ecology and environment, inc.
Global Environmental Specialists
720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

November 8, 2019

Mr. Brooks Stanfield, On-Scene Coordinator
United States Environmental Protection Agency, Region 10
1200 Sixth Avenue, Suite 155, 13-J07
Seattle, Washington 98101

Re: 2019 Removal Site Evaluation Report
Former Kaiser Smelter Site, Mead, Washington
Contract Number: EP-S7-13-07, Task Order: 0066

Dear Mr. Stanfield:

Enclosed please find the final 2019 Removal Site Evaluation Report for the Former Kaiser Smelter Site, which is located in Mead, Washington. If you have any questions regarding this submittal, please call Valerie Cramer or me at (206) 624-9537.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Steven G. Hall
START-IV Removal Team Leader

cc: Jeffrey Fowlow, On-Scene Coordinator, US EPA, Seattle, Washington
Valerie Cramer, START-IV Engineer, E & E, Seattle, Washington

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Former Kaiser Smelter Site

2019 Removal Site Evaluation Report

Mead, Washington

Contract Number EP-S7-13-07
Task Order: 0066

November 2019

Prepared for:

United States Environmental Protection Agency
1200 Sixth Avenue
Seattle, Washington 98101

Prepared by:

Ecology and Environmental, Inc.
720 Third Avenue, Suite 1700
Seattle, Washington 98104

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List of Abbreviations and Acronyms

Abbreviation	Definition
%	percent
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
ACM	asbestos containing material
AST	aboveground storage tank
CSL	Washington State Freshwater Sediment – Cleanup Screening Level
E & E	Ecology and Environment, Inc.
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ERRS	Emergency and Rapid Response Services (ERRS)
H	estimated quantity with high bias
IRS	IRS Environmental
Landau	Landau Associates
J	estimated quantity
K	estimated quantity with unknown bias
L	estimated quantity with low bias
MTCA	Model Toxic Control Act
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NWTPH-Dx	Diesel-Range Organics
NWTPH-Gx	Gasoline-Range Organics
OSC	On-Scene Coordinator
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PLM	Polarized Light Microscopy
pg/L	picograms per liter
ppm	parts per million
Q	Detected concentration is below the method reporting limit, but is above the method quantitation limit
QA	Quality Assurance
QC	Quality Control
RSE	Removal Site Evaluation
RML	Removal Management Level
SCO	Washington State Freshwater Sediment – Sediment Cleanup Objective
Site	Former Kaiser Smelter Plant Site
SSDMP	Site Specific Data Management Plan
SSSP	Site Specific Sampling Plan
START	Superfund Technical Assessment and Response Team

List of Abbreviations and Acronyms (cont.)

SVOCs	Semivolatile Organic Compounds
TAL	Target Analyte List
TSI	Thermal System Insulation
U	Not detected above reported sample quantitation limit
VOCs	Volatile Organic Compounds

1 Introduction

Ecology and Environment, Inc. (E & E) was tasked by the United States Environmental Protection Agency (EPA) to perform a Removal Site Evaluation (RSE) at the Former Kaiser Smelter Plant (site). The Site is located in Mead near the city of Spokane, Washington. E & E completed the RSE activities under Task Order 30, which was issued under EPA Region 10 Superfund Technical Assessment and Response Team (START)-IV Contract number EP-S7-13-07.

Previous site investigations conducted by environmental consultants and the Washington State Department of Ecology (Ecology) have identified the Site as a potential source of polychlorinated biphenyls (PCBs) migrating from the former facility to surface water in nearby Deadman Creek.

The specific goals and objectives for the RSE were to conduct a limited assessment by determining the presence and concentration of hazardous substances in the following decision areas, as directed by the On-Scene Coordinator (OSC):

- Document the presence of and characterize the Robertson Protective Metal siding (also referred to as Galbestos; see Section 2.4) on facility buildings.
- Confirm the presence of PCBs in soils, sediment, and surface water along pathways from the former facility to Deadman Creek.
- Collect soil, sediment, debris, building material, bulk building material, loose material and product, and surface water sampling.
- Provide estimated quantities of hazardous substances.

To complete the RSE, START reviewed site information, coordinated the field event to collect samples for laboratory analysis, interpreted the analytical results, calculated estimated volumes for various materials, and produced this report. This RSE Report is organized as follows:

- Section 1, Introduction: Authority for performance of this work, goals for the project, and summary of the report contents;
- Section 2, Site Description and Background: Includes a description of the site's background and location, followed by a summary of previous site investigations;
- Section 3, 2019 Field Sampling Event: Sampling of bulk building material, building siding material, loose material and product, soil, sediment, debris, and surface water;

- Section 4, RSE Results: Presentation of laboratory data;
- Section 5, Quality Assurance/Quality Control (QA/QC): Discussion of the QA/QC procedures employed for the project;
- Section 6, Summary and Conclusions: Describes activities performed during the RSE and summarizes the results; and
- Section 7, References: An alphabetical listing of references cited throughout the text.

