeCDD	83.8	40-135	
13C-123478-HxCDD	89.5	40-135	
13C-123678-HxCDD	97.1	40-135	
13C-1234678-HpCDD	89.2	40-135	
13C-OCDD	64.0	40-135	
13C-2378-TCDF	103	40-135	
13C-12378-PeCDF	77.8	40-135	
13C-23478-PeCDF	82.2	40-135	
13C-123478-HxCDF	101	40-135	
13C-123678-HxCDF	109	40-135	
13C-234678-HxCDF	107	40-135	
13C-123789-HxCDF	93.8	40-135	
13C-1234678-HpCDF	40.1	40-135	
13C-1234789-HpCDF	78.8	40-135	

CRS

37Cl4-2378-TCDD	92.1	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 4.28 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP10-2@4'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-004	**Date Received:** 6/13/2018
	QC Batch #: 1798	**Date Extracted:** 6/13/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/14/2018
Time Collected: 13:15	**Sample Size:** 12.45 g **% Solids:** 80.3	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 0.394	0.172	0.500	
12378-PeCDD	DL= 0.454	0.327	2.50	
123478-HxCDD	DL= 0.561	0.327	2.50	
123678-HxCDD	DL= 0.621	0.655	2.50	
123789-HxCDD	0.837	0.315	2.50	J
1234678-HpCDD	3.18	0.409	2.50	
OCDD	17.1	1.01	5.00	
2,3,7,8-TCDF	DL= 0.277	0.0886	0.500	
12378-PeCDF	DL= 0.366	0.412	2.50	
23478-PeCDF	DL= 0.414	0.422	2.50	
123478-HxCDF	DL= 0.353	0.518	2.50	
123678-HxCDF	DL= 0.331	0.533	2.50	
234678-HxCDF	DL= 0.330	0.319	2.50	
123789-HxCDF	DL= 0.562	0.425	2.50	
1234678-HpCDF	2.94	0.279	2.50	
1234789-HpCDF	DL= 0.863	0.378	2.50	
OCDF	DL= 1.59	0.461	5.00	

Totals	Conc. (pg/g)	EMPC
Total TCDD	1.00	
Total PeCDD	DL= 0.454	
Total HxCDD	7.43	
Total HpCDD	7.77	
Total TCDF		1.07
Total PeCDF	DL= 0.414	
Total HxCDF	1.44	
Total HpCDF	5.78	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	95.2	40-135	
13C-12378-PeCDD	73.3	40-135	
13C-123478-HxCDD	75.6	40-135	
13C-123678-HxCDD	83.3	40-135	
13C-1234678-HpCDD	74.4	40-135	
13C-OCDD	58.2	40-135	
13C-2378-TCDF	96.9	40-135	
13C-12378-PeCDF	71.3	40-135	
13C-23478-PeCDF	59.0	40-135	
13C-123478-HxCDF	100	40-135	
13C-123678-HxCDF	107	40-135	
13C-234678-HxCDF	96.4	40-135	
13C-123789-HxCDF	83.8	40-135	
13C-1234678-HpCDF	43.3	40-135	
13C-1234789-HpCDF	67.2	40-135	
CRS			
37Cl4-2378-TCDD	82.7	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.150 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP4-1@5'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-005	**Date Received:** 6/13/2018
	QC Batch #: 1798	**Date Extracted:** 6/13/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/14/2018
Time Collected: 15:20	**Sample Size:** 15.05 g **% Solids:** 67.0	**Q-225 Analysis:** 6/19/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	0.597	0.172	0.496	
12378-PeCDD	0.853	0.327	2.48	J
123478-HxCDD	DL= 0.562	0.327	2.48	
123678-HxCDD	1.83	0.655	2.48	J
123789-HxCDD	2.59	0.315	2.48	
1234678-HpCDD	21.5	0.409	2.48	
OCDD	174	1.01	4.96	
2,3,7,8-TCDF	DL= 0.390	0.0886	0.496	
12378-PeCDF	DL= 0.343	0.412	2.48	
23478-PeCDF	DL= 0.316	0.422	2.48	
123478-HxCDF	0.618	0.518	2.48	J
123678-HxCDF	0.435	0.533	2.48	J
234678-HxCDF	DL= 0.232	0.319	2.48	
123789-HxCDF	DL= 0.346	0.425	2.48	
1234678-HpCDF	12.2	0.279	2.48	
1234789-HpCDF	DL= 0.761	0.378	2.48	
OCDF	12.2	0.461	4.96	

Totals	Conc. (pg/g)	EMPC
Total TCDD	3.86	
Total PeCDD	4.46	6.85
Total HxCDD	19.0	
Total HpCDD	49.1	
Total TCDF	4.53	
Total PeCDF	3.22	
Total HxCDF	10.9	
Total HpCDF	35.6	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	96.8	40-135	
13C-12378-PeCDD	75.3	40-135	
13C-123478-HxCDD	84.3	40-135	
13C-123678-HxCDD	89.1	40-135	
13C-1234678-HpCDD	72.6	40-135	
13C-OCDD	64.6	40-135	
13C-2378-TCDF	94.8	40-135	
13C-12378-PeCDF	70.2	40-135	
13C-23478-PeCDF	70.4	40-135	
13C-123478-HxCDF	101	40-135	
13C-123678-HxCDF	109	40-135	
13C-234678-HxCDF	106	40-135	
13C-123789-HxCDF	94.6	40-135	
13C-1234678-HpCDF	44.5	40-135	
13C-1234789-HpCDF	64.9	40-135	

CRS

37Cl4-2378-TCDD	82.2	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 2.39 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP14-1@6.5'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-006	**Date Received:** 6/13/2018
	QC Batch #: 1798	**Date Extracted:** 6/13/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/14/2018
Time Collected: 16:15	**Sample Size:** 12.53 g **% Solids:** 80.6	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 0.300	0.172	0.495	
12378-PeCDD	DL= 0.421	0.327	2.48	
123478-HxCDD	DL= 0.275	0.327	2.48	
123678-HxCDD	0.573	0.655	2.48	
123789-HxCDD	1.13	0.315	2.48	
1234678-HpCDD	3.30	0.409	2.48	
OCDD	21.3	1.01	4.95	
2,3,7,8-TCDF	DL= 0.302	0.0886	0.495	
12378-PeCDF	DL= 0.281	0.412	2.48	
23478-PeCDF	DL= 0.244	0.422	2.48	
123478-HxCDF	DL= 0.220	0.518	2.48	
123678-HxCDF	DL= 0.188	0.533	2.48	
234678-HxCDF	DL= 0.204	0.319	2.48	
123789-HxCDF	DL= 0.310	0.425	2.48	
1234678-HpCDF	0.907	0.279	2.48	
1234789-HpCDF	DL= 0.395	0.378	2.48	
OCDF	DL= 0.865	0.461	4.95	

Totals	Conc. (pg/g)	EMPC
Total TCDD	0.875	1.20
Total PeCDD		1.75
Total HxCDD	7.88	
Total HpCDD	7.84	
Total TCDF	DL= 0.302	
Total PeCDF	DL= 0.281	
Total HxCDF	0.958	
Total HpCDF	3.04	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	111	40-135	
13C-12378-PeCDD	80.7	40-135	
13C-123478-HxCDD	79.9	40-135	
13C-123678-HxCDD	83.1	40-135	
13C-1234678-HpCDD	92.1	40-135	
13C-OCDD	69.2	40-135	
13C-2378-TCDF	107	40-135	
13C-12378-PeCDF	74.0	40-135	
13C-23478-PeCDF	74.4	40-135	
13C-123478-HxCDF	99.2	40-135	
13C-123678-HxCDF	115	40-135	
13C-234678-HxCDF	105	40-135	
13C-123789-HxCDF	97.3	40-135	
13C-1234678-HpCDF	51.9	40-135	
13C-1234789-HpCDF	81.8	40-135	
CRS			
37Cl4-2378-TCDD	94.1	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.219 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP20-1@6'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-007	**Date Received:** 6/13/2018
	QC Batch #: 1798	**Date Extracted:** 6/13/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/14/2018
Time Collected: 17:15	**Sample Size:** 11.68 g **% Solids:** 85.1	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 0.438	0.172	0.503	
12378-PeCDD	DL= 0.735	0.327	2.52	
123478-HxCDD	DL= 0.361	0.327	2.52	
123678-HxCDD	0.798	0.655	2.52	J
123789-HxCDD	1.17	0.315	2.52	J
1234678-HpCDD	6.91	0.409	2.52	
OCDD	53.9	1.01	5.03	
2,3,7,8-TCDF	DL= 0.326	0.0886	0.503	
12378-PeCDF	DL= 0.432	0.412	2.52	
23478-PeCDF	DL= 0.372	0.422	2.52	
123478-HxCDF	DL= 0.230	0.518	2.52	
123678-HxCDF	DL= 0.216	0.533	2.52	
234678-HxCDF	DL= 0.208	0.319	2.52	
123789-HxCDF	DL= 0.372	0.425	2.52	
1234678-HpCDF	2.35	0.279	2.52	J
1234789-HpCDF	DL= 0.390	0.378	2.52	
OCDF	3.82	0.461	5.03	J

Totals	Conc. (pg/g)	EMPC
Total TCDD	2.43	
Total PeCDD	DL= 0.735	
Total HxCDD	9.32	
Total HpCDD	16.9	
Total TCDF	DL= 0.326	
Total PeCDF	DL= 0.432	
Total HxCDF	2.56	
Total HpCDF	6.93	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	103	40-135	
13C-12378-PeCDD	82.4	40-135	
13C-123478-HxCDD	93.6	40-135	
13C-123678-HxCDD	108	40-135	
13C-1234678-HpCDD	108	40-135	
13C-OCDD	73.6	40-135	
13C-2378-TCDF	108	40-135	
13C-12378-PeCDF	72.7	40-135	
13C-23478-PeCDF	72.6	40-135	
13C-123478-HxCDF	131	40-135	
13C-123678-HxCDF	119	40-135	
13C-234678-HxCDF	132	40-135	
13C-123789-HxCDF	106	40-135	
13C-1234678-HpCDF	66.9	40-135	
13C-1234789-HpCDF	90.2	40-135	
CRS			
37Cl4-2378-TCDD	90.8	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.307 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Sample **Method Blank**		**Date Received:** NA
	QC Batch #: 1803	**Date Extracted:** 6/17/2018
	Matrix: Soil	**ZB-5MS Analysis:** 6/18/2018
Project ID: Proposed Grays Harbor Potash	**Sample Size:** 10.00 g	

Analyte	Conc. (pg/g)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 0.375	0.172	0.500		13C-2378-TCDD	81.7	40-135	
12378-PeCDD	DL= 0.550	0.327	2.50		13C-12378-PeCDD	69.3	40-135	
123478-HxCDD	DL= 0.830	0.327	2.50		13C-123478-HxCDD	58.2	40-135	
123678-HxCDD	DL= 0.807	0.655	2.50		13C-123678-HxCDD	71.9	40-135	
123789-HxCDD	DL= 0.798	0.315	2.50		13C-1234678-HpCDD	82.0	40-135	
1234678-HpCDD	DL= 0.817	0.409	2.50		13C-OCDD	79.6	40-135	
OCDD	DL= 0.859	1.01	5.00		13C-2378-TCDF	79.9	40-135	
2,3,7,8-TCDF	DL= 0.267	0.0886	0.500		13C-12378-PeCDF	64.6	40-135	
12378-PeCDF	DL= 0.763	0.412	2.50		13C-23478-PeCDF	64.9	40-135	
23478-PeCDF	DL= 0.681	0.422	2.50		13C-123478-HxCDF	85.8	40-135	
123478-HxCDF	DL= 0.614	0.518	2.50		13C-123678-HxCDF	94.6	40-135	
123678-HxCDF	DL= 0.615	0.533	2.50		13C-234678-HxCDF	78.3	40-135	
234678-HxCDF	DL= 0.656	0.319	2.50		13C-123789-HxCDF	74.1	40-135	
123789-HxCDF	DL= 1.08	0.425	2.50		13C-1234678-HpCDF	90.6	40-135	
1234678-HpCDF	DL= 0.394	0.279	2.50		13C-1234789-HpCDF	88.1	40-135	
1234789-HpCDF	DL= 0.679	0.378	2.50					
OCDF	DL= 1.14	0.461	5.00					

Totals	Conc. (pg/g)	EMPC
Total TCDD	DL= 0.375	
Total PeCDD	DL= 0.550	
Total HxCDD	DL= 0.830	
Total HpCDD	DL= 0.817	
Total TCDF	DL= 0.267	
Total PeCDF	DL= 0.763	
Total HxCDF	DL= 1.08	
Total HpCDF	DL= 0.679	

CRS		
37Cl4-2378-TCDD	68.8	40-135

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Samples **Laboratory Control Samples**	**QC Batch #:** 1800 **Matrix:** Soil	**Date Received:** NA **Date Extracted:** 6/17/2018 **ZB-5MS Analysis:** 6/18/2018
Project ID: Proposed Grays Harbor Potash	**Sample Size:** 10.00 g	

Analyte	LCS1 % Rec.	LCS2 % Rec.	%RSD	Labeled Standards	LCS1 % Rec.	LCS2 % Rec	Limits (a)
2,3,7,8-TCDD	106	102	2.72	13C-2378-TCDD	87.1	94.2	40-135
12378-PeCDD	102	105	2.05	13C-12378-PeCDD	87.2	89.7	40-135
123478-HxCDD	112	116	2.48	13C-123478-HxCDD	82.8	75.8	40-135
123678-HxCDD	115	119	2.42	13C-123678-HxCDD	96.6	85.5	40-135
123789-HxCDD	111	129	10.61	13C-1234678-HpCDD	83.1	107	40-135
1234678-HpCDD	107	110	1.96	13C-OCDD	79.6	112	40-135
OCDD	111	116	3.12	13C-2378-TCDF	95.9	93.3	40-135
2,3,7,8-TCDF	106	111	3.26	13C-12378-PeCDF	80.4	87.1	40-135
12378-PeCDF	103	106	2.03	13C-23478-PeCDF	77.2	83.6	40-135
23478-PeCDF	104	104	0.00	13C-123478-HxCDF	80.3	99.5	40-135
123478-HxCDF	120	125	2.89	13C-123678-HxCDF	82.3	110	40-135
123678-HxCDF	107	112	3.23	13C-234678-HxCDF	73.3	91.2	40-135
234678-HxCDF	111	114	1.89	13C-123789-HxCDF	82.1	86.4	40-135
123789-HxCDF	113	119	3.66	13C-1234678-HpCDF	93.5	112	40-135
1234678-HpCDF	107	110	1.96	13C-1234789-HpCDF	82.9	109	40-135
1234789-HpCDF	109	110	0.65				
OCDF	114	124	5.94				
				CRS			
				37Cl4-2378-TCDD	73.9	76.9	40-135

(a) Limits based on method acceptance criteria.

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP21-1@4.5'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-008	**Date Received:** 6/13/2018
	QC Batch #: 1803	**Date Extracted:** 6/17/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/18/2018
Time Collected: 17:15	**Sample Size:** 12.28 g **% Solids:** 83.3	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 0.374	0.172	0.489	
12378-PeCDD	DL= 0.473	0.327	2.44	
123478-HxCDD	DL= 0.525	0.327	2.44	
123678-HxCDD	DL= 0.552	0.655	2.44	
123789-HxCDD	DL= 0.527	0.315	2.44	
1234678-HpCDD	1.97	0.409	2.44	
OCDD	9.44	1.01	4.89	
2,3,7,8-TCDF	DL= 0.290	0.0886	0.489	
12378-PeCDF	DL= 0.250	0.412	2.44	
23478-PeCDF	DL= 0.250	0.422	2.44	
123478-HxCDF	DL= 0.232	0.518	2.44	
123678-HxCDF	DL= 0.224	0.533	2.44	
234678-HxCDF	DL= 0.228	0.319	2.44	
123789-HxCDF	DL= 0.351	0.425	2.44	
1234678-HpCDF	0.417	0.279	2.44	
1234789-HpCDF	DL= 0.414	0.378	2.44	
OCDF	DL= 1.11	0.461	4.89	

Totals	Conc. (pg/g)	EMPC
Total TCDD	0.714	
Total PeCDD	DL= 0.473	
Total HxCDD	3.24	
Total HpCDD	4.39	
Total TCDF	DL= 0.290	
Total PeCDF	DL= 0.250	
Total HxCDF	DL= 0.351	
Total HpCDF	1.03	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	98.1	40-135	
13C-12378-PeCDD	69.1	40-135	
13C-123478-HxCDD	96.2	40-135	
13C-123678-HxCDD	109	40-135	
13C-1234678-HpCDD	91.9	40-135	
13C-OCDD	61.2	40-135	
13C-2378-TCDF	99.1	40-135	
13C-12378-PeCDF	78.5	40-135	
13C-23478-PeCDF	69.9	40-135	
13C-123478-HxCDF	115	40-135	
13C-123678-HxCDF	125	40-135	
13C-234678-HxCDF	117	40-135	
13C-123789-HxCDF	103	40-135	
13C-1234678-HpCDF	100	40-135	
13C-1234789-HpCDF	99.0	40-135	

CRS

37Cl4-2378-TCDD	86.5	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0267 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP-15-1@5'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-009	**Date Received:** 6/13/2018
	QC Batch #: 1803	**Date Extracted:** 6/17/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/18/2018
Time Collected: 17:55	**Sample Size:** 12.79 g **% Solids:** 78.6	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 0.425	0.172	0.498		13C-2378-TCDD	93.7	40-135	
12378-PeCDD	DL= 0.703	0.327	2.49		13C-12378-PeCDD	70.8	40-135	
123478-HxCDD	DL= 0.515	0.327	2.49		13C-123478-HxCDD	84.9	40-135	
123678-HxCDD	DL= 0.570	0.655	2.49		13C-123678-HxCDD	92.2	40-135	
123789-HxCDD	1.23	0.315	2.49	J	13C-1234678-HpCDD	85.2	40-135	
1234678-HpCDD	3.98	0.409	2.49		13C-OCDD	57.2	40-135	
OCDD	22.6	1.01	4.98		13C-2378-TCDF	95.4	40-135	
2,3,7,8-TCDF	DL= 0.452	0.0886	0.498		13C-12378-PeCDF	72.2	40-135	
12378-PeCDF	DL= 0.493	0.412	2.49		13C-23478-PeCDF	70.9	40-135	
23478-PeCDF	DL= 0.467	0.422	2.49		13C-123478-HxCDF	107	40-135	
123478-HxCDF	DL= 0.288	0.518	2.49		13C-123678-HxCDF	112	40-135	
123678-HxCDF	DL= 0.282	0.533	2.49		13C-234678-HxCDF	102	40-135	
234678-HxCDF	DL= 0.309	0.319	2.49		13C-123789-HxCDF	96.2	40-135	
123789-HxCDF	DL= 0.444	0.425	2.49		13C-1234678-HpCDF	86.2	40-135	
1234678-HpCDF	0.873	0.279	2.49	J	13C-1234789-HpCDF	91.3	40-135	
1234789-HpCDF	DL= 0.618	0.378	2.49					
OCDF	DL= 2.36	0.461	4.98					

Totals	Conc. (pg/g)	EMPC
Total TCDD	1.02	
Total PeCDD	DL= 0.703	
Total HxCDD	6.67	
Total HpCDD	8.67	
Total TCDF	DL= 0.452	
Total PeCDF	DL= 0.493	
Total HxCDF	0.536	
Total HpCDF	2.54	