2 Site Description and Background

This section describes the background of the Site including location, description, and previous investigations.

2.1 Site Location

Site Name:	Former Kaiser Smelter Plant
SEMS Identification Number:	WAN001020091
Latitude:	47.755202
Longitude:	-117.378674
Legal Description:	Township 26N, Range 43E, Section 10
County:	Spokane County
Site Owners:	• Spokane Recycling LLC (former facility and effluent outlet) • Kaiser Aluminum Investments Company (settling ponds and undeveloped land)

2.2 Site Description & Background

The Former Kaiser Smelter Plant is located on East Hawthorne Road in Mead, Washington, approximately 8 miles north of downtown Spokane, Washington (Figure 2-1). The facility was an aluminum smelter plant on approximately 170 acres and is zoned for heavy industrial use. The facility contains several large industrial buildings, a baghouse, administrative buildings, a network of stormwater catch basins, two settling ponds, sumps, storage tanks, a rail spur, and other facility operational areas. The smelter plant began operations in 1942 during World War II and closed in 2000 (Ecology 2002).

The vicinity of the site is comprised of a mix of residential, educational, commercial, and industrial development.

The closest surface water body is Deadman Creek, which is located approximately 1.5 miles north of the site's industrial buildings (Figures 2-2 and 2-3). Deadman Creek is a tributary of the Little Spokane River, which subsequently flows into the Spokane River.

The former facility has a system of catch basins and storm sewers to collect and divert stormwater through an aqueduct flowing north from the facility to a pair of settling ponds. The water flows into the southern end of the lower settling pond. At the northern end of the lower pond, a pipe transfers the water through a second aqueduct to the effluent outfall and discharges into Deadman Creek.

The former smelter plant is divided into separate parcels. The former smelter facility and the effluent outfall (located to the north by Deadman Creek) have been sold to at least three separate owners, with the current owner being Spokane Recycling Company LLC. The undeveloped 425-acre parcel with the settling ponds was acquired by Kaiser Aluminum and Chemical Corporation from the United States of America in 1976. The parcel was subsequently conveyed to Kaiser Aluminum Fabricated Products, LLC in 2006 and finally Kaiser Aluminum Investments Company in 2010 (Figure 2-2).

A portion of the former smelter plant was placed on the National Priorities List (NPL) in 1983. This NPL site, known as the Kaiser Aluminum – Mead Works Potliner Superfund Cleanup Site, is owned by a trust, which is responsible for carrying out a long-term remedy that is being overseen by Ecology. The NPL site consists of spent potlining solid waste, a 25-acre wet scrubber sludge bed, and a plume of groundwater contaminated with cyanide and fluoride (Ecology 2002).

In September 2018, EPA conducted a site walk at the site. EPA observed potential sources of contamination including unsecured aboveground storage tanks labeled as containing coal tar pitch, damaged suspect asbestos-containing material (ACM) thermal system insulation (TSI) on facility pipes, and unknown drums/containers and material piles within the Green Mill Building. Several unsecured electrical transformers were observed inside the rectifier building.

2.3 Previous Investigations

Several parties have performed environmental investigations at the Site, and summaries of these investigations, based on the available information, are provided below. A review of the background and investigation history for the NPL site located on the facility was not included in the RSE scope of work.

2010 Due Diligence Investigations

In June 2010, environmental consultant Landau Associates (Landau) conducted a due diligence investigation on behalf of Commercial Development Corporation, Inc. The Landau report also referred to a "due diligence investigation" of the property that was conducted on behalf of a potential buyer by environmental consulting firm TRC in April 2010. The complete TRC report was not available, but results from their investigation in the form of data summary tables and a site figure were included with the Landau report.

The TRC data indicated that the PCBs Aroclor 1248 and/or 1260[1] were present in a number of soil and sediment samples collected from the site. Additionally, the TRC data indicated that the siding material present on facility buildings (labeled as "Galbestos" in both the TRC and Landau information; see section 2.4) contained both PCBs and asbestos. The TRC data also indicates that other contaminants and hazardous substances, including diesel-range organics and polycyclic aromatic hydrocarbons (PAHs), were present in catch basin sediments at the facility.

During the Landau investigation, sediment samples were collected from lined catch basins by the potline buildings, the clarifier pond, and two settling ponds. All samples collected contained detectable concentrations of the PCB Aroclor 1268 including the lower pond (4,170 to 6,600 micrograms per kilogram [µg/kg]), upper pond (1,960 to 6,260 µg/kg), and catch basin sediment (404 to 428,000 µg/kg). Landau also collected samples of the building siding, which contained the PCB Aroclor 1268 at concentrations ranging from 33,300,000 to 71,900,000 µg/kg.

2015 Asbestos Abatement Cost Estimate

In June 2015, the asbestos abatement contractor IRS Environmental (IRS) completed a cost estimate of the known asbestos throughout the facility. The IRS Environmental proposal refers to over 30 facility buildings and structures that contain ACM. To remove and dispose of the known asbestos, IRS estimated a cost of $2.3 million (IRS, 2015).

2018 Ecology Sediment and Surface Water Sampling

Subsequent sampling activities performed by Ecology's National Pollution Discharge Elimination System (NPDES) program staff starting in March 2018 have also confirmed the presence of PCBs in sediments in stormwater catch basins, the two settling ponds, and water discharging from the stormwater outlet into Deadman Creek. Ecology reported total PCB concentrations in surface water as high as 236,000 picograms per liter (pg/L) at the stormwater outfall to the lower settling pond, while surface water concentrations in the lower settling pond were 44,300 pg/L. PCB concentrations in surface water collected at the outfall to Deadman Creek were 7,460 pg/L.

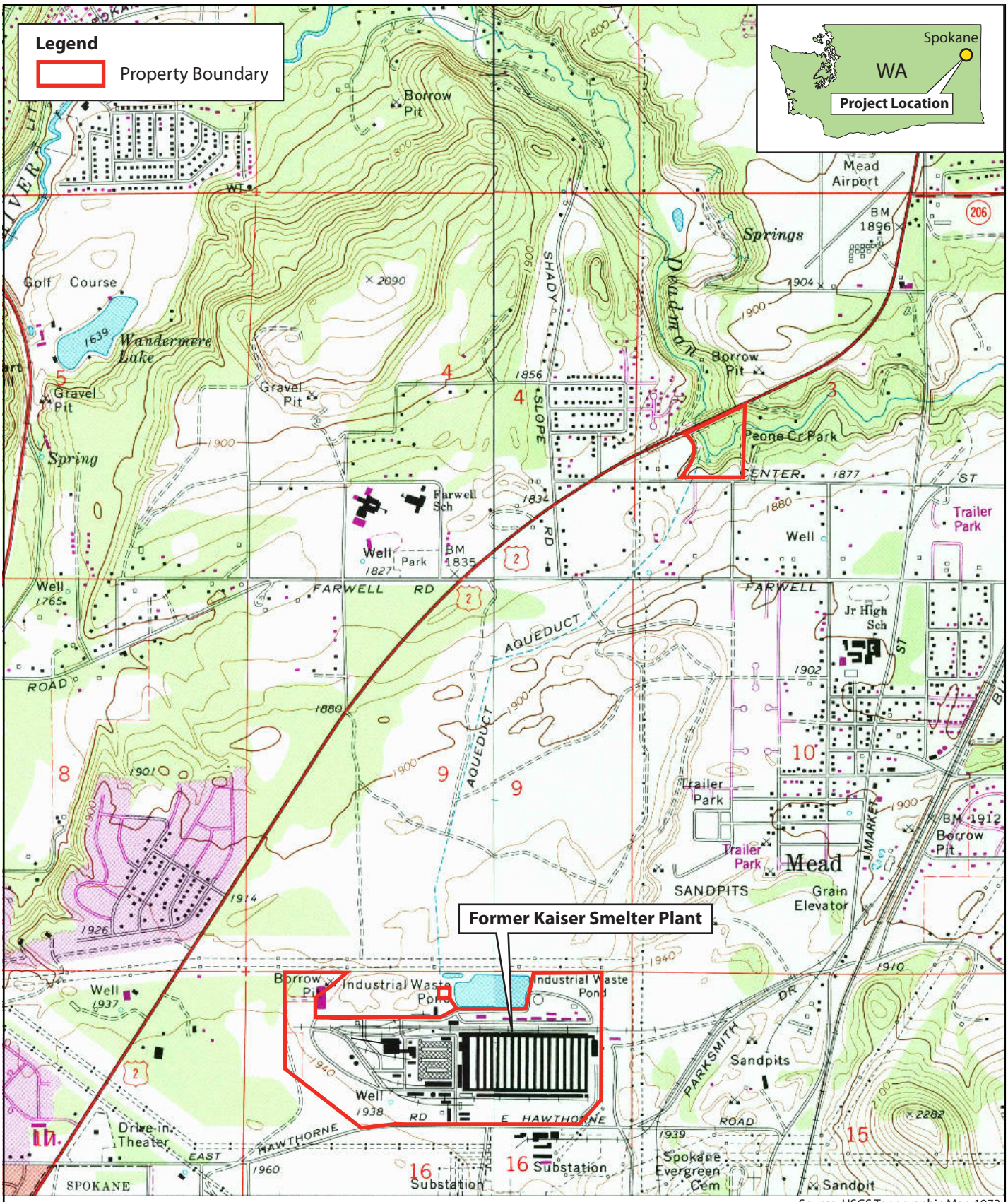
Ecology compared the surface water results to the Model Toxics Control Act (MTCA) human health screening level for fresh water in the Spokane River Basin (7 pg/L) and the Spokane Tribe of Indians human health screening level for fresh water in the Spokane River Basin (1.3 pg/L). The total PCBs concentrations in surface water were several orders of magnitude greater than these screening levels.