CRS			
37Cl4-2378-TCDD	81.7	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.178 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP4-2@12'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-010	**Date Received:** 6/13/2018
	QC Batch #: 1803	**Date Extracted:** 6/17/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/18/2018
Time Collected: 14:15	**Sample Size:** 15.15 g **% Solids:** 66.0	**Q-225 Analysis:** 6/19/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.67	0.172	0.500	
12378-PeCDD	1.70	0.327	2.50	J
123478-HxCDD	DL= 0.869	0.327	2.50	
123678-HxCDD	3.67	0.655	2.50	
123789-HxCDD	4.65	0.315	2.50	
1234678-HpCDD	37.3	0.409	2.50	
OCDD	307	1.01	5.00	
2,3,7,8-TCDF	1.27	0.0886	0.500	
12378-PeCDF	DL= 0.546	0.412	2.50	
23478-PeCDF	0.725	0.422	2.50	J
123478-HxCDF	3.84	0.518	2.50	
123678-HxCDF	1.92	0.533	2.50	J
234678-HxCDF	0.861	0.319	2.50	J
123789-HxCDF	DL= 0.649	0.425	2.50	
1234678-HpCDF	63.6	0.279	2.50	
1234789-HpCDF	1.40	0.378	2.50	J
OCDF	50.5	0.461	5.00	

Totals	Conc. (pg/g)	EMPC	
Total TCDD	13.3		
Total PeCDD	12.9	15.3	
Total HxCDD	38.1		
Total HpCDD	84.2		
Total TCDF	43.1		X
Total PeCDF	34.8		X
Total HxCDF	68.4		
Total HpCDF	129		

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	106	40-135	
13C-12378-PeCDD	88.6	40-135	
13C-123478-HxCDD	94.4	40-135	
13C-123678-HxCDD	98.8	40-135	
13C-1234678-HpCDD	100	40-135	
13C-OCDD	78.8	40-135	
13C-2378-TCDF	115	40-135	
13C-12378-PeCDF	87.9	40-135	
13C-23478-PeCDF	92.1	40-135	
13C-123478-HxCDF	114	40-135	
13C-123678-HxCDF	124	40-135	
13C-234678-HxCDF	113	40-135	
13C-123789-HxCDF	103	40-135	
13C-1234678-HpCDF	101	40-135	
13C-1234789-HpCDF	107	40-135	

CRS

37Cl4-2378-TCDD	89.8	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 6.34 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: MW-2@6'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-011	**Date Received:** 6/13/2018
	QC Batch #: 1803	**Date Extracted:** 6/17/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/18/2018
Time Collected: 10:30	**Sample Size:** 13.41 g **% Solids:** 74.1	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 0.463	0.172	0.503	
12378-PeCDD	DL= 0.667	0.327	2.52	
123478-HxCDD	DL= 0.542	0.327	2.52	
123678-HxCDD	1.12	0.655	2.52	J
123789-HxCDD	2.33	0.315	2.52	J
1234678-HpCDD	14.7	0.409	2.52	
OCDD	67.5	1.01	5.03	
2,3,7,8-TCDF	DL= 0.379	0.0886	0.503	
12378-PeCDF	DL= 0.598	0.412	2.52	
23478-PeCDF	DL= 0.528	0.422	2.52	
123478-HxCDF	DL= 0.469	0.518	2.52	
123678-HxCDF	DL= 0.430	0.533	2.52	
234678-HxCDF	DL= 0.467	0.319	2.52	
123789-HxCDF	DL= 0.735	0.425	2.52	
1234678-HpCDF	2.46	0.279	2.52	J
1234789-HpCDF	DL= 1.73	0.378	2.52	
OCDF	7.62	0.461	5.03	

Totals	Conc. (pg/g)	EMPC
Total TCDD	1.63	
Total PeCDD	DL= 0.667	
Total HxCDD	16.2	
Total HpCDD	30.1	
Total TCDF	DL= 0.379	
Total PeCDF	DL= 0.598	
Total HxCDF	3.26	
Total HpCDF	0.246	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	95.0	40-135	
13C-12378-PeCDD	75.3	40-135	
13C-123478-HxCDD	86.3	40-135	
13C-123678-HxCDD	100	40-135	
13C-1234678-HpCDD	89.3	40-135	
13C-OCDD	90.0	40-135	
13C-2378-TCDF	104	40-135	
13C-12378-PeCDF	74.8	40-135	
13C-23478-PeCDF	78.1	40-135	
13C-123478-HxCDF	109	40-135	
13C-123678-HxCDF	117	40-135	
13C-234678-HxCDF	107	40-135	
13C-123789-HxCDF	92.3	40-135	
13C-1234678-HpCDF	89.3	40-135	
13C-1234789-HpCDF	93.2	40-135	
CRS			
37Cl4-2378-TCDD	94.4	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.539 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: MW-1@6'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-012	**Date Received:** 6/13/2018
	QC Batch #: 1803	**Date Extracted:** 6/17/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/18/2018
Time Collected: 12:00	**Sample Size:** 12.48 g **% Solids:** 80.5	**Q-225 Analysis:** 6/19/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 0.462	0.172	0.498	
12378-PeCDD	DL= 0.988	0.327	2.49	
123478-HxCDD	DL= 0.670	0.327	2.49	
123678-HxCDD	DL= 0.677	0.655	2.49	
123789-HxCDD	1.46	0.315	2.49	J
1234678-HpCDD	6.51	0.409	2.49	
OCDD	34.6	1.01	4.98	
2,3,7,8-TCDF	5.86	0.0886	0.498	
12378-PeCDF	2.41	0.412	2.49	J
23478-PeCDF	5.08	0.422	2.49	
123478-HxCDF	74.7	0.518	2.49	
123678-HxCDF	30.4	0.533	2.49	
234678-HxCDF	4.21	0.319	2.49	
123789-HxCDF	DL= 0.483	0.425	2.49	
1234678-HpCDF	26.3	0.279	2.49	
1234789-HpCDF	23.9	0.378	2.49	
OCDF	20.7	0.461	4.98	

Totals	Conc. (pg/g)	EMPC
Total TCDD	DL= 0.462	
Total PeCDD	DL= 0.988	
Total HxCDD	9.33	
Total HpCDD	14.8	
Total TCDF	38.6	
Total PeCDF	53.9	
Total HxCDF	190	
Total HpCDF	79.6	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	101	40-135	
13C-12378-PeCDD	84.8	40-135	
13C-123478-HxCDD	87.0	40-135	
13C-123678-HxCDD	94.7	40-135	
13C-1234678-HpCDD	89.9	40-135	
13C-OCDD	67.7	40-135	
13C-2378-TCDF	108	40-135	
13C-12378-PeCDF	80.3	40-135	
13C-23478-PeCDF	85.0	40-135	
13C-123478-HxCDF	112	40-135	
13C-123678-HxCDF	115	40-135	
13C-234678-HxCDF	103	40-135	
13C-123789-HxCDF	93.2	40-135	
13C-1234678-HpCDF	91.6	40-135	
13C-1234789-HpCDF	94.1	40-135	

CRS

37Cl4-2378-TCDD	103	40-135

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 13.8 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: MW-3@5'

Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-013	**Date Received:** 6/13/2018
	QC Batch #: 1803	**Date Extracted:** 6/17/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/19/2018
Time Collected: 18:10	**Sample Size:** 16.32 g **% Solids:** 62.2	**Q-225 Analysis:** 6/19/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	2.95	0.172	0.493	
12378-PeCDD	3.47	0.327	2.46	
123478-HxCDD	DL= 0.925	0.327	2.46	
123678-HxCDD	5.37	0.655	2.46	
123789-HxCDD	8.35	0.315	2.46	
1234678-HpCDD	69.8	0.409	2.46	
OCDD	505	1.01	4.93	
2,3,7,8-TCDF	3.46	0.0886	0.493	
12378-PeCDF	DL= 1.47	0.412	2.46	
23478-PeCDF	DL= 1.26	0.422	2.46	
123478-HxCDF	2.13	0.518	2.46	
123678-HxCDF	1.70	0.533	2.46	
234678-HxCDF	DL= 0.448	0.319	2.46	
123789-HxCDF	DL= 0.663	0.425	2.46	
1234678-HpCDF	19.1	0.279	2.46	
1234789-HpCDF	DL= 1.13	0.378	2.46	
OCDF	40.5	0.461	4.93	

Totals	Conc. (pg/g)	EMPC
Total TCDD	20.8	24.3
Total PeCDD	21.0	
Total HxCDD	70.4	
Total HpCDD	148	
Total TCDF	26.7	38.4
Total PeCDF	12.7	
Total HxCDF	31.0	
Total HpCDF	55.2	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	91.1	40-135	
13C-12378-PeCDD	71.0	40-135	
13C-123478-HxCDD	80.2	40-135	
13C-123678-HxCDD	87.6	40-135	
13C-1234678-HpCDD	85.6	40-135	
13C-OCDD	71.1	40-135	
13C-2378-TCDF	101	40-135	
13C-12378-PeCDF	68.1	40-135	
13C-23478-PeCDF	67.4	40-135	
13C-123478-HxCDF	106	40-135	
13C-123678-HxCDF	117	40-135	
13C-234678-HxCDF	101	40-135	
13C-123789-HxCDF	90.3	40-135	
13C-1234678-HpCDF	83.9	40-135	
13C-1234789-HpCDF	93.3	40-135	

CRS

37Cl4-2378-TCDD	78.1	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 9.57 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: MW-4@5'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-014	**Date Received:** 6/13/2018
	QC Batch #: 1803	**Date Extracted:** 6/17/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/19/2018
Time Collected: 16:12	**Sample Size:** 16.21 g **% Solids:** 63.0	**Q-225 Analysis:** 6/19/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	3.22	0.172	0.490	
12378-PeCDD	4.02	0.327	2.45	
123478-HxCDD	2.28	0.327	2.45	J
123678-HxCDD	8.16	0.655	2.45	
123789-HxCDD	10.2	0.315	2.45	
1234678-HpCDD	103	0.409	2.45	
OCDD	730	1.01	4.90	
2,3,7,8-TCDF	10.5	0.0886	0.490	
12378-PeCDF	1.64	0.412	2.45	J
23478-PeCDF	2.62	0.422	2.45	
123478-HxCDF	3.44	0.518	2.45	
123678-HxCDF	1.42	0.533	2.45	J
234678-HxCDF	1.14	0.319	2.45	J
123789-HxCDF	DL= 0.385	0.425	2.45	
1234678-HpCDF	31.0	0.279	2.45	
1234789-HpCDF	1.74	0.378	2.45	J
OCDF	75.1	0.461	4.90	

Totals	Conc. (pg/g)	EMPC
Total TCDD	44.5	
Total PeCDD	40.5	
Total HxCDD	85.1	
Total HpCDD	227	
Total TCDF	65.5	68.3
Total PeCDF	29.5	
Total HxCDF	52.1	
Total HpCDF	102	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	107	40-135	
13C-12378-PeCDD	95.0	40-135	
13C-123478-HxCDD	92.7	40-135	
13C-123678-HxCDD	101	40-135	
13C-1234678-HpCDD	88.8	40-135	
13C-OCDD	68.2	40-135	
13C-2378-TCDF	112	40-135	
13C-12378-PeCDF	88.5	40-135	
13C-23478-PeCDF	91.6	40-135	
13C-123478-HxCDF	112	40-135	
13C-123678-HxCDF	114	40-135	
13C-234678-HxCDF	105	40-135	
13C-123789-HxCDF	95.3	40-135	
13C-1234678-HpCDF	93.0	40-135	
13C-1234789-HpCDF	98.6	40-135	

CRS

37Cl4-2378-TCDD	91.1	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 13.4 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: MW-5@10'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-015	**Date Received:** 6/13/2018
	QC Batch #: 1803	**Date Extracted:** 6/17/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/19/2018
Time Collected: 13:45	**Sample Size:** 15.99 g **% Solids:** 63.1	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.47	0.172	0.496	
12378-PeCDD	1.68	0.327	2.48	J
123478-HxCDD	DL= 0.581	0.327	2.48	
123678-HxCDD	1.62	0.655	2.48	J
123789-HxCDD	5.24	0.315	2.48	
1234678-HpCDD	7.56	0.409	2.48	
OCDD	22.9	1.01	4.96	
2,3,7,8-TCDF	DL= 0.399	0.0886	0.496	
12378-PeCDF	DL= 0.550	0.412	2.48	
23478-PeCDF	DL= 0.496	0.422	2.48	
123478-HxCDF	DL= 0.426	0.518	2.48	
123678-HxCDF	DL= 0.354	0.533	2.48	
234678-HxCDF	DL= 0.362	0.319	2.48	
123789-HxCDF	DL= 0.568	0.425	2.48	
1234678-HpCDF	DL= 0.726	0.279	2.48	
1234789-HpCDF	DL= 0.972	0.378	2.48	
OCDF	DL= 1.80	0.461	4.96	

Totals	Conc. (pg/g)	EMPC
Total TCDD	5.35	6.25
Total PeCDD	9.06	
Total HxCDD	26.1	
Total HpCDD	16.2	
Total TCDF	1.51	
Total PeCDF	DL= 0.550	
Total HxCDF	DL= 0.568	
Total HpCDF	DL= 0.972	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	109	40-135	
13C-12378-PeCDD	87.1	40-135	
13C-123478-HxCDD	84.5	40-135	
13C-123678-HxCDD	99.6	40-135	
13C-1234678-HpCDD	87.2	40-135	
13C-OCDD	71.9	40-135	
13C-2378-TCDF	104	40-135	
13C-12378-PeCDF	85.1	40-135	
13C-23478-PeCDF	86.9	40-135	
13C-123478-HxCDF	100	40-135	
13C-123678-HxCDF	113	40-135	
13C-234678-HxCDF	103	40-135	
13C-123789-HxCDF	94.1	40-135	
13C-1234678-HpCDF	90.9	40-135	
13C-1234789-HpCDF	93.5	40-135	

CRS

37Cl4-2378-TCDD	98.5	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 3.92 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: MW-6@6'		
Project ID: Proposed Grays Harbor Potash Exp	**Ceres Sample ID:** 12138-016	**Date Received:** 6/13/2018
	QC Batch #: 1803	**Date Extracted:** 6/17/2018
Date Collected: 6/11/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/19/2018
Time Collected: 13:40	**Sample Size:** 15.77 g **% Solids:** 64.4	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.46	0.172	0.492	
12378-PeCDD	1.38	0.327	2.46	J
123478-HxCDD	0.748	0.327	2.46	J
123678-HxCDD	2.51	0.655	2.46	
123789-HxCDD	4.92	0.315	2.46	
1234678-HpCDD	33.0	0.409	2.46	
OCDD	272	1.01	4.92	
2,3,7,8-TCDF	0.916	0.0886	0.492	
12378-PeCDF	DL= 0.317	0.412	2.46	
23478-PeCDF	DL= 0.324	0.422	2.46	
123478-HxCDF	1.15	0.518	2.46	J
123678-HxCDF	0.570	0.533	2.46	J
234678-HxCDF	DL= 0.400	0.319	2.46	
123789-HxCDF	DL= 0.653	0.425	2.46	
1234678-HpCDF	15.7	0.279	2.46	
1234789-HpCDF	DL= 0.987	0.378	2.46	
OCDF	30.7	0.461	4.92	

Totals	Conc. (pg/g)	EMPC
Total TCDD	6.33	
Total PeCDD	10.0	11.0
Total HxCDD	35.4	
Total HpCDD	70.6	
Total TCDF	7.78	9.01
Total PeCDF	6.15	
Total HxCDF	17.0	
Total HpCDF	39.2	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	115	40-135	
13C-12378-PeCDD	89.0	40-135	
13C-123478-HxCDD	82.2	40-135	
13C-123678-HxCDD	91.2	40-135	
13C-1234678-HpCDD	88.0	40-135	
13C-OCDD	71.0	40-135	
13C-2378-TCDF	114	40-135	
13C-12378-PeCDF	84.9	40-135	
13C-23478-PeCDF	81.0	40-135	
13C-123478-HxCDF	96.6	40-135	
13C-123678-HxCDF	118	40-135	
13C-234678-HxCDF	102	40-135	
13C-123789-HxCDF	89.5	40-135	
13C-1234678-HpCDF	88.3	40-135	
13C-1234789-HpCDF	92.0	40-135	
CRS			
37Cl4-2378-TCDD	104	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 4.50 pg/g

Analyst: JMH **Reviewed by: BS**

Section VI: Sample Tracking

ESN Environmental
NORTHWEST, II

CHAIN-OF-CUSTODY RECORD

ESN Northwest
1210 Eastside Street SE, Suite 200
Olympia, WA 98501

CLIENT:
ADDRES
PHONE: FAX:
CLIENT PROJECT #: PROJECT MANAGER:

DATE: 6-11-8 PAGE 1 OF 1
PROJECT NAME: Proposed Grays Harbor Potash Export Facility
LOCATION:
COLLECTOR: DATE OF COLLECTION: 6-11-8

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES: TPH - HCID	TPH - Diesel & Oil	TPH - Gasoline	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos - PLM	GRO Suite	DRO Suite	WO Suite	DIOXINS	NOTES	Total Number of Containers	Laboratory Note Number
1. TP1-1@4'	4'	1045	SOIL																		X				
2. TP1-2@9'	9'	1108																							
3. TP10-1@12'	12'	1300																							
4. TP10-2@4'	4'	1315																							
5. TP9-1@5'	5'	1345																							
6. TP14-1@6.5'	6.5'	1520																							
7. TP20-1@6'	6'	1615																							
8. TP21-1@4.5'	4.5'	1715																							
9. TP15-1@5'	5'	1755																							
10. TP4-2@12'	12'	1415																							
11. MW-2@6'	6'	1030																							
12. MW-1@6'	6'	1200																							
13. MW-3@5'	5'	1810																							
~~14. MW-3@10'~~	~~10'~~	~~1809~~																					No sample		
15. MW-4@5'	5'	1612																							
16. MW-5@10'	10'	1345																							
17. MW-6@6'	6'	1340																							
18.																									

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
Jennifer Arnold	6-12-18	[illegible]	6/13/18 12:21
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

Turn Around Time: 24 HR 48 HR (5 DAY)

Sample Receipt Check List Logged by: JM (initials)

Ceres ID: 12138	Date/Time: 6/13/18 12:21
Client Project ID: Proposed Grays Harbor Potash Export Facility	Received Temp: 5.6 °C Acceptable: (Y) / N
Chain of Custody Relinquished by signed?	(Y) / N
Chain of Custody Received by signed?	(Y) / N
Custody Seals? Present?	Y / N
Intact?	Y / N
NA:	NA
Unlabeled / Illegible Samples	Y / N
Proper Containers:	(Y) / N
Preservation Acceptable (Chemical or Temperature)?	(Y) / N
Drinking Water, Sodium Thiosulfate present?	Y / N / (NA)
Residual Cl?	Y / N
Aqueous sample pH: NA	

List COC discrepancies:

JM 6/13/18

List Damaged Samples: TP10-2@4' Jar broken but intact. Transferred to new jar.

Section VII: Qualifiers/Abbreviations

J	Concentration found below the lower quantitation limit but greater than zero.
B	Analyte present in the associated Method Blank.
E	Concentration found exceeds the Calibration range of the HRGC/HRMS.
D	This analyte concentration was calculated from a dilution.
X	The concentration found is the estimated maximum possible concentration due to chlorinated diphenyl ethers present in the sample.
H	Recovery limits exceeded. See cover letter.
*****	Results taken from dilution.
I	Interference. See cover letter.
Conc.	Concentration Found
DL	Calculated Detection Limit
ND	Non-Detect
% Rec.	Percent Recovery

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

July 2, 2018 Ceres ID: 12147

ESN Northwest, Inc.
1210 Eastside Street SE
Olympia, WA 98501

The following report contains the results for the thirteen soil samples received on June 19, 2018. These samples were analyzed for tetra through octa chlorinated dibenzo-p-dioxins and dibenzofurans by EPA method 8290A. Routine turn-around time was provided for this work.