[1] It's not clear from the available data whether Aroclor 1268 was included in the TRC analyses. Some laboratory PCB reporting lists do not include Aroclor 1268, and PCBs matching the pattern of Aroclor 1268 are sometimes reported as Aroclor 1248 or Aroclor 1260.

2.4 Siding on Facility Buildings

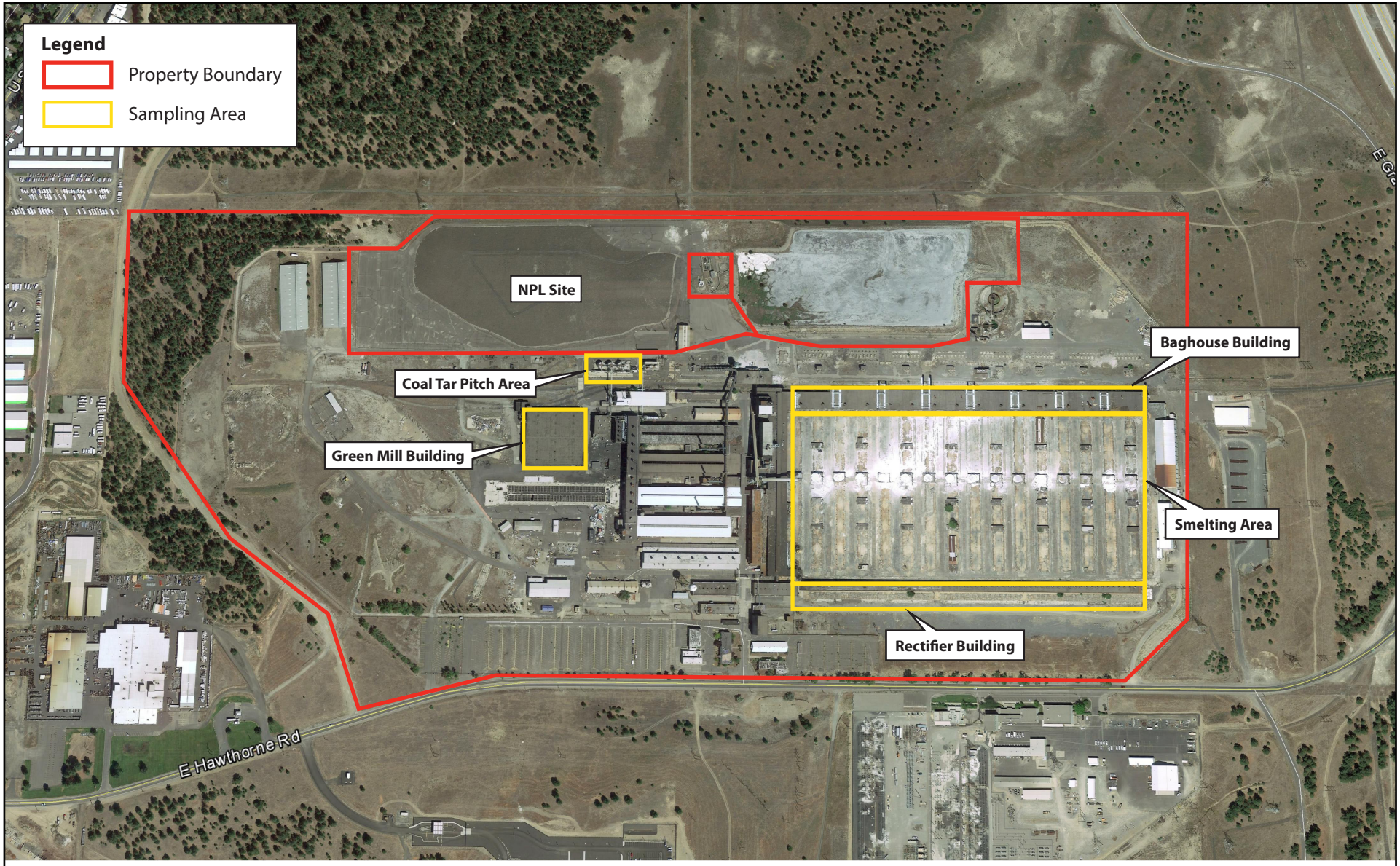
Many of the facility buildings are composed of a weatherproof siding material that contains PCBs and asbestos. Galbestos is a trademark name for one such metal sheeting product, with asbestos felt on both sides, coated with either bitumen or polyester resin. During previous environmental investigation reports, the siding material at the facility was referred to as "Galbestos."