This work was authorized under the Project Name: Proposed Grays Harbor IDD #1 Site.

Sample results are reported on a dry weight basis.

Continuing Calibration Verification (CCV) Requirements
All associated calibration verification standard(s) (CCV) met the acceptance criteria.

Confirmation analysis was performed on the samples which had concentrations above the method calibration limit for the 2,3,7,8-TCDF on a Quadrex Q-225 column for isomer specificity.

The report consists of a Cover Letter, Sample Inventory (Section I), Data Summary (Section II), Sample Tracking (Section VI), and Qualifiers/Abbreviations (Section VII). Raw Data (Section III), Continuing Calibration (Section IV), and Initial Calibration (Section V) are available in a full report (.pdf format) upon request.

If you have any questions regarding this report, please feel free to contact me at (916)932-5011.

Sincerely,

James M. Hedin
Director of Operations/CEO
jhedin@ceres-lab.com

Section I: Sample Inventory

Ceres Sample ID:	Sample ID	Date Received	Collection Date &Time
12147-001	TP8-2@8'	6/19/2018	6/12/2018 14:53
12147-002	TP8-3@11'	6/19/2018	6/12/2018 15:14
12147-003	TP9-1@6.5'	6/19/2018	6/12/2018 16:09
12147-004	TP8-1@7'	6/19/2018	6/12/2018 14:32
12147-005	TP13-1@12'	6/19/2018	6/12/2018 13:26
12147-006	TP18-1@12'	6/19/2018	6/12/2018 12:43
12147-007	TP24-2@10'	6/19/2018	6/12/2018 9:47
12147-008	TP25-1@5.5'	6/19/2018	6/12/2018 10:17
12147-009	TP19-1@5'	6/19/2018	6/12/2018 11:40
12147-010	TP23-1@6'	6/19/2018	6/12/2018 8:27
12147-011	TP22-1@6'	6/19/2018	6/12/2018 7:50
12147-012	TP24-1@5.5'	6/19/2018	6/12/2018 9:19
12147-013	TP16-1@5.5'	6/19/2018	6/12/2018 17:00

Section II: Data Summary

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Sample **Method Blank**		**Date Received:** NA
	QC Batch #: 1807	**Date Extracted:** 6/23/2018
	Matrix: Soil	**ZB-5MS Analysis:** 6/24/2018
Project ID: Proposed Grays Harbor IDD #1 Site	**Sample Size:** 10.00 g	

Analyte	Conc. (pg/g)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 0.248	0.172	0.500		13C-2378-TCDD	85.0	40-135	
12378-PeCDD	DL= 0.355	0.327	2.50		13C-12378-PeCDD	74.7	40-135	
123478-HxCDD	DL= 0.955	0.327	2.50		13C-123478-HxCDD	59.9	40-135	
123678-HxCDD	DL= 1.03	0.655	2.50		13C-123678-HxCDD	64.3	40-135	
123789-HxCDD	DL= 0.992	0.315	2.50		13C-1234678-HpCDD	74.9	40-135	
1234678-HpCDD	DL= 1.18	0.409	2.50		13C-OCDD	90.3	40-135	
OCDD	DL= 1.01	1.01	5.00		13C-2378-TCDF	88.2	40-135	
2,3,7,8-TCDF	DL= 0.240	0.0886	0.500		13C-12378-PeCDF	71.4	40-135	
12378-PeCDF	DL= 0.352	0.412	2.50		13C-23478-PeCDF	70.7	40-135	
23478-PeCDF	DL= 0.341	0.422	2.50		13C-123478-HxCDF	77.0	40-135	
123478-HxCDF	DL= 0.321	0.518	2.50		13C-123678-HxCDF	96.6	40-135	
123678-HxCDF	DL= 0.259	0.533	2.50		13C-234678-HxCDF	80.5	40-135	
234678-HxCDF	DL= 0.313	0.319	2.50		13C-123789-HxCDF	79.4	40-135	
123789-HxCDF	DL= 0.529	0.425	2.50		13C-1234678-HpCDF	74.1	40-135	
1234678-HpCDF	DL= 0.484	0.279	2.50		13C-1234789-HpCDF	75.0	40-135	
1234789-HpCDF	DL= 0.797	0.378	2.50					
OCDF	DL= 0.942	0.461	5.00					

Totals	Conc. (pg/g)	EMPC
Total TCDD	DL= 0.248	
Total PeCDD	DL= 0.355	
Total HxCDD	DL= 1.03	
Total HpCDD	DL= 1.18	
Total TCDF	DL= 0.240	
Total PeCDF	DL= 0.352	
Total HxCDF	DL= 0.529	
Total HpCDF	DL= 0.797	

CRS

37Cl4-2378-TCDD	76.4	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Samples **Laboratory Control Samples**	**QC Batch #:** 1807 **Matrix:** Soil	**Date Received:** NA **Date Extracted:** 6/23/2018 **ZB-5MS Analysis:** 6/24/2018
Project ID: Proposed Grays Harbor IDD #1	**Sample Size:** 10.00 g	

Analyte	LCS1 % Rec.	LCS2 % Rec.	%RSD
2,3,7,8-TCDD	103	111	5.29
12378-PeCDD	106	106	0.00
123478-HxCDD	112	113	0.63
123678-HxCDD	111	121	6.10
123789-HxCDD	121	123	1.16
1234678-HpCDD	103	106	2.03
OCDD	109	112	1.92
2,3,7,8-TCDF	101	107	4.08
12378-PeCDF	93	92.8	0.15
23478-PeCDF	93.4	89	3.41
123478-HxCDF	99.8	103	2.23
123678-HxCDF	96.4	101	3.30
234678-HxCDF	103	106	2.03
123789-HxCDF	105	106	0.67
1234678-HpCDF	92.8	94.2	1.06
1234789-HpCDF	93.6	93.8	0.15
OCDF	101	106	3.42

Labeled Standards	LCS1 % Rec.	LCS2 % Rec	Limits (a)
13C-2378-TCDD	107	102	40-135
13C-12378-PeCDD	103	101	40-135
13C-123478-HxCDD	74.6	80.0	40-135
13C-123678-HxCDD	87.2	86.5	40-135
13C-1234678-HpCDD	88.2	90.2	40-135
13C-OCDD	95.2	94.6	40-135
13C-2378-TCDF	108	116	40-135
13C-12378-PeCDF	96.0	94.4	40-135
13C-23478-PeCDF	104	95.0	40-135
13C-123478-HxCDF	82.2	88.1	40-135
13C-123678-HxCDF	83.3	103	40-135
13C-234678-HxCDF	91.4	95.6	40-135
13C-123789-HxCDF	94.0	93.2	40-135
13C-1234678-HpCDF	91.7	84.6	40-135
13C-1234789-HpCDF	92.1	87.8	40-135
CRS			
37Cl4-2378-TCDD	91.0	91.1	40-135

(a) Limits based on method acceptance criteria.

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP8-2@8'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-001	**Date Received:** 6/19/2018
	QC Batch #: 1807	**Date Extracted:** 6/23/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/24/2018
Time Collected: 14:53	**Sample Size:** 16.59 g **% Solids:** 60.2	**Q-225 Analysis:** 7/1/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.80	0.172	0.501	
12378-PeCDD	1.95	0.327	2.50	J
123478-HxCDD	0.619	0.327	2.50	J
123678-HxCDD	1.29	0.655	2.50	J
123789-HxCDD	5.22	0.315	2.50	
1234678-HpCDD	7.13	0.409	2.50	
OCDD	20.7	1.01	5.01	
2,3,7,8-TCDF	0.950	0.0886	0.501	
12378-PeCDF	DL= 0.393	0.412	2.50	
23478-PeCDF	DL= 0.693	0.422	2.50	
123478-HxCDF	0.585	0.518	2.50	J
123678-HxCDF	0.303	0.533	2.50	J
234678-HxCDF	0.328	0.319	2.50	J
123789-HxCDF	DL= 0.204	0.425	2.50	
1234678-HpCDF	0.655	0.279	2.50	J
1234789-HpCDF	DL= 0.634	0.378	2.50	
OCDF	DL= 1.32	0.461	5.01	

Totals	Conc. (pg/g)	EMPC
Total TCDD	19.9	20.8
Total PeCDD	15.2	
Total HxCDD	28.4	
Total HpCDD	14.4	
Total TCDF	15.2	
Total PeCDF	1.24	
Total HxCDF	2.36	
Total HpCDF	0.655	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	110	40-135	
13C-12378-PeCDD	101	40-135	
13C-123478-HxCDD	85.1	40-135	
13C-123678-HxCDD	92.7	40-135	
13C-1234678-HpCDD	103	40-135	
13C-OCDD	88.3	40-135	
13C-2378-TCDF	124	40-135	
13C-12378-PeCDF	98.4	40-135	
13C-23478-PeCDF	102	40-135	
13C-123478-HxCDF	109	40-135	
13C-123678-HxCDF	123	40-135	
13C-234678-HxCDF	110	40-135	
13C-123789-HxCDF	109	40-135	
13C-1234678-HpCDF	88.2	40-135	
13C-1234789-HpCDF	107	40-135	
CRS			
37Cl4-2378-TCDD	106	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 4.76 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP8-3@11'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-002	**Date Received:** 6/19/2018
	QC Batch #: 1807	**Date Extracted:** 6/23/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/24/2018
Time Collected: 15:14	**Sample Size:** 18.64 g **% Solids:** 53.4	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.71	0.172	0.503	
12378-PeCDD	1.59	0.327	2.51	J
123478-HxCDD	0.594	0.327	2.51	J
123678-HxCDD	1.21	0.655	2.51	J
123789-HxCDD	4.78	0.315	2.51	
1234678-HpCDD	5.89	0.409	2.51	
OCDD	23.1	1.01	5.03	
2,3,7,8-TCDF	0.529	0.0886	0.503	
12378-PeCDF	DL= 0.251	0.412	2.51	
23478-PeCDF	DL= 0.290	0.422	2.51	
123478-HxCDF	DL= 0.221	0.518	2.51	
123678-HxCDF	DL= 0.212	0.533	2.51	
234678-HxCDF	DL= 0.204	0.319	2.51	
123789-HxCDF	DL= 0.296	0.425	2.51	
1234678-HpCDF	DL= 0.503	0.279	2.51	
1234789-HpCDF	DL= 0.583	0.378	2.51	
OCDF	DL= 0.768	0.461	5.03	

Totals	Conc. (pg/g)	EMPC
Total TCDD	12.6	13.5
Total PeCDD	11.4	
Total HxCDD	27.7	
Total HpCDD	13.1	
Total TCDF	2.00	2.26
Total PeCDF	DL= 0.290	
Total HxCDF	DL= 0.296	
Total HpCDF	DL= 0.583	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	110	40-135	
13C-12378-PeCDD	110	40-135	
13C-123478-HxCDD	85.3	40-135	
13C-123678-HxCDD	86.5	40-135	
13C-1234678-HpCDD	108	40-135	
13C-OCDD	92.8	40-135	
13C-2378-TCDF	122	40-135	
13C-12378-PeCDF	103	40-135	
13C-23478-PeCDF	108	40-135	
13C-123478-HxCDF	109	40-135	
13C-123678-HxCDF	124	40-135	
13C-234678-HxCDF	115	40-135	
13C-123789-HxCDF	103	40-135	
13C-1234678-HpCDF	92.8	40-135	
13C-1234789-HpCDF	111	40-135	

CRS

37Cl4-2378-TCDD	108	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 4.08 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP9-1@6.5'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-003	**Date Received:** 6/19/2018
	QC Batch #: 1807	**Date Extracted:** 6/23/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/24/2018
Time Collected: 16:09	**Sample Size:** 16.65 g **% Solids:** 60.5	**Q-225 Analysis:** 7/1/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	5.45	0.172	0.497	
12378-PeCDD	11.0	0.327	2.48	
123478-HxCDD	7.26	0.327	2.48	
123678-HxCDD	17.6	0.655	2.48	
123789-HxCDD	21.2	0.315	2.48	
1234678-HpCDD	73.2	0.409	2.48	
OCDD	129	1.01	4.97	
2,3,7,8-TCDF	25.7	0.0886	0.497	
12378-PeCDF	18.8	0.412	2.48	
23478-PeCDF	17.1	0.422	2.48	
123478-HxCDF	57.0	0.518	2.48	
123678-HxCDF	16.3	0.533	2.48	
234678-HxCDF	11.4	0.319	2.48	
123789-HxCDF	0.866	0.425	2.48	J
1234678-HpCDF	96.1	0.279	2.48	
1234789-HpCDF	2.59	0.378	2.48	
OCDF	41.0	0.461	4.97	

Totals	Conc. (pg/g)	EMPC
Total TCDD	308	
Total PeCDD	200	
Total HxCDD	228	
Total HpCDD	119	
Total TCDF	272	276
Total PeCDF	179	
Total HxCDF	172	
Total HpCDF	113	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	106	40-135	
13C-12378-PeCDD	105	40-135	
13C-123478-HxCDD	84.0	40-135	
13C-123678-HxCDD	86.1	40-135	
13C-1234678-HpCDD	109	40-135	
13C-OCDD	95.1	40-135	
13C-2378-TCDF	127	40-135	
13C-12378-PeCDF	97.3	40-135	
13C-23478-PeCDF	103	40-135	
13C-123478-HxCDF	115	40-135	
13C-123678-HxCDF	127	40-135	
13C-234678-HxCDF	119	40-135	
13C-123789-HxCDF	110	40-135	
13C-1234678-HpCDF	98.3	40-135	
13C-1234789-HpCDF	114	40-135	

CRS			
37Cl4-2378-TCDD	88.4	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 39.6 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP8-1@7'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-004	**Date Received:** 6/19/2018
	QC Batch #: 1807	**Date Extracted:** 6/23/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/24/2018
Time Collected: 14:32	**Sample Size:** 17.47 g **% Solids:** 57.6	**Q-225 Analysis:** 7/1/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	2.76	0.172	0.497		13C-2378-TCDD	96.4	40-135	
12378-PeCDD	1.71	0.327	2.49	J	13C-12378-PeCDD	98.1	40-135	
123478-HxCDD	0.432	0.327	2.49	J	13C-123478-HxCDD	79.4	40-135	
123678-HxCDD	1.27	0.655	2.49	J	13C-123678-HxCDD	83.5	40-135	
123789-HxCDD	4.53	0.315	2.49		13C-1234678-HpCDD	109	40-135	
1234678-HpCDD	5.77	0.409	2.49		13C-OCDD	94.1	40-135	
OCDD	17.7	1.01	4.97		13C-2378-TCDF	112	40-135	
2,3,7,8-TCDF	0.864	0.0886	0.497		13C-12378-PeCDF	95.3	40-135	
12378-PeCDF	DL= 0.451	0.412	2.49		13C-23478-PeCDF	97.5	40-135	
23478-PeCDF	DL= 0.408	0.422	2.49		13C-123478-HxCDF	113	40-135	
123478-HxCDF	DL= 0.265	0.518	2.49		13C-123678-HxCDF	126	40-135	
123678-HxCDF	DL= 0.268	0.533	2.49		13C-234678-HxCDF	111	40-135	
234678-HxCDF	DL= 0.262	0.319	2.49		13C-123789-HxCDF	108	40-135	
123789-HxCDF	DL= 0.356	0.425	2.49		13C-1234678-HpCDF	89.2	40-135	
1234678-HpCDF	1.62	0.279	2.49	J	13C-1234789-HpCDF	111	40-135	
1234789-HpCDF	DL= 0.315	0.378	2.49					
OCDF	1.21	0.461	4.97	J				

Totals	Conc. (pg/g)	EMPC
Total TCDD	18.7	
Total PeCDD	14.3	
Total HxCDD	25.1	
Total HpCDD	11.8	
Total TCDF	10.6	
Total PeCDF	0.989	
Total HxCDF	1.62	
Total HpCDF	2.77	

CRS		
37Cl4-2378-TCDD	84.6	40-135

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 5.26 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP13-1@12'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-005	**Date Received:** 6/19/2018
	QC Batch #: 1807	**Date Extracted:** 6/23/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/24/2018
Time Collected: 13:26	**Sample Size:** 18.36 g **% Solids:** 54.9	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.58	0.172	0.497	
12378-PeCDD	1.13	0.327	2.49	J
123478-HxCDD	DL= 0.849	0.327	2.49	
123678-HxCDD	DL= 0.873	0.655	2.49	
123789-HxCDD	3.51	0.315	2.49	
1234678-HpCDD	3.39	0.409	2.49	
OCDD	10.1	1.01	4.97	
2,3,7,8-TCDF	DL= 0.168	0.0886	0.497	
12378-PeCDF	DL= 0.343	0.412	2.49	
23478-PeCDF	DL= 0.295	0.422	2.49	
123478-HxCDF	DL= 0.329	0.518	2.49	
123678-HxCDF	DL= 0.293	0.533	2.49	
234678-HxCDF	DL= 0.306	0.319	2.49	
123789-HxCDF	DL= 0.436	0.425	2.49	
1234678-HpCDF	DL= 0.313	0.279	2.49	
1234789-HpCDF	DL= 0.372	0.378	2.49	
OCDF	DL= 0.610	0.461	4.97	

Totals	Conc. (pg/g)	EMPC
Total TCDD	13.2	
Total PeCDD	6.79	9.79
Total HxCDD	19.3	
Total HpCDD	7.54	
Total TCDF	0.934	1.40
Total PeCDF	DL= 0.343	
Total HxCDF	DL= 0.436	
Total HpCDF	DL= 0.372	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	83.7	40-135	
13C-12378-PeCDD	101	40-135	
13C-123478-HxCDD	68.9	40-135	
13C-123678-HxCDD	72.5	40-135	
13C-1234678-HpCDD	99.7	40-135	
13C-OCDD	85.4	40-135	
13C-2378-TCDF	108	40-135	
13C-12378-PeCDF	77.7	40-135	
13C-23478-PeCDF	89.9	40-135	
13C-123478-HxCDF	103	40-135	
13C-123678-HxCDF	114	40-135	
13C-234678-HxCDF	96.5	40-135	
13C-123789-HxCDF	103	40-135	
13C-1234678-HpCDF	87.3	40-135	
13C-1234789-HpCDF	98.2	40-135	

CRS

37Cl4-2378-TCDD	81.2	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 3.10 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP18-1@12'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-006	**Date Received:** 6/19/2018
	QC Batch #: 1807	**Date Extracted:** 6/23/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/24/2018
Time Collected: 12:43	**Sample Size:** 16.81 g **% Solids:** 60.3	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.75	0.172	0.493	
12378-PeCDD	1.45	0.327	2.47	J
123478-HxCDD	DL= 0.372	0.327	2.47	
123678-HxCDD	1.06	0.655	2.47	J
123789-HxCDD	4.86	0.315	2.47	
1234678-HpCDD	5.10	0.409	2.47	
OCDD	16.8	1.01	4.93	
2,3,7,8-TCDF	DL= 0.243	0.0886	0.493	
12378-PeCDF	DL= 0.293	0.412	2.47	
23478-PeCDF	DL= 0.258	0.422	2.47	
123478-HxCDF	DL= 0.212	0.518	2.47	
123678-HxCDF	DL= 0.191	0.533	2.47	
234678-HxCDF	DL= 0.186	0.319	2.47	
123789-HxCDF	DL= 0.277	0.425	2.47	
1234678-HpCDF	DL= 0.412	0.279	2.47	
1234789-HpCDF	DL= 0.552	0.378	2.47	
OCDF	DL= 0.810	0.461	4.93	