However, following the 2019 field sampling event, EPA learned that the siding material installed at the facility was not actually the Galbestos brand name and instead was a similar material manufactured under the brand name "Robertson Protective Metal Siding" (Robertson siding). Robertson siding was previously manufactured by H.H. Robertson Company. It is a coated metal sheet that was used for a wide range of metal wall and roof applications from the 1910s to the 1970s. It consisted of a steel sheet with three protective coatings. The first coating consisted of a thick envelope of asphaltic protective coating, known to contain PCBs. The second layer is an asphalt-saturated heavy asbestos felt. It is rolled onto the first coat and permanently bonded under pressure and heat. The final coating is an application of a waterproof sealing coat (H.H. Robertson CO., 1925). For the remainder of this report, the building siding material will be referred to as Robertson siding.



ecology and environment, inc. Global Environmental Specialists	Former Kaiser Smelter Plant Removal Assessment Mead, WA	**Site Location**	Figure 2-1

ecology and environment, inc. Global Environmental Specialists	Former Kaiser Smelter Plant Removal Assessment Mead, WA	**Site Vicinity Map**	Figure 2-2



Source: Google Earth Pro 2018

SCALE

0 500 1,000 Feet

ecology and environment, inc. Global Environmental Specialists	Former Kaiser Smelter Plant Removal Assessment Mead, WA	**Site Detail Overview**	Figure 2-3

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3 May 2019 Field Sampling Event

Prior to the May 2019 EPA Field Sampling Event, a Site Specific Sampling Plan (SSSP) and a Site Specific Data Management Plan (SSDMP) were prepared to document planned sampling activities (E & E 2019a, E & E 2019b). The SSSP described the sampling strategy, sampling methodology, and analytical parameters used to investigate the Site. The SSDMP provided guidance for data collection by field personnel and subsequent data management activities. Photographs of the Site during the 2019 field sampling activities are presented in Appendix A.

Previous investigations have shown elevated concentrations of PCBs in the building siding, soil, sediment in catch basins and settling ponds, and surface water at the effluent outfall at the stream. During the 2019 field sampling event, site observation and sampling efforts were conducted to verify the presence of contamination and the potential for contaminant migration.

EPA and START personnel mobilized to the site on May 19, 2019. Work was conducted from May 20 to May 23, 2019, and site personnel demobilized on May 24, 2019.

EPA was represented on site by two OSCs and four START personnel. On May 20, a representative from Ecology accompanied EPA and START on a site walk to previous sampling locations at the settling ponds and effluent outfall. Additionally, the Kaiser Aluminum Environmental Engineering Manager met with EPA at the settling ponds on May 20 to discuss the history and previous activities during Kaiser Aluminum operations. On May 21, the current property owner of the former facility, (i.e., the owner of Spokane Recycling), met with EPA to discuss the field sampling activities at the site.

3.1 Sampling Activities

EPA and START conducted a limited field sampling event of the former facility. The scope of the site assessment was to evaluate the potential presence and/or release of hazardous substances at the former facility. Activities performed included sampling of surface water, sediment, soil, waste and product, suspect ACM, and building materials.

The sampling strategy was designed to fulfill the project-specific objectives by collecting environmental samples at locations that were biased toward those areas that are most likely to be contaminated. As appropriate, grass, leaves, other

vegetative material, rocks, and other debris unsuitable for analysis were removed from samples before being placed into sample containers. Samples of soil, surface water, and groundwater were stored on ice in coolers continuously maintained under the custody of START personnel. Sampling methods used for each sample type are described below.

In addition to sampling activities, START also documented general field conditions at the facility and calculated estimated quantities and volumes for some of the primary suspect waste materials and sources. The following paragraphs describe additional details regarding the May 2019 Field Sampling Event. The samples are described in Table 3-1, and the sample locations are shown on Figures 3-1 and 3-2.

3.1.1 Suspect ACM Sampling

START conducted a limited ACM survey of common and/or damaged suspect materials. Bulk samples of suspect ACM were collected at eight locations throughout the Former Smelter Plant facility (Figure 3-1). The suspect materials that were sampled included damaged and friable piping TSI in the Baghouse Building, Coal Tar Tank Farm, near the Green Mill Building, and on exterior piping; an unknown white, chalky rectangular object in the Baghouse Building; and a piece of non-suspect TSI in the Baghouse Building.

The Robertson siding is another type of ACM that is located throughout the facility. Sampling activities for the Robertson siding are discussed in the next section.

Samples were collected using hand tools to separate or obtain a portion of the suspect ACM to be provided to the project laboratory. All samples were placed in clean, dedicated sampling baggies and labeled with a sampling number.

Samples were submitted for the following analysis:

- Asbestos by Polarized Light Microscopy (PLM) – EPA/600/R-93/116

The subcontract laboratory for the suspect ACM samples was:

- EMSL Analytical, Inc in Cinnaminson, NJ

3.1.2 Robertson Siding Sampling

Robertson siding bulk samples were collected at eight locations throughout the Former Smelter Plant facility (Figure 3-1). Samples were collected from the siding of buildings (exterior and/or interior) at the Baghouse Building, the Green Mill Building, and Building 60.

Similar to the suspect ACM samples described in Section 3.1.1, the Robertson siding samples were collected using hand tools to separate or obtain a portion of the suspect ACM to be provided to the project laboratory. All samples were placed in clean, dedicated sampling baggies and labeled with a sampling number.

Samples were submitted for the following analysis:

- PCBs – EPA Method 1668 (two of eight samples)
- PCBs – EPA Method 8082 (six of eight samples)
- Asbestos by PLM – EPA/600/R-93/116 (eight samples)

The subcontract laboratory for samples analyzed for PCBs by EPA Method 1668 was:

- TestAmerica (Knoxville) Laboratory in Knoxville, TN

The subcontract laboratory for samples analyzed for PCBs by EPA Method 8082 was:

- Eurofins Lancaster Laboratories in Lancaster, PA

The subcontract laboratory for samples analyzed by suspect ACM was:

- EMSL Analytical, Inc in Cinnaminson, NJ

3.1.3 Material and Products Sampling

During field activities, several piles of materials, products, and wastes, including green coke, baghouse dust, alumina, coal tar, and transformers, were observed at the facility. These materials and products were sampled during the field event (Figure 3-1).

Green Coke Piles

Raw "green" petroleum coke is often referred to as green coke, which means it is unprocessed. The type of green coke used in aluminum smelting facilities is anode grade coke. The anode grade coke is an essential input to produce calcined coke, which is then used in the production of aluminum. Green coke is marketed to have potential value and demand in aluminum and steel industries (Transparency Market Research, June 2018).

Within the Green Mill Building, there were numerous piles of material labeled as "Green Coke" that were remnants from when the facility was active. The material is no longer being used and appears to have been abandoned. This stored material is contained in drums, buckets, boxes, piles of loose material, on the pathway, and outside. START collected four grab samples from different green coke piles. All of the samples were analyzed for PCBs, Target Analyte List (TAL) metals, and semivolatile organic compounds (SVOCs). To see if the material has potential commercial value, one sample was additionally analyzed for pH, total carbon, and total sulfur.

Samples were submitted for the following analysis:

- PCBs – EPA Method 8082
- TAL Metals – EPA Method 6020
- SVOCs – EPA Method 8270D
- Total Carbon, Total Sulfur, pH

The subcontract laboratory for the samples was:

- Eurofins Lancaster Laboratories in Lancaster, PA

Baghouse Dust

Baghouse dust is generated from particulate air emissions in aluminum smelter facilities. The dust is collected in pollution control devices and dust collectors though a wide range of potential emission sources. Baghouse dust is recommended to be disposed in a landfill environment using synthetic liner system with leachate collection (EPA, 2015).

Within and nearby the Baghouse Building, there were numerous piles of baghouse dust and fines. EPA and START observed several large piles of baghouse dust at the site. Connected to the Baghouse Building, Building 35 contained a large loose pile of baghouse dust on the ground. There was no secondary containment and it was exposed to weather outside from missing windows and doors. Located outside to the north of the Baghouse Building, there was a large loose pile of baghouse dust on the ground. This pile was fully exposed to the weather with no secondary containment or shelter. Another smaller baghouse dust pile was located in the Baghouse Building. START collected three grab samples of the baghouse dust from these piles.

Samples were submitted for the following analysis:

- PCBs – EPA Method 8082
- TAL Metals – EPA Method 6020
- SVOCs – EPA Method 8270D

The subcontract laboratory for the samples was:

- Eurofins TestAmerica Seattle in Tacoma, WA

Potline Area

Alumina is used as a starting material to produce metallic aluminum. Alumina is marketed to have potential value and demand in aluminum industries. To the south of the Baghouse Building, there are remnants of the former 15 potline areas. During the 2019 field sampling event, each of the 15 remnants of the former potline area was observed to contain a large pile of alumina material. START collected one grab sample of the alumina material.