Totals	Conc. (pg/g)	EMPC
Total TCDD	7.74	
Total PeCDD	11.2	
Total HxCDD	24.8	
Total HpCDD	10.9	
Total TCDF	0.870	1.32
Total PeCDF	DL= 0.293	
Total HxCDF	DL= 0.277	
Total HpCDF	DL= 0.552	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	95.9	40-135	
13C-12378-PeCDD	90.2	40-135	
13C-123478-HxCDD	75.7	40-135	
13C-123678-HxCDD	84.8	40-135	
13C-1234678-HpCDD	113	40-135	
13C-OCDD	93.2	40-135	
13C-2378-TCDF	120	40-135	
13C-12378-PeCDF	87.3	40-135	
13C-23478-PeCDF	93.5	40-135	
13C-123478-HxCDF	114	40-135	
13C-123678-HxCDF	127	40-135	
13C-234678-HxCDF	118	40-135	
13C-123789-HxCDF	115	40-135	
13C-1234678-HpCDF	97.2	40-135	
13C-1234789-HpCDF	108	40-135	
CRS			
37Cl4-2378-TCDD	92.2	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 3.85 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP24-2@10'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-007	**Date Received:** 6/19/2018
	QC Batch #: 1807	**Date Extracted:** 6/23/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/24/2018
Time Collected: 9:47	**Sample Size:** 15.35 g **% Solids:** 64.9	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	2.10	0.172	0.502	
12378-PeCDD	2.13	0.327	2.51	J
123478-HxCDD	DL= 0.447	0.327	2.51	
123678-HxCDD	1.41	0.655	2.51	J
123789-HxCDD	4.58	0.315	2.51	
1234678-HpCDD	5.65	0.409	2.51	
OCDD	22.3	1.01	5.02	
2,3,7,8-TCDF	0.618	0.0886	0.502	
12378-PeCDF	DL= 0.810	0.412	2.51	
23478-PeCDF	DL= 0.652	0.422	2.51	
123478-HxCDF	DL= 0.430	0.518	2.51	
123678-HxCDF	DL= 0.329	0.533	2.51	
234678-HxCDF	DL= 0.328	0.319	2.51	
123789-HxCDF	DL= 0.475	0.425	2.51	
1234678-HpCDF	DL= 0.427	0.279	2.51	
1234789-HpCDF	DL= 0.520	0.378	2.51	
OCDF	DL= 1.03	0.461	5.02	

Totals	Conc. (pg/g)	EMPC
Total TCDD	11.4	
Total PeCDD	9.84	
Total HxCDD	25.4	
Total HpCDD	11.9	
Total TCDF	2.52	3.54
Total PeCDF	DL= 0.810	
Total HxCDF	DL= 0.475	
Total HpCDF	DL= 0.520	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	95.0	40-135	
13C-12378-PeCDD	104	40-135	
13C-123478-HxCDD	75.8	40-135	
13C-123678-HxCDD	81.3	40-135	
13C-1234678-HpCDD	104	40-135	
13C-OCDD	83.3	40-135	
13C-2378-TCDF	113	40-135	
13C-12378-PeCDF	98.7	40-135	
13C-23478-PeCDF	102	40-135	
13C-123478-HxCDF	97.4	40-135	
13C-123678-HxCDF	124	40-135	
13C-234678-HxCDF	113	40-135	
13C-123789-HxCDF	110	40-135	
13C-1234678-HpCDF	91.6	40-135	
13C-1234789-HpCDF	108	40-135	
CRS			
37Cl4-2378-TCDD	85.5	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 4.95 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP25-1@5.5'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-008	**Date Received:** 6/19/2018
	QC Batch #: 1807	**Date Extracted:** 6/23/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/24/2018
Time Collected: 10:17	**Sample Size:** 13.96 g **% Solids:** 72.3	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 0.473	0.172	0.496	
12378-PeCDD	DL= 0.644	0.327	2.48	
123478-HxCDD	DL= 0.396	0.327	2.48	
123678-HxCDD	1.64	0.655	2.48	J
123789-HxCDD	2.73	0.315	2.48	
1234678-HpCDD	9.11	0.409	2.48	
OCDD	68.0	1.01	4.96	
2,3,7,8-TCDF	DL= 0.376	0.0886	0.496	
12378-PeCDF	DL= 0.674	0.412	2.48	
23478-PeCDF	DL= 0.599	0.422	2.48	
123478-HxCDF	DL= 0.340	0.518	2.48	
123678-HxCDF	DL= 0.290	0.533	2.48	
234678-HxCDF	DL= 0.254	0.319	2.48	
123789-HxCDF	DL= 0.346	0.425	2.48	
1234678-HpCDF	5.51	0.279	2.48	
1234789-HpCDF	DL= 0.333	0.378	2.48	
OCDF	7.61	0.461	4.96	

Totals	Conc. (pg/g)	EMPC
Total TCDD	1.87	
Total PeCDD	DL= 0.644	
Total HxCDD	17.9	
Total HpCDD	25.3	
Total TCDF	1.93	
Total PeCDF	DL= 0.674	
Total HxCDF	6.94	
Total HpCDF	13.2	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	105	40-135	
13C-12378-PeCDD	92.8	40-135	
13C-123478-HxCDD	73.7	40-135	
13C-123678-HxCDD	79.0	40-135	
13C-1234678-HpCDD	99.7	40-135	
13C-OCDD	95.7	40-135	
13C-2378-TCDF	126	40-135	
13C-12378-PeCDF	82.8	40-135	
13C-23478-PeCDF	85.4	40-135	
13C-123478-HxCDF	103	40-135	
13C-123678-HxCDF	122	40-135	
13C-234678-HxCDF	127	40-135	
13C-123789-HxCDF	126	40-135	
13C-1234678-HpCDF	103	40-135	
13C-1234789-HpCDF	100	40-135	
CRS			
37Cl4-2378-TCDD	85.3	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.680 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP19-1@5'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-009	**Date Received:** 6/19/2018
	QC Batch #: 1807	**Date Extracted:** 6/23/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/24/2018
Time Collected: 11:40	**Sample Size:** 31.54 g **% Solids:** 31.7	**Q-225 Analysis:** 7/1/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	2.44	0.172	0.500	
12378-PeCDD	2.40	0.327	2.50	J
123478-HxCDD	3.57	0.327	2.50	
123678-HxCDD	5.25	0.655	2.50	
123789-HxCDD	8.77	0.315	2.50	
1234678-HpCDD	48.9	0.409	2.50	
OCDD	350	1.01	5.00	
2,3,7,8-TCDF	2.12	0.0886	0.500	
12378-PeCDF	DL= 0.429	0.412	2.50	
23478-PeCDF	0.783	0.422	2.50	J
123478-HxCDF	2.09	0.518	2.50	J
123678-HxCDF	1.45	0.533	2.50	J
234678-HxCDF	DL= 0.503	0.319	2.50	
123789-HxCDF	DL= 0.676	0.425	2.50	
1234678-HpCDF	37.0	0.279	2.50	
1234789-HpCDF	DL= 1.07	0.378	2.50	
OCDF	52.5	0.461	5.00	

Totals	Conc. (pg/g)	EMPC
Total TCDD	40.6	
Total PeCDD	26.4	
Total HxCDD	62.0	
Total HpCDD	111	
Total TCDF	27.0	28.1
Total PeCDF	11.0	
Total HxCDF	38.2	
Total HpCDF	75.8	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	94.4	40-135	
13C-12378-PeCDD	92.5	40-135	
13C-123478-HxCDD	67.2	40-135	
13C-123678-HxCDD	72.0	40-135	
13C-1234678-HpCDD	104	40-135	
13C-OCDD	104	40-135	
13C-2378-TCDF	127	40-135	
13C-12378-PeCDF	81.7	40-135	
13C-23478-PeCDF	82.0	40-135	
13C-123478-HxCDF	114	40-135	
13C-123678-HxCDF	130	40-135	
13C-234678-HxCDF	117	40-135	
13C-123789-HxCDF	117	40-135	
13C-1234678-HpCDF	96.5	40-135	
13C-1234789-HpCDF	119	40-135	

CRS

37Cl4-2378-TCDD	98.6	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 8.38 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Sample **Method Blank**		**Date Received:** NA
	QC Batch #: 1808	**Date Extracted:** 6/25/2018
	Matrix: Soil	**ZB-5MS Analysis:** 6/27/2018
Project ID: Proposed Grays Harbor IDD #1	**Sample Size:** 10.00 g	

Analyte	Conc. (pg/g)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 0.462	0.172	0.500		13C-2378-TCDD	83.8	40-135	
12378-PeCDD	DL= 0.897	0.327	2.50		13C-12378-PeCDD	71.5	40-135	
123478-HxCDD	DL= 1.03	0.327	2.50		13C-123478-HxCDD	62.8	40-135	
123678-HxCDD	DL= 1.02	0.655	2.50		13C-123678-HxCDD	81.2	40-135	
123789-HxCDD	DL= 0.999	0.315	2.50		13C-1234678-HpCDD	76.6	40-135	
1234678-HpCDD	DL= 1.20	0.409	2.50		13C-OCDD	71.3	40-135	
OCDD	DL= 2.14	1.01	5.00		13C-2378-TCDF	91.5	40-135	
2,3,7,8-TCDF	DL= 0.436	0.0886	0.500		13C-12378-PeCDF	82.5	40-135	
12378-PeCDF	DL= 0.622	0.412	2.50		13C-23478-PeCDF	80.2	40-135	
23478-PeCDF	DL= 0.579	0.422	2.50		13C-123478-HxCDF	85.9	40-135	
123478-HxCDF	DL= 0.593	0.518	2.50		13C-123678-HxCDF	96.4	40-135	
123678-HxCDF	DL= 0.562	0.533	2.50		13C-234678-HxCDF	87.2	40-135	
234678-HxCDF	DL= 0.668	0.319	2.50		13C-123789-HxCDF	83.7	40-135	
123789-HxCDF	DL= 1.08	0.425	2.50		13C-1234678-HpCDF	82.5	40-135	
1234678-HpCDF	DL= 0.788	0.279	2.50		13C-1234789-HpCDF	79.1	40-135	
1234789-HpCDF	DL= 1.38	0.378	2.50					
OCDF	DL= 2.12	0.461	5.00					

Totals	Conc. (pg/g)	EMPC
Total TCDD	DL= 0.462	
Total PeCDD	DL= 0.897	
Total HxCDD	DL= 1.03	
Total HpCDD	DL= 1.20	
Total TCDF	DL= 0.436	
Total PeCDF	DL= 0.622	
Total HxCDF	DL= 1.08	
Total HpCDF	DL= 1.38	

CRS		
37Cl4-2378-TCDD	79.6	40-135

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Samples **Laboratory Control Samples**	**QC Batch #:** 1808 **Matrix:** Soil	**Date Received:** NA **Date Extracted:** 6/25/2018 **ZB-5MS Analysis:** 6/27/2018
Project ID: Proposed Grays Harbor IDD #1	**Sample Size:** 10.00 g	

Analyte	LCS1 % Rec.	LCS2 % Rec.	%RSD
2,3,7,8-TCDD	118	130	6.84
12378-PeCDD	119	117	1.20
123478-HxCDD	113	121	4.83
123678-HxCDD	122	116	3.57
123789-HxCDD	118	115	1.82
1234678-HpCDD	110	114	2.53
OCDD	120	124	2.32
2,3,7,8-TCDF	115	124	5.33
12378-PeCDF	111	112	0.63
23478-PeCDF	106	109	1.97
123478-HxCDF	109	110	0.65
123678-HxCDF	109	108	0.65
234678-HxCDF	106	108	1.32
123789-HxCDF	109	114	3.17
1234678-HpCDF	110	110	0.00
1234789-HpCDF	1112	109	116.17
OCDF	125	127	1.12

Labeled Standards	LCS1 % Rec.	LCS2 % Rec	Limits (a)
13C-2378-TCDD	96.2	98.3	40-135
13C-12378-PeCDD	113	113	40-135
13C-123478-HxCDD	85.3	79.2	40-135
13C-123678-HxCDD	94.0	91.8	40-135
13C-1234678-HpCDD	105	113	40-135
13C-OCDD	97.4	108	40-135
13C-2378-TCDF	122	118	40-135
13C-12378-PeCDF	119	121	40-135
13C-23478-PeCDF	121	117	40-135
13C-123478-HxCDF	110	107	40-135
13C-123678-HxCDF	121	123	40-135
13C-234678-HxCDF	109	109	40-135
13C-123789-HxCDF	104	100	40-135
13C-1234678-HpCDF	106	113	40-135
13C-1234789-HpCDF	108	120	40-135
CRS			
37Cl4-2378-TCDD	91.1	93.5	40-135

(a) Limits based on method acceptance criteria.

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP23-1@6'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-010	**Date Received:** 6/19/2018
	QC Batch #: 1808	**Date Extracted:** 6/25/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/27/2018
Time Collected: 8:27	**Sample Size:** 11.4 g **% Solids:** 88.3	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 0.367	0.172	0.497	
12378-PeCDD	DL= 0.528	0.327	2.48	
123478-HxCDD	DL= 0.531	0.327	2.48	
123678-HxCDD	DL= 0.563	0.655	2.48	
123789-HxCDD	DL= 0.535	0.315	2.48	
1234678-HpCDD	2.87	0.409	2.48	
OCDD	16.5	1.01	4.97	
2,3,7,8-TCDF	DL= 0.401	0.0886	0.497	
12378-PeCDF	DL= 0.572	0.412	2.48	
23478-PeCDF	DL= 0.467	0.422	2.48	
123478-HxCDF	DL= 0.424	0.518	2.48	
123678-HxCDF	DL= 0.388	0.533	2.48	
234678-HxCDF	DL= 0.344	0.319	2.48	
123789-HxCDF	DL= 0.475	0.425	2.48	
1234678-HpCDF	DL= 0.592	0.279	2.48	
1234789-HpCDF	DL= 0.740	0.378	2.48	
OCDF	DL= 2.37	0.461	4.97	

Totals	Conc. (pg/g)	EMPC
Total TCDD	DL= 0.367	
Total PeCDD	DL= 0.528	
Total HxCDD	3.93	
Total HpCDD	5.24	
Total TCDF	DL= 0.401	
Total PeCDF	DL= 0.572	
Total HxCDF	DL= 0.475	
Total HpCDF	DL= 0.740	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	97.7	40-135	
13C-12378-PeCDD	97.9	40-135	
13C-123478-HxCDD	89.5	40-135	
13C-123678-HxCDD	100	40-135	
13C-1234678-HpCDD	110	40-135	
13C-OCDD	83.6	40-135	
13C-2378-TCDF	123	40-135	
13C-12378-PeCDF	107	40-135	
13C-23478-PeCDF	112	40-135	
13C-123478-HxCDF	109	40-135	
13C-123678-HxCDF	117	40-135	
13C-234678-HxCDF	118	40-135	
13C-123789-HxCDF	116	40-135	
13C-1234678-HpCDF	105	40-135	
13C-1234789-HpCDF	123	40-135	

CRS

37Cl4-2378-TCDD	93.9	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.336 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP22-1@6'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-011	**Date Received:** 6/19/2018
	QC Batch #: 1808	**Date Extracted:** 6/25/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/27/2018
Time Collected: 7:50	**Sample Size:** 12.9 g **% Solids:** 77.9	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 0.340	0.172	0.498		13C-2378-TCDD	92.7	40-135	
12378-PeCDD	DL= 1.20	0.327	2.49		13C-12378-PeCDD	116	40-135	
123478-HxCDD	DL= 0.562	0.327	2.49		13C-123478-HxCDD	91.7	40-135	
123678-HxCDD	DL= 0.563	0.655	2.49		13C-123678-HxCDD	101	40-135	
123789-HxCDD	DL= 0.550	0.315	2.49		13C-1234678-HpCDD	105	40-135	
1234678-HpCDD	3.98	0.409	2.49		13C-OCDD	78.6	40-135	
OCDD	21.7	1.01	4.98		13C-2378-TCDF	119	40-135	
2,3,7,8-TCDF	DL= 0.382	0.0886	0.498		13C-12378-PeCDF	124	40-135	
12378-PeCDF	DL= 0.906	0.412	2.49		13C-23478-PeCDF	130	40-135	
23478-PeCDF	DL= 0.799	0.422	2.49		13C-123478-HxCDF	122	40-135	
123478-HxCDF	DL= 0.262	0.518	2.49		13C-123678-HxCDF	127	40-135	
123678-HxCDF	DL= 0.256	0.533	2.49		13C-234678-HxCDF	119	40-135	
234678-HxCDF	DL= 0.236	0.319	2.49		13C-123789-HxCDF	116	40-135	
123789-HxCDF	DL= 0.371	0.425	2.49		13C-1234678-HpCDF	105	40-135	
1234678-HpCDF	1.01	0.279	2.49	J	13C-1234789-HpCDF	1,110	40-135	
1234789-HpCDF	DL= 0.552	0.378	2.49					
OCDF	DL= 1.52	0.461	4.98					

Totals	Conc. (pg/g)	EMPC
Total TCDD	DL= 0.340	
Total PeCDD	DL= 1.20	
Total HxCDD	7.39	
Total HpCDD	8.79	
Total TCDF	DL= 0.382	
Total PeCDF	DL= 0.906	
Total HxCDF	DL= 0.371	
Total HpCDF	2.84	

CRS

37Cl4-2378-TCDD	93.7	40-135

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0564 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP24-1@5.5'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-012	**Date Received:** 6/19/2018
	QC Batch #: 1808	**Date Extracted:** 6/25/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/27/2018
Time Collected: 19:19	**Sample Size:** 16.88 g **% Solids:** 59.6	**Q-225 Analysis:** 7/1/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	3.05	0.172	0.497	
12378-PeCDD	2.93	0.327	2.49	
123478-HxCDD	DL= 1.16	0.327	2.49	
123678-HxCDD	4.97	0.655	2.49	
123789-HxCDD	6.65	0.315	2.49	
1234678-HpCDD	54.7	0.409	2.49	
OCDD	402	1.01	4.97	
2,3,7,8-TCDF	2.04	0.0886	0.497	
12378-PeCDF	DL= 0.850	0.412	2.49	
23478-PeCDF	DL= 0.722	0.422	2.49	
123478-HxCDF	1.81	0.518	2.49	
123678-HxCDF	0.749	0.533	2.49	
234678-HxCDF	DL= 0.539	0.319	2.49	
123789-HxCDF	DL= 0.786	0.425	2.49	
1234678-HpCDF	16.3	0.279	2.49	
1234789-HpCDF	DL= 0.836	0.378	2.49	
OCDF	40.2	0.461	4.97	

Totals	Conc. (pg/g)	EMPC
Total TCDD	18.4	
Total PeCDD	26.9	
Total HxCDD	62.8	
Total HpCDD	119	
Total TCDF	18.8	19.9
Total PeCDF	7.24	
Total HxCDF	30.7	
Total HpCDF	56.0	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	83.1	40-135	
13C-12378-PeCDD	102	40-135	
13C-123478-HxCDD	88.9	40-135	
13C-123678-HxCDD	94.9	40-135	
13C-1234678-HpCDD	98.0	40-135	
13C-OCDD	73.4	40-135	
13C-2378-TCDF	98.0	40-135	
13C-12378-PeCDF	113	40-135	
13C-23478-PeCDF	118	40-135	
13C-123478-HxCDF	109	40-135	
13C-123678-HxCDF	120	40-135	
13C-234678-HxCDF	112	40-135	
13C-123789-HxCDF	104	40-135	
13C-1234678-HpCDF	92.8	40-135	
13C-1234789-HpCDF	109	40-135	