The sample was submitted for the following analysis:

- TAL Metals – EPA Method 6020

The subcontract laboratory for the samples was:

- Eurofins TestAmerica Seattle in Tacoma, WA

Coal Tar Tanks

Coal tar is a byproduct from steel production. It is converted into coal tar pitch and used in the production process for aluminum smelting. There were three coal tar aboveground storage tanks (ASTs). The maximum capacity of each tank is

2,300 cubic yards or 100,000 gallons. One of the three ASTs had an open access port where coal tar could be observed inside and falling outside of the tank. Visible coal tar was on the ground within and outside the secondary containment and exposed to weather conditions. EPA and START did not open the remaining two ASTs. START collected one grab sample of the coal tar from the AST with the open door.

The sample was submitted for the following analysis:

- PCBs – EPA Method 8082
- TAL Metals – EPA Method 6020
- SVOCs – EPA Method 8270D

The subcontract laboratory for the samples was:

- Eurofins Lancaster Laboratories in Lancaster, PA

Transformers

Transformer oil or dielectric fluid is an oil that is stable at high temperatures and has electrical insulating properties. Although PCBs are no longer commercially produced in the United States, there may be PCBs in dielectric fluid in transformers before the 1979 PCB ban.

During the 2018 Site Walk, EPA observed several transformers in the Rectifier Building. At the 2019 Field Sampling Event, EPA and START observed five transformers. Four of the five transformers contained dielectric fluid while the fifth transformer was empty. Due to limited access and safety concerns, only three of the transformers were sampled for dielectric fluids. A field screening tests, using Dexsil Clor-N-Oil kits, were conducted to identify the presence of PCBs above or below concentrations of 50 parts per million (ppm). All three field screening tests indicated potential PCBs concentrations were below 50 ppm.

The three transformer samples were then submitted for the following analysis:

- PCBs – EPA Method 8082

The subcontract laboratory for the samples was:

- Eurofins TestAmerica Seattle in Tacoma, WA

3.1.4 Sediment and Soil Sampling at the Former Facility

Soil and sediment samples were collected along potential PCB migration pathways from the facility buildings with Robertson siding to the facility stormwater catch basins (Figure 3-1). At the former facility, sample locations were in areas with exposed soil and sediment, except for one sample. This sample was collected along the exterior of the Baghouse Building where dust and debris had settled onto the ground. In total, one soil sample, one debris sample, and four sediment samples were collected at the former facility.

Soil and debris samples were collected using dedicated stainless steel spoons. Collected material was placed in a dedicated stainless steel bowl, thoroughly homogenized, and placed into a pre-labeled container.

To collect sediment samples from the catch basins, EPA and START removed the catch basin grates and carefully folded back the protected fabric. Using a long pole, sediment samples were collected with unpreserved, sample-specific 1-liter high density polyethylene containers. The sediment was transferred to a dedicated stainless steel bowl, thoroughly homogenized, and placed into a pre-labeled container. All samples were analyzed for PCBs, TAL metals, and SVOCs, while one sample was also analyzed for volatile organic compounds (VOCs), gasoline-range organics (NWTPH-Gx), and diesel-range organics (NWTPH-Dx). The NWTPH-Gx and VOC aliquots were removed directly from the sampling locations using a 5-gram Core N' One (or equivalent) sampler prior to homogenization.

Samples were submitted for the following analysis:

- PCBs – EPA Method 8082 (six samples)
- TAL Metals – EPA Method 6020 (six samples)
- SVOCs – EPA Method 8270D (six samples)
- Gasoline-Range Organics –NWTPH-Gx (one sample)
- Diesel-Range Organics - NWTPH-Dx (one sample)
- VOCs - EPA Method 8260C (one sample)

The subcontract laboratory for the samples was:

- Eurofins Lancaster Laboratories in Lancaster, PA

3.1.5 Sediment Sampling at Pond and Outfall

At the two settling ponds and effluent outfall, a total of four sediment samples were collected (Figure 3-2). Two samples were collected at the lower settling pond, at the northern inlet and southern outlet baffle. One sample was collected in the upper settling pond, near the suspected connection piping between the two ponds. The final sample was collected at the base of the effluent outfall at Deadman Creek.

Sediment sampling began at the most downstream location and proceeded throughout the sample event. Sediment samples were collected by using dedicated trowels and removing sediment from the ponds and outfall. The sediment was transferred in a dedicated stainless steel bowl, thoroughly homogenized, and placed into a pre-labeled container. The NWTPH-Gx and VOC aliquots were removed directly from the sampling locations using a 5-gram Core N' One (or equivalent) sampler prior to homogenization.