CRS			
37Cl4-2378-TCDD	80.2	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 8.44 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP16-1@5.5'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12147-013	**Date Received:** 6/19/2018
	QC Batch #: 1808	**Date Extracted:** 6/25/2018
Date Collected: 6/12/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/27/2018
Time Collected: 17:00	**Sample Size:** 18.17 g **% Solids:** 55.5	**Q-225 Analysis:** 7/1/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 0.417	0.172	4.96	
12378-PeCDD	DL= 0.944	0.327	2.48	
123478-HxCDD	DL= 0.964	0.327	2.48	
123678-HxCDD	8.00	0.655	2.48	
123789-HxCDD	6.55	0.315	2.48	
1234678-HpCDD	115	0.409	2.48	
OCDD	748	1.01	4.96	
2,3,7,8-TCDF	1.07	0.0886	0.496	
12378-PeCDF	DL= 1.14	0.412	2.48	
23478-PeCDF	DL= 0.936	0.422	2.48	
123478-HxCDF	2.36	0.518	2.48	
123678-HxCDF	0.969	0.533	2.48	
234678-HxCDF	0.948	0.319	2.48	
123789-HxCDF	DL= 0.390	0.425	2.48	
1234678-HpCDF	17.5	0.279	2.48	
1234789-HpCDF	DL= 1.63	0.378	2.48	
OCDF	45.0	0.461	4.96	

Totals	Conc. (pg/g)	EMPC
Total TCDD	7.78	
Total PeCDD	DL= 0.944	
Total HxCDD	54.4	
Total HpCDD	210	
Total TCDF	13.9	
Total PeCDF	6.90	
Total HxCDF	28.6	
Total HpCDF	53.6	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	87.5	40-135	
13C-12378-PeCDD	97.0	40-135	
13C-123478-HxCDD	84.3	40-135	
13C-123678-HxCDD	90.1	40-135	
13C-1234678-HpCDD	67.8	40-135	
13C-OCDD	49.4	40-135	
13C-2378-TCDF	98.0	40-135	
13C-12378-PeCDF	112	40-135	
13C-23478-PeCDF	117	40-135	
13C-123478-HxCDF	106	40-135	
13C-123678-HxCDF	117	40-135	
13C-234678-HxCDF	108	40-135	
13C-123789-HxCDF	107	40-135	
13C-1234678-HpCDF	90.3	40-135	
13C-1234789-HpCDF	64.3	40-135	

CRS

37Cl4-2378-TCDD	83.4	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 3.55 pg/g

Analyst: JMH **Reviewed by: BS**

Section VI: Sample Tracking

ESN NORTHWEST, INC. | Environmental

CHAIN-OF-CUSTODY RECORD

CLIENT: ESN Northwest
1210 Eastside Street SE, Suite 200
Olympia, WA 98501

ADDRESS:

PHONE: FAX: lab@esnnw.com

CLIENT PROJECT #: PROJECT MANAGER:

DATE: 6-12-18 PAGE 1 OF 1

PROJECT NAME: proposed Grays Harbor

LOCATION: IDD #1 site

COLLECTOR: Allison Kinney DATE OF COLLECTION: 6-12-18

Sample Number	Depth	Time	Sample Type	Container Type	TPH - HCID	TPH - Diesel & Oil	TPH - Gasoline	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos - PLM	GRO Suite	DRO Suite	WO Suite	DIDXNS	NOTES	Total Number of Containers	Laboratory Note Number
1. TP8-2@8'	8'	1453	SOIL																		X				
2. TP8-3@11'	11'	1514																							
3. TP9-1@6.5'	6.5'	1609																							
4. TP8-1@7'	7'	1432																							
5. TP13-1@12'	12'	1326																							
6. TP14-1@12'	12'	1243																							
7. TP24-2@10'	10'	947																							
8. TP25-1@5.5'	5.5'	1017																							
9. TP19-1@5'	5'	1140																							
10. TP23-1@6'	6'	827																							
11. TP22-1@6'	6'	750																							
12. TP24-1@5.5'	5.5'	919																							
13. TP16-1@5.5'	5.5'	1100																			X				
14.																									
15.																									
16.																									
17.																									
18.																									

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
[signature]	6-13-18	[signature]	6/13/18 14:14
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

STD TAT

Turn Around Time: 24 HR 48 HR 5 DAY

Sample Receipt Check List Logged by: JL (initials)

Ceres ID: 12147		Date/Time: 6/19/18 14:14
Client Project ID: Proposed Grays Harbor IDD#1 Site		Received Temp: 4.1 °C Acceptable: (Y) / N
Chain of Custody Relinquished by signed?		(Y) / N
Chain of Custody Received by signed?		(Y) / N
Custody Seals?	Present?	Y / N
	Intact?	Y / N
	NA:	(NA)
Unlabeled / Illegible Samples		Y / (N)
Proper Containers:		(Y) / N
Preservation Acceptable (Chemical or Temperature)?		(Y) / N
Drinking Water, Sodium Thiosulfate present?		Y / N / (NA)
Residual Cl?		Y / N
Aqueous sample pH: NA		

List COC discrepancies:

JL 6/19/18

List Damaged Samples:

JL 6/19/18

Section VII: Qualifiers/Abbreviations

J	Concentration found below the lower quantitation limit but greater than zero.
B	Analyte present in the associated Method Blank.
E	Concentration found exceeds the Calibration range of the HRGC/HRMS.
D	This analyte concentration was calculated from a dilution.
X	The concentration found is the estimated maximum possible concentration due to chlorinated diphenyl ethers present in the sample.
H	Recovery limits exceeded. See cover letter.
*****	Results taken from dilution.
I	Interference. See cover letter.
Conc.	Concentration Found
DL	Calculated Detection Limit
ND	Non-Detect
% Rec.	Percent Recovery

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

July 2, 2018 Ceres ID: 12148

ESN Northwest, Inc.
1210 Eastside Street SE
Olympia, WA 98501

The following report contains the results for the ten soil samples received on June 19, 2018. These samples were analyzed for tetra through octa chlorinated dibenzo-p-dioxins and dibenzofurans by EPA method 8290A. Routine turn-around time was provided for this work.

This work was authorized under the Project Name: Proposed Grays Harbor IDD #1 Site.

Sample results are reported on a dry weight basis.

Continuing Calibration Verification (CCV) Requirements
All associated calibration verification standard(s) (CCV) met the acceptance criteria.

Confirmation analysis was performed on the samples which had concentrations above the method calibration limit for the 2,3,7,8-TCDF on a Quadrex Q-225 column for isomer specificity.

The report consists of a Cover Letter, Sample Inventory (Section I), Data Summary (Section II), Sample Tracking (Section VI), and Qualifiers/Abbreviations (Section VII). Raw Data (Section III), Continuing Calibration (Section IV), and Initial Calibration (Section V) are available in a full report (.pdf format) upon request.

If you have any questions regarding this report, please feel free to contact me at (916)932-5011.

Sincerely,

James M. Hedin
Director of Operations/CEO
jhedin@ceres-lab.com

Section I: Sample Inventory

Ceres Sample ID:	Sample ID	Date Received	Collection Date &Time
12148-001	TP12-1@12'	6/19/2018	6/13/2018 14:36
12148-002	TP17-2@8'	6/19/2018	6/13/2018 13:40
12148-003	TP7-2@10'	6/19/2018	6/13/2018 12:57
12148-004	TP17-1@4'	6/19/2018	6/13/2018 13:26
12148-005	TP11-1@9'	6/19/2018	6/13/2018 10:20
12148-006	TP5-1@10'	6/19/2018	6/13/2018 10:51
12148-007	TP7-1@6'	6/19/2018	6/13/2018 12:20
12148-008	TP2-1@12'	6/19/2018	6/13/2018 8:50
12148-009	TP3-1@6'	6/19/2018	6/13/2018 9:22
12148-010	TP6-1@12'	6/19/2018	6/13/2018 11:38

Section II: Data Summary

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Sample **Method Blank**		**Date Received:** NA
	QC Batch #: 1808	**Date Extracted:** 6/25/2018
	Matrix: Soil	**ZB-5MS Analysis:** 6/27/2018
Project ID: Proposed Grays Harbor IDD #1	**Sample Size:** 10.00 g	

Analyte	Conc. (pg/g)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 0.462	0.172	0.500		13C-2378-TCDD	83.8	40-135	
12378-PeCDD	DL= 0.897	0.327	2.50		13C-12378-PeCDD	71.5	40-135	
123478-HxCDD	DL= 1.03	0.327	2.50		13C-123478-HxCDD	62.8	40-135	
123678-HxCDD	DL= 1.02	0.655	2.50		13C-123678-HxCDD	81.2	40-135	
123789-HxCDD	DL= 0.999	0.315	2.50		13C-1234678-HpCDD	76.6	40-135	
1234678-HpCDD	DL= 1.20	0.409	2.50		13C-OCDD	71.3	40-135	
OCDD	DL= 2.14	1.01	5.00		13C-2378-TCDF	91.5	40-135	
2,3,7,8-TCDF	DL= 0.436	0.0886	0.500		13C-12378-PeCDF	82.5	40-135	
12378-PeCDF	DL= 0.622	0.412	2.50		13C-23478-PeCDF	80.2	40-135	
23478-PeCDF	DL= 0.579	0.422	2.50		13C-123478-HxCDF	85.9	40-135	
123478-HxCDF	DL= 0.593	0.518	2.50		13C-123678-HxCDF	96.4	40-135	
123678-HxCDF	DL= 0.562	0.533	2.50		13C-234678-HxCDF	87.2	40-135	
234678-HxCDF	DL= 0.668	0.319	2.50		13C-123789-HxCDF	83.7	40-135	
123789-HxCDF	DL= 1.08	0.425	2.50		13C-1234678-HpCDF	82.5	40-135	
1234678-HpCDF	DL= 0.788	0.279	2.50		13C-1234789-HpCDF	79.1	40-135	
1234789-HpCDF	DL= 1.38	0.378	2.50					
OCDF	DL= 2.12	0.461	5.00					

Totals	Conc. (pg/g)	EMPC
Total TCDD	DL= 0.462	
Total PeCDD	DL= 0.897	
Total HxCDD	DL= 1.03	
Total HpCDD	DL= 1.20	
Total TCDF	DL= 0.436	
Total PeCDF	DL= 0.622	
Total HxCDF	DL= 1.08	
Total HpCDF	DL= 1.38	

CRS			
37Cl4-2378-TCDD	79.6	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Samples **Laboratory Control Samples**	**QC Batch #:** 1808 **Matrix:** Soil	**Date Received:** NA **Date Extracted:** 6/25/2018 **ZB-5MS Analysis:** 6/27/2018
Project ID: Proposed Grays Harbor IDD #1	**Sample Size:** 10.00 g	

Analyte	LCS1 % Rec.	LCS2 % Rec.	%RSD
2,3,7,8-TCDD	118	130	6.84
12378-PeCDD	119	117	1.20
123478-HxCDD	113	121	4.83
123678-HxCDD	122	116	3.57
123789-HxCDD	118	115	1.82
1234678-HpCDD	110	114	2.53
OCDD	120	124	2.32
2,3,7,8-TCDF	115	124	5.33
12378-PeCDF	111	112	0.63
23478-PeCDF	106	109	1.97
123478-HxCDF	109	110	0.65
123678-HxCDF	109	108	0.65
234678-HxCDF	106	108	1.32
123789-HxCDF	109	114	3.17
1234678-HpCDF	110	110	0.00
1234789-HpCDF	1112	109	116.17
OCDF	125	127	1.12

Labeled Standards	LCS1 % Rec.	LCS2 % Rec	Limits (a)
13C-2378-TCDD	96.2	98.3	40-135
13C-12378-PeCDD	113	113	40-135
13C-123478-HxCDD	85.3	79.2	40-135
13C-123678-HxCDD	94.0	91.8	40-135
13C-1234678-HpCDD	105	113	40-135
13C-OCDD	97.4	108	40-135
13C-2378-TCDF	122	118	40-135
13C-12378-PeCDF	119	121	40-135
13C-23478-PeCDF	121	117	40-135
13C-123478-HxCDF	110	107	40-135
13C-123678-HxCDF	121	123	40-135
13C-234678-HxCDF	109	109	40-135
13C-123789-HxCDF	104	100	40-135
13C-1234678-HpCDF	106	113	40-135
13C-1234789-HpCDF	108	120	40-135
CRS			
37Cl4-2378-TCDD	91.1	93.5	40-135

(a) Limits based on method acceptance criteria.

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP12-1@12'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12148-001	**Date Received:** 6/19/2018
	QC Batch #: 1808	**Date Extracted:** 6/25/2018
Date Collected: 6/13/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/27/2018
Time Collected: 14:36	**Sample Size:** 15.4 g **% Solids:** 64.6	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	3.28	0.172	0.503	
12378-PeCDD	DL= 1.89	0.327	2.51	
123478-HxCDD	DL= 1.55	0.327	2.51	
123678-HxCDD	DL= 1.50	0.655	2.51	
123789-HxCDD	6.28	0.315	2.51	
1234678-HpCDD	7.79	0.409	2.51	
OCDD	22.8	1.01	5.03	
2,3,7,8-TCDF	DL= 0.450	0.0886	0.503	
12378-PeCDF	DL= 0.674	0.412	2.51	
23478-PeCDF	DL= 0.609	0.422	2.51	
123478-HxCDF	DL= 0.833	0.518	2.51	
123678-HxCDF	DL= 0.780	0.533	2.51	
234678-HxCDF	DL= 0.756	0.319	2.51	
123789-HxCDF	DL= 1.18	0.425	2.51	
1234678-HpCDF	DL= 1.18	0.279	2.51	
1234789-HpCDF	DL= 1.53	0.378	2.51	
OCDF	DL= 3.54	0.461	5.03	

Totals	Conc. (pg/g)	EMPC
Total TCDD	7.35	
Total PeCDD	DL= 1.89	
Total HxCDD	28.0	
Total HpCDD	18.0	
Total TCDF	DL= 0.450	
Total PeCDF	DL= 0.674	
Total HxCDF	DL= 1.18	
Total HpCDF	DL= 1.53	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	94.8	40-135	
13C-12378-PeCDD	110	40-135	
13C-123478-HxCDD	85.3	40-135	
13C-123678-HxCDD	98.0	40-135	
13C-1234678-HpCDD	90.3	40-135	
13C-OCDD	75.8	40-135	
13C-2378-TCDF	113	40-135	
13C-12378-PeCDF	117	40-135	
13C-23478-PeCDF	127	40-135	
13C-123478-HxCDF	103	40-135	
13C-123678-HxCDF	113	40-135	
13C-234678-HxCDF	109	40-135	
13C-123789-HxCDF	96.6	40-135	
13C-1234678-HpCDF	92.5	40-135	
13C-1234789-HpCDF	102	40-135	

CRS

37Cl4-2378-TCDD	102	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 3.99 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP17-2@8'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12148-002	**Date Received:** 6/19/2018
	QC Batch #: 1808	**Date Extracted:** 6/25/2018
Date Collected: 6/13/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/27/2018
Time Collected: 13:40	**Sample Size:** 16.07 g **% Solids:** 62	**Q-225 Analysis:** 7/1/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	3.47	0.172	0.502	
12378-PeCDD	2.08	0.327	2.51	J
123478-HxCDD	1.37	0.327	2.51	J
123678-HxCDD	4.01	0.655	2.51	
123789-HxCDD	6.21	0.315	2.51	
1234678-HpCDD	40.6	0.409	2.51	
OCDD	309	1.01	5.02	
2,3,7,8-TCDF	2.29	0.0886	0.502	
12378-PeCDF	DL= 0.583	0.412	2.51	
23478-PeCDF	DL= 0.541	0.422	2.51	
123478-HxCDF	1.80	0.518	2.51	J
123678-HxCDF	1.22	0.533	2.51	J
234678-HxCDF	DL= 0.397	0.319	2.51	
123789-HxCDF	DL= 0.628	0.425	2.51	
1234678-HpCDF	12.8	0.279	2.51	
1234789-HpCDF	DL= 0.661	0.378	2.51	
OCDF	27.6	0.461	5.02	

Totals	Conc. (pg/g)	EMPC
Total TCDD	10.1	
Total PeCDD	13.2	
Total HxCDD	47.6	
Total HpCDD	86.0	
Total TCDF	8.88	
Total PeCDF	5.78	
Total HxCDF	18.5	
Total HpCDF	36.6	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	81.2	40-135	
13C-12378-PeCDD	106	40-135	
13C-123478-HxCDD	85.2	40-135	
13C-123678-HxCDD	95.8	40-135	
13C-1234678-HpCDD	97.1	40-135	
13C-OCDD	83.7	40-135	
13C-2378-TCDF	107	40-135	
13C-12378-PeCDF	114	40-135	
13C-23478-PeCDF	124	40-135	
13C-123478-HxCDF	109	40-135	
13C-123678-HxCDF	117	40-135	
13C-234678-HxCDF	112	40-135	
13C-123789-HxCDF	104	40-135	
13C-1234678-HpCDF	95.5	40-135	
13C-1234789-HpCDF	111	40-135	
CRS			
37Cl4-2378-TCDD	76.5	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 7.87 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP7-2@10'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12148-003	**Date Received:** 6/19/2018
	QC Batch #: 1808	**Date Extracted:** 6/25/2018
Date Collected: 6/13/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/27/2018
Time Collected: 12:57	**Sample Size:** 18.46 g **% Solids:** 54.3	**Q-225 Analysis:** 7/1/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 0.412	0.172	0.499	
12378-PeCDD	4.65	0.327	2.50	
123478-HxCDD	1.08	0.327	2.50	J
123678-HxCDD	3.03	0.655	2.50	
123789-HxCDD	7.22	0.315	2.50	
1234678-HpCDD	24.2	0.409	2.50	
OCDD	156	1.01	4.99	
2,3,7,8-TCDF	1.99	0.0886	0.499	
12378-PeCDF	1.83	0.412	2.50	J
23478-PeCDF	1.68	0.422	2.50	J
123478-HxCDF	1.62	0.518	2.50	J
123678-HxCDF	1.13	0.533	2.50	J
234678-HxCDF	0.788	0.319	2.50	J
123789-HxCDF	DL= 0.315	0.425	2.50	
1234678-HpCDF	15.8	0.279	2.50	
1234789-HpCDF	DL= 0.536	0.378	2.50	
OCDF	17.0	0.461	4.99	

Totals	Conc. (pg/g)	EMPC
Total TCDD	27.6	
Total PeCDD	35.8	
Total HxCDD	44.1	
Total HpCDD	48.7	
Total TCDF	51.8	53.1
Total PeCDF	20.2	
Total HxCDF	19.7	
Total HpCDF	31.9	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	99.4	40-135	
13C-12378-PeCDD	108	40-135	
13C-123478-HxCDD	91.1	40-135	
13C-123678-HxCDD	97.6	40-135	
13C-1234678-HpCDD	92.0	40-135	
13C-OCDD	68.5	40-135	
13C-2378-TCDF	127	40-135	
13C-12378-PeCDF	127	40-135	
13C-23478-PeCDF	132	40-135	
13C-123478-HxCDF	105	40-135	
13C-123678-HxCDF	115	40-135	
13C-234678-HxCDF	113	40-135	
13C-123789-HxCDF	103	40-135	
13C-1234678-HpCDF	92.8	40-135	
13C-1234789-HpCDF	103	40-135	

CRS

37Cl4-2378-TCDD	105	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 7.35 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP17-1@4'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12148-004	**Date Received:** 6/19/2018
	QC Batch #: 1808	**Date Extracted:** 6/25/2018
Date Collected: 6/13/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/27/2018
Time Collected: 13:26	**Sample Size:** 15.37 g **% Solids:** 64.7	**Q-225 Analysis:** 7/1/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.44	0.172	5.03	
12378-PeCDD	1.90	0.327	2.52	J
123478-HxCDD	DL= 0.840	0.327	2.52	
123678-HxCDD	3.82	0.655	2.52	
123789-HxCDD	6.18	0.315	2.52	
1234678-HpCDD	30.3	0.409	2.52	
OCDD	218	1.01	5.03	
2,3,7,8-TCDF	0.986	0.0886	0.503	
12378-PeCDF	DL= 0.564	0.412	2.52	
23478-PeCDF	DL= 0.530	0.422	2.52	
123478-HxCDF	DL= 0.749	0.518	2.52	
123678-HxCDF	DL= 0.616	0.533	2.52	
234678-HxCDF	DL= 0.645	0.319	2.52	
123789-HxCDF	DL= 0.933	0.425	2.52	
1234678-HpCDF	7.72	0.279	2.52	
1234789-HpCDF	DL= 0.643	0.378	2.52	
OCDF	18.1	0.461	5.03	

Totals	Conc. (pg/g)	EMPC
Total TCDD	5.57	
Total PeCDD	12.5	
Total HxCDD	43.3	
Total HpCDD	64.9	
Total TCDF	4.98	
Total PeCDF	4.20	
Total HxCDF	12.1	
Total HpCDF	23.1	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	100	40-135	
13C-12378-PeCDD	109	40-135	
13C-123478-HxCDD	79.5	40-135	
13C-123678-HxCDD	85.5	40-135	
13C-1234678-HpCDD	114	40-135	
13C-OCDD	95.7	40-135	
13C-2378-TCDF	127	40-135	
13C-12378-PeCDF	119	40-135	
13C-23478-PeCDF	117	40-135	
13C-123478-HxCDF	95.3	40-135	
13C-123678-HxCDF	111	40-135	
13C-234678-HxCDF	102	40-135	
13C-123789-HxCDF	97.0	40-135	
13C-1234678-HpCDF	103	40-135	
13C-1234789-HpCDF	130	40-135	
CRS			
37Cl4-2378-TCDD	93.8	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 4.89 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP11-1@9'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12148-005	**Date Received:** 6/19/2018
	QC Batch #: 1808	**Date Extracted:** 6/25/2018
Date Collected: 6/13/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/27/2018
Time Collected: 10:20	**Sample Size:** 18.71 g **% Solids:** 53.7	**Q-225 Analysis:** 7/1/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	3.74	0.172	0.498		13C-2378-TCDD	95.5	40-135	
12378-PeCDD	3.06	0.327	2.49		13C-12378-PeCDD	107	40-135	
123478-HxCDD	1.41	0.327	2.49	J	13C-123478-HxCDD	89.3	40-135	
123678-HxCDD	5.64	0.655	2.49		13C-123678-HxCDD	91.3	40-135	
123789-HxCDD	8.73	0.315	2.49		13C-1234678-HpCDD	99.9	40-135	
1234678-HpCDD	66.8	0.409	2.49		13C-OCDD	89.3	40-135	
OCDD	480	1.01	4.98		13C-2378-TCDF	117	40-135	
2,3,7,8-TCDF	3.59	0.0886	0.498		13C-12378-PeCDF	115	40-135	
12378-PeCDF	DL= 0.500	0.412	2.49		13C-23478-PeCDF	125	40-135	
23478-PeCDF	DL= 0.425	0.422	2.49		13C-123478-HxCDF	104	40-135	
123478-HxCDF	1.74	0.518	2.49	J	13C-123678-HxCDF	119	40-135	
123678-HxCDF	0.781	0.533	2.49	J	13C-234678-HxCDF	109	40-135	
234678-HxCDF	DL= 0.383	0.319	2.49		13C-123789-HxCDF	103	40-135	
123789-HxCDF	DL= 0.551	0.425	2.49		13C-1234678-HpCDF	98.3	40-135	
1234678-HpCDF	20.7	0.279	2.49		13C-1234789-HpCDF	110	40-135	
1234789-HpCDF	1.29	0.378	2.49	J				
OCDF	41.6	0.461	4.98					

Totals	Conc. (pg/g)	EMPC
Total TCDD	23.1	
Total PeCDD	25.6	28.2
Total HxCDD	70.1	
Total HpCDD	145	
Total TCDF	27.3	
Total PeCDF	8.85	
Total HxCDF	28.2	
Total HpCDF	59.5	

CRS			
37Cl4-2378-TCDD	96.7	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 10.0 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Sample **Method Blank**	**QC Batch #:** 1809 **Matrix:** Soil	**Date Received:** NA **Date Extracted:** 6/29/2018 **ZB-5MS Analysis:** 6/30/2018
Project ID: Proposed Grays Harbor IDD #1	**Sample Size:** 10.00 g	

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 0.324	0.172	0.500	
12378-PeCDD	DL= 0.573	0.327	2.50	
123478-HxCDD	DL= 0.640	0.327	2.50	
123678-HxCDD	DL= 0.643	0.655	2.50	
123789-HxCDD	DL= 0.627	0.315	2.50	
1234678-HpCDD	DL= 0.905	0.409	2.50	
OCDD	DL= 1.47	1.01	5.00	
2,3,7,8-TCDF	DL= 0.294	0.0886	0.500	
12378-PeCDF	DL= 0.308	0.412	2.50	
23478-PeCDF	DL= 0.308	0.422	2.50	
123478-HxCDF	DL= 0.456	0.518	2.50	
123678-HxCDF	DL= 0.361	0.533	2.50	
234678-HxCDF	DL= 0.513	0.319	2.50	
123789-HxCDF	DL= 0.865	0.425	2.50	
1234678-HpCDF	DL= 0.420	0.279	2.50	
1234789-HpCDF	DL= 0.932	0.378	2.50	
OCDF	DL= 1.34	0.461	5.00	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	85.8	40-135	
13C-12378-PeCDD	75.1	40-135	
13C-123478-HxCDD	61.8	40-135	
13C-123678-HxCDD	74.1	40-135	
13C-1234678-HpCDD	69.8	40-135	
13C-OCDD	67.0	40-135	
13C-2378-TCDF	83.6	40-135	
13C-12378-PeCDF	71.2	40-135	
13C-23478-PeCDF	66.6	40-135	
13C-123478-HxCDF	68.8	40-135	
13C-123678-HxCDF	83.6	40-135	
13C-234678-HxCDF	69.9	40-135	
13C-123789-HxCDF	65.1	40-135	
13C-1234678-HpCDF	72.8	40-135	
13C-1234789-HpCDF	57.6	40-135	

Totals	Conc. (pg/g)	EMPC
Total TCDD	DL= 0.324	
Total PeCDD	DL= 0.573	
Total HxCDD	DL= 0.643	
Total HpCDD	DL= 0.905	
Total TCDF	DL= 0.294	
Total PeCDF	DL= 0.308	
Total HxCDF	DL= 0.865	
Total HpCDF	DL= 0.932	

CRS

37Cl4-2378-TCDD	71.6	40-135

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Samples **Laboratory Control Samples**	**QC Batch #:** 1809 **Matrix:** Soil	**Date Received:** NA **Date Extracted:** 6/29/2018 **ZB-5MS Analysis:** 6/30/2018
Project ID: Proposed Grays Harbor IDD #1	**Sample Size:** 10.00 g	

Analyte	LCS1 % Rec.	LCS2 % Rec.	%RSD
2,3,7,8-TCDD	106	105	0.67
12378-PeCDD	103	110	4.65
123478-HxCDD	108	108	0.00
123678-HxCDD	103	111	5.29
123789-HxCDD	105	124	11.73
1234678-HpCDD	106	105	0.67
OCDD	111	109	1.29
2,3,7,8-TCDF	99.7	100	0.21
12378-PeCDF	94	97	2.22
23478-PeCDF	89	93.4	3.41
123478-HxCDF	99.6	101	0.99
123678-HxCDF	95.6	91.6	3.02
234678-HxCDF	95.8	94.6	0.89
123789-HxCDF	98.2	100	1.28
1234678-HpCDF	93.4	96.4	2.24
1234789-HpCDF	97	102	3.55
OCDF	96.9	95	1.40

Labeled Standards	LCS1 % Rec.	LCS2 % Rec	Limits (a)
13C-2378-TCDD	97.3	95.3	40-135
13C-12378-PeCDD	102	100	40-135
13C-123478-HxCDD	88.4	72.5	40-135
13C-123678-HxCDD	100	83.8	40-135
13C-1234678-HpCDD	81.4	86.8	40-135
13C-OCDD	101	82.0	40-135
13C-2378-TCDF	101	97.7	40-135
13C-12378-PeCDF	93.6	86.0	40-135
13C-23478-PeCDF	92.2	87.0	40-135
13C-123478-HxCDF	98.4	83.8	40-135
13C-123678-HxCDF	122	85.7	40-135
13C-234678-HxCDF	96.5	80.7	40-135
13C-123789-HxCDF	70.4	78.5	40-135
13C-1234678-HpCDF	83.3	83.6	40-135
13C-1234789-HpCDF	83.8	74.5	40-135
CRS			
37Cl4-2378-TCDD	82.7	81.1	40-135

(a) Limits based on method acceptance criteria.

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP5-1@10'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12148-006	**Date Received:** 6/19/2018
	QC Batch #: 1809	**Date Extracted:** 6/29/2018
Date Collected: 6/13/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/30/2018
Time Collected: 10:51	**Sample Size:** 18.54 g **% Solids:** 53.8	**Q-225 Analysis:** 7/2/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	3.17	0.172	0.502	
12378-PeCDD	2.72	0.327	2.51	
123478-HxCDD	1.38	0.327	2.51	J
123678-HxCDD	6.34	0.655	2.51	
123789-HxCDD	7.64	0.315	2.51	
1234678-HpCDD	88.2	0.409	2.51	
OCDD	694	1.01	5.02	
2,3,7,8-TCDF	5.52	0.0886	0.502	
12378-PeCDF	0.581	0.412	2.51	J
23478-PeCDF	1.15	0.422	2.51	J
123478-HxCDF	2.52	0.518	2.51	
123678-HxCDF	1.07	0.533	2.51	J
234678-HxCDF	0.660	0.319	2.51	J
123789-HxCDF	DL= 0.249	0.425	2.51	
1234678-HpCDF	37.4	0.279	2.51	
1234789-HpCDF	1.67	0.378	2.51	J
OCDF	63.0	0.461	5.02	

Totals	Conc. (pg/g)	EMPC
Total TCDD	21.0	
Total PeCDD	26.3	27.9
Total HxCDD	76.9	
Total HpCDD	203	
Total TCDF	39.1	40.0
Total PeCDF	19.9	20.5
Total HxCDF	47.0	
Total HpCDF	107	

Labeled Standards	% R	LCL-UCL (a)
13C-2378-TCDD	109	40-135
13C-12378-PeCDD	105	40-135
13C-123478-HxCDD	95.6	40-135
13C-123678-HxCDD	104	40-135
13C-1234678-HpCDD	88.2	40-135
13C-OCDD	78.8	40-135
13C-2378-TCDF	100	40-135
13C-12378-PeCDF	106	40-135
13C-23478-PeCDF	107	40-135
13C-123478-HxCDF	106	40-135
13C-123678-HxCDF	114	40-135
13C-234678-HxCDF	114	40-135
13C-123789-HxCDF	111	40-135
13C-1234678-HpCDF	94.7	40-135
13C-1234789-HpCDF	101	40-135
CRS		
37Cl4-2378-TCDD	100	40-135

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 10.3 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP7-1@6'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12148-007	**Date Received:** 6/19/2018
	QC Batch #: 1809	**Date Extracted:** 6/29/2018
Date Collected: 6/13/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/30/2018
Time Collected: 12:20	**Sample Size:** 17.26 g **% Solids:** 57.5	**Q-225 Analysis:** 7/2/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	2.28	0.172	0.504	
12378-PeCDD	2.37	0.327	2.52	J
123478-HxCDD	1.34	0.327	2.52	J
123678-HxCDD	6.36	0.655	2.52	
123789-HxCDD	6.70	0.315	2.52	
1234678-HpCDD	93.5	0.409	2.52	
OCDD	660	1.01	5.04	
2,3,7,8-TCDF	4.03	0.0886	0.504	
12378-PeCDF	1.17	0.412	2.52	J
23478-PeCDF	1.77	0.422	2.52	J
123478-HxCDF	2.31	0.518	2.52	J
123678-HxCDF	1.40	0.533	2.52	J
234678-HxCDF	1.05	0.319	2.52	J
123789-HxCDF	DL= 0.454	0.425	2.52	
1234678-HpCDF	28.0	0.279	2.52	
1234789-HpCDF	1.32	0.378	2.52	J
OCDF	47.3	0.461	5.04	

Totals	Conc. (pg/g)	EMPC
Total TCDD	33.2	
Total PeCDD	31.0	
Total HxCDD	68.1	
Total HpCDD	235	
Total TCDF	47.1	
Total PeCDF	23.8	
Total HxCDF	33.3	
Total HpCDF	70.2	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	102	40-135	
13C-12378-PeCDD	100	40-135	
13C-123478-HxCDD	97.5	40-135	
13C-123678-HxCDD	98.8	40-135	
13C-1234678-HpCDD	97.5	40-135	
13C-OCDD	91.7	40-135	
13C-2378-TCDF	112	40-135	
13C-12378-PeCDF	98.8	40-135	
13C-23478-PeCDF	103	40-135	
13C-123478-HxCDF	112	40-135	
13C-123678-HxCDF	121	40-135	
13C-234678-HxCDF	111	40-135	
13C-123789-HxCDF	110	40-135	
13C-1234678-HpCDF	101	40-135	
13C-1234789-HpCDF	118	40-135	
CRS			
37Cl4-2378-TCDD	91.3	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 8.98 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP2-1@12'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12148-008	**Date Received:** 6/19/2018
	QC Batch #: 1809	**Date Extracted:** 6/29/2018
Date Collected: 6/13/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/30/2018
Time Collected: 8:50	**Sample Size:** 18.72 g **% Solids:** 53.2	**Q-225 Analysis:** 7/2/2018

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.92	0.172	0.502	
12378-PeCDD	2.19	0.327	2.51	J
123478-HxCDD	0.567	0.327	2.51	J
123678-HxCDD	1.26	0.655	2.51	J
123789-HxCDD	4.33	0.315	2.51	
1234678-HpCDD	6.72	0.409	2.51	
OCDD	18.5	1.01	5.02	
2,3,7,8-TCDF	1.13	0.0886	0.502	
12378-PeCDF	DL= 0.271	0.412	2.51	
23478-PeCDF	DL= 0.240	0.422	2.51	
123478-HxCDF	DL= 0.198	0.518	2.51	
123678-HxCDF	DL= 0.174	0.533	2.51	
234678-HxCDF	DL= 0.207	0.319	2.51	
123789-HxCDF	DL= 0.314	0.425	2.51	
1234678-HpCDF	DL= 0.294	0.279	2.51	
1234789-HpCDF	DL= 0.432	0.378	2.51	
OCDF	DL= 0.560	0.461	5.02	

Totals	Conc. (pg/g)	EMPC
Total TCDD	21.5	
Total PeCDD	19.3	
Total HxCDD	29.0	
Total HpCDD	14.0	
Total TCDF	14.5	14.9
Total PeCDF	1.14	
Total HxCDF	DL= 0.314	
Total HpCDF	DL= 0.432	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	94.2	40-135	
13C-12378-PeCDD	91.3	40-135	
13C-123478-HxCDD	86.3	40-135	
13C-123678-HxCDD	88.4	40-135	
13C-1234678-HpCDD	85.8	40-135	
13C-OCDD	71.4	40-135	
13C-2378-TCDF	101	40-135	
13C-12378-PeCDF	86.6	40-135	
13C-23478-PeCDF	91.3	40-135	
13C-123478-HxCDF	96.3	40-135	
13C-123678-HxCDF	105	40-135	
13C-234678-HxCDF	98.3	40-135	
13C-123789-HxCDF	96.7	40-135	
13C-1234678-HpCDF	87.2	40-135	
13C-1234789-HpCDF	94.2	40-135	
CRS			
37Cl4-2378-TCDD	90.2	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 4.91 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP3-1@6'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12148-009	**Date Received:** 6/19/2018
	QC Batch #: 1809	**Date Extracted:** 6/29/2018
Date Collected: 6/13/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/30/2018
Time Collected: 9:22	**Sample Size:** 14.27 g **% Solids:** 70.6	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.39	0.172	0.497	
12378-PeCDD	0.939	0.327	2.48	J
123478-HxCDD	DL= 0.518	0.327	2.48	
123678-HxCDD	1.08	0.655	2.48	J
123789-HxCDD	2.58	0.315	2.48	
1234678-HpCDD	9.61	0.409	2.48	
OCDD	62.1	1.01	4.97	
2,3,7,8-TCDF	DL= 0.320	0.0886	0.497	
12378-PeCDF	DL= 0.335	0.412	2.48	
23478-PeCDF	DL= 0.267	0.422	2.48	
123478-HxCDF	DL= 0.215	0.518	2.48	
123678-HxCDF	DL= 0.200	0.533	2.48	
234678-HxCDF	DL= 0.230	0.319	2.48	
123789-HxCDF	DL= 0.311	0.425	2.48	
1234678-HpCDF	3.82	0.279	2.48	
1234789-HpCDF	DL= 0.281	0.378	2.48	
OCDF	5.10	0.461	4.97	

Totals	Conc. (pg/g)	EMPC
Total TCDD	7.33	7.90
Total PeCDD	5.29	6.93
Total HxCDD	15.7	
Total HpCDD	22.7	
Total TCDF	0.834	
Total PeCDF	0.900	
Total HxCDF	3.91	
Total HpCDF	9.28	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	86.9	40-135	
13C-12378-PeCDD	82.1	40-135	
13C-123478-HxCDD	81.0	40-135	
13C-123678-HxCDD	87.3	40-135	
13C-1234678-HpCDD	79.7	40-135	
13C-OCDD	71.9	40-135	
13C-2378-TCDF	95.8	40-135	
13C-12378-PeCDF	74.2	40-135	
13C-23478-PeCDF	81.5	40-135	
13C-123478-HxCDF	87.7	40-135	
13C-123678-HxCDF	93.6	40-135	
13C-234678-HxCDF	90.9	40-135	
13C-123789-HxCDF	96.6	40-135	
13C-1234678-HpCDF	73.4	40-135	
13C-1234789-HpCDF	97.3	40-135	
CRS			
37Cl4-2378-TCDD	76.4	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 2.85 pg/g

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: TP6-1@12'		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12148-010	**Date Received:** 6/19/2018
	QC Batch #: 1809	**Date Extracted:** 6/29/2018
Date Collected: 6/13/2018	**Matrix:** Soil	**ZB-5MS Analysis:** 6/30/2018
Time Collected: 11:38	**Sample Size:** 15.61 g **% Solids:** 63.7	**Q-225 Analysis:** NA

Analyte	Conc. (pg/g)	MDL	RL	Qual.
2,3,7,8-TCDD	1.23	0.172	0.503	
12378-PeCDD	1.04	0.327	2.52	J
123478-HxCDD	DL= 0.391	0.327	2.52	
123678-HxCDD	0.794	0.655	2.52	J
123789-HxCDD	3.02	0.315	2.52	
1234678-HpCDD	5.14	0.409	2.52	
OCDD	19.1	1.01	5.03	
2,3,7,8-TCDF	DL= 0.166	0.0886	0.503	
12378-PeCDF	DL= 0.197	0.412	2.52	
23478-PeCDF	DL= 0.167	0.422	2.52	
123478-HxCDF	DL= 0.207	0.518	2.52	
123678-HxCDF	DL= 0.167	0.533	2.52	
234678-HxCDF	DL= 0.190	0.319	2.52	
123789-HxCDF	DL= 0.266	0.425	2.52	
1234678-HpCDF	DL= 0.346	0.279	2.52	
1234789-HpCDF	DL= 0.386	0.378	2.52	
OCDF	DL= 0.579	0.461	5.03	

Totals	Conc. (pg/g)	EMPC
Total TCDD	9.16	
Total PeCDD	7.07	8.07
Total HxCDD	16.3	
Total HpCDD	12.4	
Total TCDF	1.14	
Total PeCDF	DL= 0.197	
Total HxCDF	DL= 0.266	
Total HpCDF	DL= 0.386	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	100	40-135	
13C-12378-PeCDD	103	40-135	
13C-123478-HxCDD	92.5	40-135	
13C-123678-HxCDD	104	40-135	
13C-1234678-HpCDD	87.4	40-135	
13C-OCDD	82.6	40-135	
13C-2378-TCDF	118	40-135	
13C-12378-PeCDF	107	40-135	
13C-23478-PeCDF	113	40-135	
13C-123478-HxCDF	97.4	40-135	
13C-123678-HxCDF	110	40-135	
13C-234678-HxCDF	108	40-135	
13C-123789-HxCDF	111	40-135	
13C-1234678-HpCDF	84.1	40-135	
13C-1234789-HpCDF	107	40-135	

CRS

37Cl4-2378-TCDD	95.1	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 2.71 pg/g

Analyst: JMH **Reviewed by: BS**

Section VI: Sample Tracking

ESN NORTHWEST, INC. Environmental Services Network

CHAIN-OF-CUSTODY RECORD

CLIENT: ESN Northwest
ADDRESS: 1210 Eastside Street SE, Suite 200, Olympia, WA 98501
PHONE: lab@esnnw.com
CLIENT PROJECT #:
PROJECT MANAGER:

DATE: 6-13-18 PAGE 1 OF 1
PROJECT NAME: Proposed Grays Harbor
LOCATION: IDD # 1 Site
COLLECTOR: ~~April Ky~~ Allison Kinney DATE OF COLLECTION: 6-13-18

Sample Number	Depth	Time	Sample Type	Container Type	TPH - HCID	TPH - Diesel & Oil	TPH - Gasoline	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos - PLM	GRO Suite	DRO Suite	WO Suite	Dioxin	NOTES	Total Number of Containers	Laboratory Note Number
1. TP12-1@12'	12'	1436	SOIL																			X			
2. TP17-2@8'	8'	1340																							
3. TP7-2@10'	10'	1257																							
4. TP17-1@4'	4'	1326																							
5. TP11-1@9'	9'	1020																							
6. TP5-1@10'	10'	1051																							
7. TP7-1@6'	6'	1220																							
8. TP2-1@12'	12'	850																							
9. TP3-1@6'	6'	922																							
10. TP6-1@12'	12'	1158																							
11.																									
12.																									
13.																									
14.																									
15.																									
16.																									
17.																									
18.																									

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
[signature]	6-18-18	[signature]	6/19/18 14:14
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

STD TAT

Turn Around Time: 24 HR 48 HR 5 DAY

Sample Receipt Check List Logged by: _____ (initials)

Ceres ID: 12148	Date/Time: 6/19/18 14:14
Client Project ID: Proposed Grays Harbor IDD #1 Site	Received Temp: 4.1 °C Acceptable: (Y) / N
Chain of Custody Relinquished by signed?	(Y) / N
Chain of Custody Received by signed?	(Y) / N
Custody Seals? Present?	Y / N
Intact?	Y / N
NA:	(NA)
Unlabeled / Illegible Samples	Y / (N)
Proper Containers:	(Y) / N
Preservation Acceptable (Chemical or Temperature)?	(Y) / N
Drinking Water, Sodium Thiosulfate present?	Y / N / (NA)
Residual Cl?	Y / N
Aqueous sample pH: NA	
List COC discrepancies: 6/19/18	
List Damaged Samples: 6/19/18	

Section VII: Qualifiers/Abbreviations

J	Concentration found below the lower quantitation limit but greater than zero.
B	Analyte present in the associated Method Blank.
E	Concentration found exceeds the Calibration range of the HRGC/HRMS.
D	This analyte concentration was calculated from a dilution.
X	The concentration found is the estimated maximum possible concentration due to chlorinated diphenyl ethers present in the sample.
H	Recovery limits exceeded. See cover letter.
*****	Results taken from dilution.
I	Interference. See cover letter.
Conc.	Concentration Found
DL	Calculated Detection Limit
ND	Non-Detect
% Rec.	Percent Recovery

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

June 29, 2018 Ceres ID: 12149

ESN Northwest, Inc.
1210 Eastside Street SE
Olympia, WA 98501

The following report contains the results for the six aqueous samples received on June 19, 2018. These samples were analyzed for tetra through octa chlorinated dibenzo-p-dioxins and dibenzofurans by EPA method 8290A. Routine turn-around time was provided for this work.

This work was authorized under the Project Name: Proposed Grays Harbor IDD #1 Site.

Continuing Calibration Verification (CCV) Requirements
All associated calibration verification standard(s) (CCV) met the acceptance criteria.

The "H" qualifier on the sample ID: MW/3 signifies that the percent recovery for an internal standard is below the method limits. The results were deemed acceptable due to the signal to noise for the internal standard chromatograph peaks being >10:1 and the detection limits calculated off of the internal standard were below the method lower calibration limit.

The report consists of a Cover Letter, Sample Inventory (Section I), Data Summary (Section II), Sample Tracking (Section VI), and Qualifiers/Abbreviations (Section VII). Raw Data (Section III), Continuing Calibration (Section IV), and Initial Calibration (Section V) are available in a full report (.pdf format) upon request.

If you have any questions regarding this report, please feel free to contact me at (916)932-5011.

Sincerely,

James M. Hedin
Director of Operations/CEO
jhedin@ceres-lab.com

Section I: Sample Inventory

Ceres Sample ID:	Sample ID	Date Received	Collection Date &Time
12149-001	MW-2	6/19/2018	6/13/2018 16:35
12149-002	MW-1	6/19/2018	6/13/2018 13:34
12149-003	MW-5	6/19/2018	6/13/2018 14:09
12149-004	MW-6	6/19/2018	6/13/2018 12:49
12149-005	MW-4	6/19/2018	6/13/2018 13:51
12149-006	MW/3	6/19/2018	6/13/2018 9:33

Section II: Data Summary

CERES Analytical Laboratory, Inc.
4919 Windplay Dr.Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Sample **Method Blank**		**Date Received:** NA
	QC Batch #: 1810	**Date Extracted:** 6/27/2018
	Matrix: Aqueous	**ZB-5MS Analysis:** 6/28/2018
Project ID: Proposed Grays Harbor IDD #1	**Sample Size:** 0.500 L	

Analyte	Conc. (pg/L)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 5.48	0.887	10.0		13C-2378-TCDD	82.5	40-135	
12378-PeCDD	DL= 8.62	2.56	50.0		13C-12378-PeCDD	75.9	40-135	
123478-HxCDD	DL= 9.39	3.08	50.0		13C-123478-HxCDD	58.0	40-135	
123678-HxCDD	DL= 8.87	5.29	50.0		13C-123678-HxCDD	72.6	40-135	
123789-HxCDD	DL= 8.89	13.1	50.0		13C-1234678-HpCDD	70.3	40-135	
1234678-HpCDD	DL= 17.6	5.15	50.0		13C-OCDD	59.5	40-135	
OCDD	DL= 34.8	8.50	100		13C-2378-TCDF	78.2	40-135	
2,3,7,8-TCDF	DL= 5.49	0.733	10.0		13C-12378-PeCDF	72.6	40-135	
12378-PeCDF	DL= 4.00	2.96	50.0		13C-23478-PeCDF	68.5	40-135	
23478-PeCDF	DL= 3.65	5.40	50.0		13C-123478-HxCDF	73.0	40-135	
123478-HxCDF	DL= 5.14	3.93	50.0		13C-123678-HxCDF	82.9	40-135	
123678-HxCDF	DL= 4.57	2.94	50.0		13C-234678-HxCDF	67.7	40-135	
234678-HxCDF	DL= 5.83	4.32	50.0		13C-123789-HxCDF	65.4	40-135	
123789-HxCDF	DL= 9.79	4.70	50.0		13C-1234678-HpCDF	69.1	40-135	
1234678-HpCDF	DL= 10.1	4.24	50.0		13C-1234789-HpCDF	64.8	40-135	
1234789-HpCDF	DL= 20.2	5.74	50.0					
OCDF	DL= 39.4	11.7	100					

Totals	Conc. (pg/L)	EMPC
Total TCDD	DL= 5.48	
Total PeCDD	DL= 8.62	
Total HxCDD	DL= 9.39	
Total HpCDD	DL= 17.6	
Total TCDF	DL= 5.49	
Total PeCDF	DL= 4.00	
Total HxCDF	DL= 9.79	
Total HpCDF	DL= 20.2	

CRS

37Cl4-2378-TCDD	70.7	40-135

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0 pg/L

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Quality Assurance Samples **Laboratory Control Samples**		**Date Received:** NA
	QC Batch #: 1810	**Date Extracted:** 6/27/2018
	Matrix: Aqueous	**ZB-5MS Analysis:** 6/28/2018
Project ID: Proposed Grays Harbour IDD #1	**Sample Size:** 0.500 L	

Analyte	LCS1 % Rec.	LCS2 % Rec.	%RSD
2,3,7,8-TCDD	103	104	0.68
12378-PeCDD	103	106	2.03
123478-HxCDD	113	106	4.52
123678-HxCDD	107	115	5.10
123789-HxCDD	123	121	1.16
1234678-HpCDD	104	108	2.67
OCDD	111	114	1.89
2,3,7,8-TCDF	98.8	98.4	0.29
12378-PeCDF	97.4	96.6	0.58
23478-PeCDF	95.8	89	5.20
123478-HxCDF	104	109	3.32
123678-HxCDF	98	98.8	0.57
234678-HxCDF	104	98.2	4.06
123789-HxCDF	107	99.8	4.92
1234678-HpCDF	98.2	99.2	0.72
1234789-HpCDF	99.6	103	2.37
OCDF	104	108	2.67

Labeled Standards	LCS1 % Rec.	LCS2 % Rec	Limits (a)
13C-2378-TCDD	102	99.5	40-135
13C-12378-PeCDD	107	105	40-135
13C-123478-HxCDD	74.2	78.1	40-135
13C-123678-HxCDD	83.7	86.2	40-135
13C-1234678-HpCDD	92.5	94.5	40-135
13C-OCDD	89.0	92.8	40-135
13C-2378-TCDF	105	110	40-135
13C-12378-PeCDF	96.9	96.4	40-135
13C-23478-PeCDF	86.8	97.0	40-135
13C-123478-HxCDF	93.8	90.1	40-135
13C-123678-HxCDF	103	103	40-135
13C-234678-HxCDF	87.3	87.8	40-135
13C-123789-HxCDF	77.9	82.6	40-135
13C-1234678-HpCDF	89.6	92.7	40-135
13C-1234789-HpCDF	86.7	86.8	40-135
CRS			
37Cl4-2378-TCDD	86.0	84.0	40-135

(a) Limits based on method acceptance criteria.

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: MW-2

Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12149-001	**Date Received:** 6/19/2018
	QC Batch #: 1810	**Date Extracted:** 6/27/2018
Date Collected: 6/13/2018	**Matrix:** Aqueous	**ZB-5MS Analysis:** 6/28/2018
Time Collected: 16:35	**Sample Size:** 0.484 L	**Q-225 Analysis:** NA

Analyte	Conc. (pg/L)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 4.99	0.887	10.3		13C-2378-TCDD	60.0	40-135	
12378-PeCDD	DL= 8.50	2.56	51.7		13C-12378-PeCDD	72.8	40-135	
123478-HxCDD	DL= 11.1	3.08	51.7		13C-123478-HxCDD	45.4	40-135	
123678-HxCDD	DL= 11.6	5.29	51.7		13C-123678-HxCDD	52.9	40-135	
123789-HxCDD	DL= 11.1	13.1	51.7		13C-1234678-HpCDD	52.5	40-135	
1234678-HpCDD	15.9	5.15	51.7	J	13C-OCDD	41.9	40-135	
OCDD	90.4	8.50	103	J	13C-2378-TCDF	61.9	40-135	
2,3,7,8-TCDF	DL= 6.53	0.733	10.3		13C-12378-PeCDF	70.2	40-135	
12378-PeCDF	DL= 7.20	2.96	51.7		13C-23478-PeCDF	62.2	40-135	
23478-PeCDF	DL= 7.67	5.40	51.7		13C-123478-HxCDF	53.7	40-135	
123478-HxCDF	DL= 5.40	3.93	51.7		13C-123678-HxCDF	60.2	40-135	
123678-HxCDF	DL= 5.07	2.94	51.7		13C-234678-HxCDF	52.8	40-135	
234678-HxCDF	DL= 5.44	4.32	51.7		13C-123789-HxCDF	48.6	40-135	
123789-HxCDF	DL= 9.85	4.70	51.7		13C-1234678-HpCDF	47.9	40-135	
1234678-HpCDF	DL= 9.41	4.24	51.7		13C-1234789-HpCDF	54.0	40-135	
1234789-HpCDF	DL= 14.2	5.74	51.7					
OCDF	DL= 26.2	11.7	103					

Totals	Conc. (pg/L)	EMPC
Total TCDD	DL= 4.99	
Total PeCDD	DL= 8.50	
Total HxCDD	DL= 11.6	
Total HpCDD	31.7	
Total TCDF	19.2	
Total PeCDF	DL= 7.67	
Total HxCDF	DL= 9.85	
Total HpCDF	DL= 14.2	

CRS			
37Cl4-2378-TCDD	125	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.

EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.

(a) - Lower control limit - Upper control limit

(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.186 pg/L

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: MW-1		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12149-002	**Date Received:** 6/19/2018
	QC Batch #: 1810	**Date Extracted:** 6/27/2018
Date Collected: 6/13/2018	**Matrix:** Aqueous	**ZB-5MS Analysis:** 6/28/2018
Time Collected: 16:35	**Sample Size:** 0.488 L	**Q-225 Analysis:** NA

Analyte	Conc. (pg/L)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 6.13	0.887	10.2	
12378-PeCDD	DL= 6.90	2.56	51.2	
123478-HxCDD	DL= 7.41	3.08	51.2	
123678-HxCDD	DL= 8.15	5.29	51.2	
123789-HxCDD	DL= 7.62	13.1	51.2	
1234678-HpCDD	DL= 11.0	5.15	51.2	
OCDD	DL= 28.2	8.50	102	
2,3,7,8-TCDF	DL= 4.21	0.733	10.2	
12378-PeCDF	DL= 7.18	2.96	51.2	
23478-PeCDF	DL= 7.20	5.40	51.2	
123478-HxCDF	DL= 5.65	3.93	51.2	
123678-HxCDF	DL= 5.15	2.94	51.2	
234678-HxCDF	DL= 5.72	4.32	51.2	
123789-HxCDF	DL= 9.11	4.70	51.2	
1234678-HpCDF	DL= 9.36	4.24	51.2	
1234789-HpCDF	DL= 13.6	5.74	51.2	
OCDF	DL= 18.5	11.7	102	

Totals	Conc. (pg/L)	EMPC
Total TCDD	DL= 6.13	
Total PeCDD	DL= 6.90	
Total HxCDD	DL= 8.15	
Total HpCDD	DL= 11.0	
Total TCDF	6.55	
Total PeCDF	DL= 7.20	
Total HxCDF	DL= 9.11	
Total HpCDF	DL= 13.6	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	65.9	40-135	
13C-12378-PeCDD	59.0	40-135	
13C-123478-HxCDD	47.5	40-135	
13C-123678-HxCDD	55.2	40-135	
13C-1234678-HpCDD	53.0	40-135	
13C-OCDD	44.2	40-135	
13C-2378-TCDF	74.2	40-135	
13C-12378-PeCDF	57.7	40-135	
13C-23478-PeCDF	55.2	40-135	
13C-123478-HxCDF	58.3	40-135	
13C-123678-HxCDF	66.0	40-135	
13C-234678-HxCDF	58.2	40-135	
13C-123789-HxCDF	54.4	40-135	
13C-1234678-HpCDF	50.0	40-135	
13C-1234789-HpCDF	52.8	40-135	

CRS			
37Cl4-2378-TCDD	124	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0 pg/L

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: MW-5

Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12149-003	**Date Received:** 6/19/2018
	QC Batch #: 1810	**Date Extracted:** 6/27/2018
Date Collected: 6/13/2018	**Matrix:** Aqueous	**ZB-5MS Analysis:** 6/28/2018
Time Collected: 16:35	**Sample Size:** 0.488 L	**Q-225 Analysis:** NA

Analyte	Conc. (pg/L)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 5.05	0.887	10.2	
12378-PeCDD	DL= 10.1	2.56	51.2	
123478-HxCDD	DL= 9.17	3.08	51.2	
123678-HxCDD	DL= 10.7	5.29	51.2	
123789-HxCDD	DL= 9.75	13.1	51.2	
1234678-HpCDD	DL= 15.0	5.15	51.2	
OCDD	DL= 21.1	8.50	102	
2,3,7,8-TCDF	DL= 4.02	0.733	10.2	
12378-PeCDF	DL= 6.32	2.96	51.2	
23478-PeCDF	DL= 5.83	5.40	51.2	
123478-HxCDF	DL= 5.81	3.93	51.2	
123678-HxCDF	DL= 4.79	2.94	51.2	
234678-HxCDF	DL= 5.79	4.32	51.2	
123789-HxCDF	DL= 8.58	4.70	51.2	
1234678-HpCDF	DL= 8.43	4.24	51.2	
1234789-HpCDF	DL= 13.3	5.74	51.2	
OCDF	DL= 18.8	11.7	102	

Totals	Conc. (pg/L)	EMPC
Total TCDD	DL= 5.05	
Total PeCDD	DL= 10.1	
Total HxCDD	DL= 10.7	
Total HpCDD	DL= 15.0	
Total TCDF	DL= 4.02	
Total PeCDF	DL= 6.32	
Total HxCDF	DL= 8.58	
Total HpCDF	DL= 13.3	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	80.4	40-135	
13C-12378-PeCDD	70.9	40-135	
13C-123478-HxCDD	55.5	40-135	
13C-123678-HxCDD	60.8	40-135	
13C-1234678-HpCDD	71.4	40-135	
13C-OCDD	61.8	40-135	
13C-2378-TCDF	87.2	40-135	
13C-12378-PeCDF	75.9	40-135	
13C-23478-PeCDF	75.9	40-135	
13C-123478-HxCDF	68.7	40-135	
13C-123678-HxCDF	78.1	40-135	
13C-234678-HxCDF	71.5	40-135	
13C-123789-HxCDF	71.6	40-135	
13C-1234678-HpCDF	66.6	40-135	
13C-1234789-HpCDF	70.3	40-135	

CRS

37Cl4-2378-TCDD	133	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0 pg/L

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: MW-6

Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12149-004	**Date Received:** 6/19/2018
	QC Batch #: 1810	**Date Extracted:** 6/27/2018
Date Collected: 6/13/2018	**Matrix:** Aqueous	**ZB-5MS Analysis:** 6/28/2018
Time Collected: 16:35	**Sample Size:** 0.487 L	**Q-225 Analysis:** NA

Analyte	Conc. (pg/L)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 6.77	0.887	10.3	
12378-PeCDD	DL= 9.87	2.56	51.3	
123478-HxCDD	DL= 19.6	3.08	51.3	
123678-HxCDD	DL= 20.3	5.29	51.3	
123789-HxCDD	DL= 19.5	13.1	51.3	
1234678-HpCDD	DL= 16.0	5.15	51.3	
OCDD	DL= 42.4	8.50	103	
2,3,7,8-TCDF	DL= 4.83	0.733	10.3	
12378-PeCDF	DL= 5.54	2.96	51.3	
23478-PeCDF	DL= 5.80	5.40	51.3	
123478-HxCDF	DL= 7.64	3.93	51.3	
123678-HxCDF	DL= 6.87	2.94	51.3	
234678-HxCDF	DL= 10.8	4.32	51.3	
123789-HxCDF	DL= 13.8	4.70	51.3	
1234678-HpCDF	DL= 10.8	4.24	51.3	
1234789-HpCDF	DL= 16.6	5.74	51.3	
OCDF	DL= 28.5	11.7	103	

Totals	Conc. (pg/L)	EMPC
Total TCDD	DL= 6.77	
Total PeCDD	DL= 9.87	
Total HxCDD	DL= 20.3	
Total HpCDD	DL= 16.0	
Total TCDF	DL= 4.83	
Total PeCDF	DL= 5.80	
Total HxCDF	DL= 13.8	
Total HpCDF	DL= 16.6	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	60.5	40-135	
13C-12378-PeCDD	58.4	40-135	
13C-123478-HxCDD	40.7	40-135	
13C-123678-HxCDD	47.3	40-135	
13C-1234678-HpCDD	53.0	40-135	
13C-OCDD	43.3	40-135	
13C-2378-TCDF	64.4	40-135	
13C-12378-PeCDF	59.5	40-135	
13C-23478-PeCDF	58.5	40-135	
13C-123478-HxCDF	61.3	40-135	
13C-123678-HxCDF	67.3	40-135	
13C-234678-HxCDF	48.2	40-135	
13C-123789-HxCDF	54.8	40-135	
13C-1234678-HpCDF	52.9	40-135	
13C-1234789-HpCDF	55.0	40-135	

CRS

37Cl4-2378-TCDD	130	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0 pg/L

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: MW-4		
Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12149-005	**Date Received:** 6/19/2018
	QC Batch #: 1810	**Date Extracted:** 6/27/2018
Date Collected: 6/13/2018	**Matrix:** Aqueous	**ZB-5MS Analysis:** 6/28/2018
Time Collected: 16:35	**Sample Size:** 0.491 L	**Q-225 Analysis:** NA

Analyte	Conc. (pg/L)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 6.96	0.887	10.2		13C-2378-TCDD	71.8	40-135	
12378-PeCDD	DL= 11.1	2.56	50.9		13C-12378-PeCDD	65.6	40-135	
123478-HxCDD	DL= 14.4	3.08	50.9		13C-123478-HxCDD	53.0	40-135	
123678-HxCDD	DL= 12.5	5.29	50.9		13C-123678-HxCDD	69.1	40-135	
123789-HxCDD	DL= 13.0	13.1	50.9		13C-1234678-HpCDD	61.1	40-135	
1234678-HpCDD	DL= 23.6	5.15	50.9		13C-OCDD	56.2	40-135	
OCDD	DL= 70.0	8.50	102		13C-2378-TCDF	84.0	40-135	
2,3,7,8-TCDF	DL= 4.39	0.733	10.2		13C-12378-PeCDF	65.0	40-135	
12378-PeCDF	DL= 9.79	2.96	50.9		13C-23478-PeCDF	69.5	40-135	
23478-PeCDF	DL= 8.78	5.40	50.9		13C-123478-HxCDF	64.7	40-135	
123478-HxCDF	DL= 8.73	3.93	50.9		13C-123678-HxCDF	75.8	40-135	
123678-HxCDF	DL= 7.62	2.94	50.9		13C-234678-HxCDF	69.3	40-135	
234678-HxCDF	DL= 8.36	4.32	50.9		13C-123789-HxCDF	63.8	40-135	
123789-HxCDF	DL= 14.5	4.70	50.9		13C-1234678-HpCDF	59.0	40-135	
1234678-HpCDF	DL= 16.8	4.24	50.9		13C-1234789-HpCDF	69.7	40-135	
1234789-HpCDF	DL= 22.1	5.74	50.9					
OCDF	DL= 59.1	11.7	102					

Totals	Conc. (pg/L)	EMPC
Total TCDD	DL= 6.96	
Total PeCDD	DL= 11.1	
Total HxCDD	DL= 14.4	
Total HpCDD	DL= 23.6	
Total TCDF	DL= 4.39	
Total PeCDF	DL= 9.79	
Total HxCDF	DL= 14.5	
Total HpCDF	DL= 22.1	

CRS			
37Cl4-2378-TCDD	134	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.
EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
(a) - Lower control limit - Upper control limit
(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0 pg/L

Analyst: JMH **Reviewed by: BS**

CERES Analytical Laboratory, Inc.
4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762

EPA Method 8290A

Client Sample ID: MW/3

Project ID: Proposed Grays Harbor IDD #1	**Ceres Sample ID:** 12149-006	**Date Received:** 6/19/2018
	QC Batch #: 1810	**Date Extracted:** 6/27/2018
Date Collected: 6/13/2018	**Matrix:** Aqueous	**ZB-5MS Analysis:** 6/28/2018
Time Collected: 16:35	**Sample Size:** 0.486 L	**Q-225 Analysis:** NA

Analyte	Conc. (pg/L)	MDL	RL	Qual.
2,3,7,8-TCDD	DL= 7.83	0.887	10.3	
12378-PeCDD	DL= 8.66	2.56	51.4	
123478-HxCDD	DL= 13.8	3.08	51.4	
123678-HxCDD	DL= 14.7	5.29	51.4	
123789-HxCDD	DL= 13.9	13.1	51.4	
1234678-HpCDD	DL= 20.1	5.15	51.4	
OCDD	DL= 57.4	8.50	103	
2,3,7,8-TCDF	DL= 8.56	0.733	10.3	
12378-PeCDF	DL= 10.0	2.96	51.4	
23478-PeCDF	DL= 8.95	5.40	51.4	
123478-HxCDF	DL= 7.05	3.93	51.4	
123678-HxCDF	DL= 6.62	2.94	51.4	
234678-HxCDF	DL= 7.48	4.32	51.4	
123789-HxCDF	DL= 15.1	4.70	51.4	
1234678-HpCDF	DL= 12.5	4.24	51.4	
1234789-HpCDF	DL= 26.3	5.74	51.4	
OCDF	DL= 47.4	11.7	103	

Totals	Conc. (pg/L)	EMPC
Total TCDD	DL= 7.83	
Total PeCDD	DL= 8.66	
Total HxCDD	DL= 14.7	
Total HpCDD	DL= 20.1	
Total TCDF	21.9	
Total PeCDF	DL= 10.0	
Total HxCDF	DL= 15.1	
Total HpCDF	DL= 26.3	

Labeled Standards	% R	LCL-UCL (a)	Qualifiers
13C-2378-TCDD	41.6	40-135	
13C-12378-PeCDD	47.6	40-135	
13C-123478-HxCDD	35.2	40-135	H
13C-123678-HxCDD	39.4	40-135	H
13C-1234678-HpCDD	42.1	40-135	
13C-OCDD	27.0	40-135	H
13C-2378-TCDF	46.4	40-135	
13C-12378-PeCDF	50.0	40-135	
13C-23478-PeCDF	46.2	40-135	
13C-123478-HxCDF	43.4	40-135	
13C-123678-HxCDF	50.0	40-135	
13C-234678-HxCDF	43.8	40-135	
13C-123789-HxCDF	35.7	40-135	H
13C-1234678-HpCDF	36.1	40-135	H
13C-1234789-HpCDF	29.2	40-135	H

CRS

37Cl4-2378-TCDD	133	40-135	

DL - Signifies Non-Detect (ND) at sample specific detection limit.

EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.

(a) - Lower control limit - Upper control limit

(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.

Total Toxic Equivalency (TEQ min.) (b)**:** 0.0 pg/L

Analyst: JMH **Reviewed by: BS**

Section VI: Sample Tracking

ESN NORTHWEST, INC | Environmental

CHAIN-OF-CUSTODY RECORD

ESN Northwest
1210 Eastside Street SE, Suite 200
Olympia, WA 98501

CLIENT: –
ADDRESS
PHONE: 360-459-4670 FAX: lab@esnnw.com
CLIENT PROJECT #: PROJECT MANAGER:

DATE: 6-13-18 / 6-14-18 PAGE 1 OF 1
PROJECT NAME: Proposed Grays Harbor
LOCATION: IDD #1 Site
COLLECTOR: April Ryckman DATE OF COLLECTION: 6-13-18

Sample Number	Depth	Time	Sample Type	Container Type	TPH - HCID	TPH - Diesel & Oil	TPH - Gasoline	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos - PLM	GRO Suite	DRO Suite	WO Suite	Dioxins			NOTES	Total Number of Containers	Laboratory Note Number
1. MW-2		1635	WATER																		X						
2. MW-1		1334	↓																		↓						
3. MW-5		1409																									
4. MW-6		1249																									
5. MW-4		1351																									
6. MW/3		933	↓																								
7.																											
8.																											
9.																											
10.																											
11.																											
12.																											
13.																											
14.																											
15.																											
16.																											
17.																											
18.																											

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
[signature]	6-18-18	[signature]	6/18/18 14:14
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

STD TAT

Turn Around Time: 24 HR 48 HR 5 DAY

Sample Receipt Check List Logged by: [illegible] (initials)

Ceres ID: 12149	Date/Time: 6/19/18 14:14
Client Project ID: Proposed Grays Harbor IOD #1 Site	Received Temp: 4.1 °C Acceptable: Y / N
Chain of Custody Relinquished by signed?	Y / N
Chain of Custody Received by signed?	Y / N
Custody Seals? Present?	Y / N
Intact?	Y / N
NA:	NA
Unlabeled / Illegible Samples	Y / N
Proper Containers:	Y / N
Preservation Acceptable (Chemical or Temperature)?	Y / N
Drinking Water, Sodium Thiosulfate present?	Y / N NA
Residual Cl?	Y / N
Aqueous sample pH: 7.2, 7.2, 7.1	
List COC discrepancies: MW-3 – MW-3	
List Damaged Samples:	

Section VII: Qualifiers/Abbreviations

J	Concentration found below the lower quantitation limit but greater than zero.
B	Analyte present in the associated Method Blank.
E	Concentration found exceeds the Calibration range of the HRGC/HRMS.
D	This analyte concentration was calculated from a dilution.
X	The concentration found is the estimated maximum possible concentration due to chlorinated diphenyl ethers present in the sample.
H	Recovery limits exceeded. See cover letter.
*****	Results taken from dilution.
I	Interference. See cover letter.
Conc.	Concentration Found
DL	Calculated Detection Limit
ND	Non-Detect
% Rec.	Percent Recovery

ESN NORTHWEST, INC. Environmental Services Network

CHAIN-OF-CUSTODY RECORD

CLIENT: ~~BHE~~ Berger ABAM

ADDRESS: 33301 9th Av. S. Suite 300 Federal Way, WA 98003

PHONE: 206 920 8307 FAX:

CLIENT PROJECT #: A17.0202.00 PROJECT MANAGER: Victoria England

DATE: 6/11/18 PAGE 1 OF 1

PROJECT NAME: Proposed Grays Harbor Potash Export Facility

LOCATION: IDD #1 SITE

COLLECTOR: April Ryckman 2818988709 DATE OF COLLECTION: 6/11/18

Sample Number	Depth	Time	Sample Type	Container Type	TPH - HCID	TPH - Diesel & Oil	TPH - Gasoline	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos - PLM	GRO Suite	DRO Suite	WO Suite	Dioxins	Cyanide	NOTES	Total Number of Containers	Laboratory Note Number
1. TP1-1@4'	4'	1045	Soil	VOA/Jar		X	X		X		X	X	X								X	X		5	
2. TP1-2@9'	9'	1108				X	X		X		X	X	X								X	X		5	
3. TP10-1@12'	12'	1300				X	X		X		X	X	X								X	X		6	
4. TP10-2@4'	4'	1315				X	X		X		X	X	X								X	X		6	
5. TP4-1@5'	5'	1345				X	X		X		X	X	X								X	X		6	
6. TP14-1@6.5'	6.5'	1520				X	X		X		X	X	X								X	X		6	
7. TP20-1@6'	6'	1615				X	X		X		X	X	X								X	X		6	
8. TP21-1@4.5'	4.5	1715				X	X		X		X	X	X								X	X		6	
9. TP15-1@5'	5'	1755				X	X		X		X	X	X								X	X		6	
10. TP4-2@12'	12'	1415				X	X		X		X	X	X								X	X		6	
11. MW-2@6'	6'	1030				X	X		X		X	X	X								X	X		5	
12. MW-1@6'	6'	1200				X	X		X		X	X	X								X	X		6	
13. MW-3@5'	5'	1810				X	X		X		X	X	X								X	X		6	
14. MW-3@10'	10'	1809				X	X		X		X	X											make the most of the material	2	
15. MW-4@5'	5'	1612				X	X		X		X	X	X								X	X		6	
16. MW-5@10'	10'	1345				X	X		X		X	X	X								X	X		6	
17. MW-6@6'	6'	1340	↓	↓		X	X		X		X	X	X								X	X		6	
18.																									

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
April Ryckman	6/11/18 1909	BRIAN BOWES	6/11/18
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

Turn Around Time: 24 HR 48 HR (5 DAY)

1210 Eastside Street SE, Suite 200
Olympia, Washington 98501
Phone: 360-459-4670
Fax: 360-459-3432
Website: www.esnnw.com
E-Mail: info@esnnw.com

ESN NORTHWEST, INC. | Environmental Services Network

CHAIN-OF-CUSTODY RECORD

CLIENT: Berger ABAM
ADDRESS: 33301 9th Ave. S. Federal Way, WA 98003
PHONE: 281 898 8709 FAX:
CLIENT PROJECT #: A17.0222.00 PROJECT MANAGER: Victoria England

DATE: 6/12/18 PAGE ____ OF ____
PROJECT NAME: Proposed Grays Harbor Potash Export Facility
LOCATION: IDD#1 Site
COLLECTOR: Allison Kinney DATE OF COLLECTION: 6/12/18

Sample Number	Depth	Time	Sample Type	Container Type	TPH - HCID	TPH - Diesel & Oil	TPH - Gasoline	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos - PLM	GRO Suite	DRO Suite	WO Suite	Dioxins	Cyanide	NOTES	Total Number of Containers	Laboratory Note Number
1. TP8-2@8'	8'	1453	Soil	VOA/Jar		X	X		X		X	X	X	X							X	X			6	
2. TP8-3@11'	11'	1514	↓	↓		X	X		X		X	X	X	X							X	X			↓	
3. TP9-1@6.5'	6.5'	1609				↓	↓		↓		↓	↓	↓	↓							X	X				
4. TP8-1@7'	7'	1432																			X	X				
5. TP13-1@12'	12'	1326																			X	X				
6. TP18-1@12'	12'	1243																			X	X				
7. TP24-2@10'	10'	947																			X	X				
8. TP25-1@5.5'	5.5'	1017																			X	X				
9. TP19-1@5'	5'	1140																			X	X				
10. TP23-1@6'	6'	827																			X	X				
11. TP22-1@6'	6'	750																			X	X				
12. TP24-1@5.5'	5.5'	919	↓	↓		↓	↓		↓		↓	↓	↓	↓							X	X			↓	
13. TP16-1@5.5'	5.5'	1700				X	X		X		X	X	X	X							X	X			6	
14.																										
15.																										
16.																										
17.																										
18.																										

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
	6/14/18 1415		6/14/18 1415
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
	6/14/18 1415	Jennifer Arnold	6-14-18

SAMPLE RECEIPT
TOTAL NUMBER OF CONTAINERS
CHAIN OF CUSTODY SEALS Y/N/NA
SEALS INTACT? Y/N/NA
RECEIVED GOOD COND./COLD
NOTES:

LABORATORY NOTES:

Turn Around Time: 24 HR 48 HR (5 DAY)

1210 Eastside Street SE, Suite 200
Olympia, Washington 98501
Phone: 360-459-4670
Fax: 360-459-3432
Website: www.esnnw.com
E-Mail: info@esnnw.com

ESN NORTHWEST, INC. | Environmental Services Network

CHAIN-OF-CUSTODY RECORD

CLIENT: BergerABAM

ADDRESS: 33301 9th Ave S. Federal Way WA 98003

PHONE: 281 898 8709 FAX:

CLIENT PROJECT #: A17.0202.00 PROJECT MANAGER: Victoria England

DATE: 6·13·18 PAGE 1 OF 1

PROJECT NAME: Proposed Grays Harbor Potash Export Facility

LOCATION: IDD #1 site

COLLECTOR: Allison Kinney DATE OF COLLECTION: 6·13·18

Sample Number	Depth	Time	Sample Type	Container Type	TPH - HCID	TPH - Diesel & Oil	TPH - Gasoline	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos - PLM	GRO Suite	DRO Suite	WO Suite	Dioxins	Cyanide	NOTES	Total Number of Containers	Laboratory Note Number
1. TP12-1@12'	12'	1456	Soil	VOA/JAR		X	X			X		X	X		X							X	X		6	
2. TP17-2@8'	8'	1340				X	X			X		X	X		X							X	X		6	
3. TP7-2@10'	10'	1257				X	X			X		X	X		X							X	X		6	
4. TP17-1@4'	4'	1326				X	X			X		X	X		X							X	X		6	
5. TP11-1@9'	9'	1020				X	X			X		X	X		X							X	X		6	
6. TP5-1@10'	10'	1051				X	X			X		X	X		X							X	X		6	
7. TP7-1@6'	6'	1220				X	X			X		X	X		X							X	X		6	
8. TP2-1@12'	12'	850				X	X			X		X	X		X							X	X		6	
9. TP3-1@6'	6'	922				X	X			X		X	X		X							X	X		6	
10. TP6-1@12	12'	1138	↓	↓		X	X			X		X	X		X							X	X		6	
11.																										
12.																										
13.																										
14.																										
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16.																										
17.																										
18.																										

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
[signature]	6/14/18 1415	[signature]	6/14/18 1415
[signature]	6/14/18 1415	[signature] 6/14/18	

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

Turn Around Time: 24 HR 48 HR 5 DAY

1210 Eastside Street SE, Suite 200
Olympia, Washington 98501
Phone: 360-459-4670
Fax: 360-459-3432
Website: www.esnnw.com
E-Mail: info@esnnw.com

ESN NORTHWEST, INC. | Environmental Services Network

CHAIN-OF-CUSTODY RECORD

CLIENT: Berger ABAM

ADDRESS: 33301 9th Ave. S. Federal Way, WA 98003

PHONE: 281 8988709 FAX:

CLIENT PROJECT #: A17.0202.00 PROJECT MANAGER: Victoria England

DATE: 6/13/18 + 6/14/18 PAGE OF

PROJECT NAME: Proposed Grays Harbor Potash Export Facility

LOCATION: IDD #1 site

COLLECTOR: April Ryckman DATE OF COLLECTION:

Sample Number	Depth	Time	Sample Type	Container Type	TPH - HCID	TPH - Diesel & Oil	TPH - Gasoline	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos - PLM	GRO Suite	DRO Suite	WO Suite	DIOXINS	CYANIDE	NOTES	Total Number of Containers	Laboratory Note Number
1. MW-2		1635	water		X	X			X		X	X		X							A	X		Filter RCRA 8 metals	7	
2. MW-1		1334	↓		X	X			X		X	X		X							X	X		Filter in lab	7	
3. MW-5		1409			X	X			X		X	X		X							X	X		+ preserve	7	
4. MW-6		1249			X	X			X		X	X		X							X	X			7	
5. MW-4		1351			X	X			X		X	X		X							X	X		IF MW-2 too	7	
6. MW13		933			X	X			X		X	X		X							X	X		turbid please	7	
7.																								Filter before		
8.																								running analyses'		
9.																										
10.																								MW-3 taken on		
11.																								6-14-18		
12.																										
13.																										
14.																										
15.																										
16.																										
17.																										
18.																										

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
April Ryckman	6/14/18 1415	Jennifer Elwood	6-14-18
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

Turn Around Time: 24 HR 48 HR 5 DAY

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