Samples were submitted for the following analysis:

- PCBs – EPA Method 8082
- TAL Metals – EPA Method 6020
- SVOCs – EPA Method 8270D

- Gasoline-Range Organics – NWTPH-Gx
- Diesel Range Organics – NWTPH-Dx
- VOCs – EPA Method 8260C

The subcontract laboratory for the samples was:

- Eurofins Lancaster Laboratories in Lancaster, PA

3.1.6 Surface Water Sampling

Surface water samples were collected at four locations from the settling ponds and effluent outfall and were co-located with the sediment samples (Figure 3-2). One field duplicate was collected with the upper pond sample.

Surface water sampling began at the most downstream location and proceeded upstream throughout the sample event. Surface water samples were collected by hand-dipping sample containers into the water, using peristaltic pump, or if drainage pipe was elevated, from water running directly out of the pipe. For hand-dipped samples, except for the aliquots for VOCs and NWTPH-Gx analysis, bottles were filled by dipping directly in the waterway being sampled. VOC and NWTPH-Gx sample aliquots were filled from unpreserved, sample-specific glass containers. At locations where surface water was fairly shallow or there was no elevated discharge pipe, surface water samples were collected using a peristaltic pump and dedicated Teflon-lined hose to pump water directly into the sampling bottles. Sample containers for VOC and NWTPH-Gx analysis were pre-preserved. The remaining bottles were preserved after sample collection, as required by the method.

Samples were submitted for the following analyses:

- PCBs – EPA Method 1668
- PCBs – EPA Method 8082
- TAL Metals – EPA Method 6020
- SVOCs – EPA Method 8270D
- Gasoline-Range Organics –NWTPH-Gx
- Diesel-Range Organics – NWTPH-Dx
- VOCs - EPA Method 8260C

Subcontract laboratory for the surface water samples (all analyses except PCBs by EPA Method 1668):

- Eurofins Lancaster Laboratories in Lancaster, PA

The subcontract laboratory for samples analyzed for PCBs by EPA Method 1668 was:

- SGS AXYS Analytical Services in Sidney, BC, Canada

3.2 Summary of Field Observations

In addition to the sampling activities described above, EPA and START documented site conditions, including road conditions, building structure and integrity, and health and safety hazards. Due to the size of the facility and limited scope,

EPA and START primarily focused on the Green Mill Building, Baghouse Building, and adjacent areas. A brief description of these observations are provided below.

Former Facility

- The on-site buildings were in various states of disrepair. A previous property owner specialized in salvage and demolition and began to demolish several buildings, including the potline buildings (The Spokesman-Review, October 2013). During the site visit, evidence of the demolition was visible. Some buildings were partially torn down, others were left with only the foundation, some had caved-in ceilings with ponded water inside, while others appeared to be structurally sound.
- The Robertson siding was observed on a number of facility buildings and was visibly weathered and deteriorating. Pieces of Robertson siding were seen on the ground, directly below exterior and interior walls that had the siding, in various locations throughout the former facility.
- The limited asbestos assessment focused on the Baghouse Building, which was open to the outside and had visible and damaged suspect ACM. In the rafters, TSI material was visibly deteriorating from the pipelines. Asbestos warning tags were seen on or near some suspect ACM TSI. Pieces of TSI were on the ground after falling off overhead steam pipelines. Within the Baghouse Building and connected Building 32, there is approximately 5,500 linear feet of ACM TSI in the rafters.
- Additionally, approximately 750 linear feet of suspect ACM TSI was observed on exterior pipelines throughout the facility.
- Throughout the entire Green Mill Building, there was roughly 4,500 cubic yards of green coke material.
- The volume of the baghouse dust pile in Building 35 (connected to the eastern side of the Baghouse Building) was roughly 1,000 cubic yards. The volume of the exterior baghouse dust pile, located to the north of the Baghouse Building, was roughly 220 cubic yards. Several smaller piles of baghouse dust were also observed throughout the facility.
- The access port of one of the three coal tar ASTs was open with coal tar inside and falling outside. Approximately 370 cubic yards of coal tar material was observed. EPA and START did not open the remaining two ASTs.
- Open pits are present inside several buildings and outside within footprints of former buildings.
- Numerous areas of debris (trash, building materials, structural steel, old machinery, office equipment, unopen boxes deteriorating with supplies falling out) were observed across the entire site.

- A large amount of graffiti was visible within the interior and exterior of buildings. The security guard reported of keeping a photo library of graffiti on his cellular phone and stated that the appearance of new graffiti occurs approximately weekly.
- Several mattresses were discovered throughout the facility.
- Tire tracks were visible throughout the facility. In the Green Mill Building, tire tracks were visible in the waste piles. In the Baghouse Building, tire tracks were observed in the baghouse dust piles and near fallen suspect ACM.
- Metal fabricators were renting a workspace from the property owner. The renters were supplying their own electricity with generators and were supplying their own water.
- EPA and START were able to drive vehicles throughout the former facility with few obstacles.
- EPA and START observed little site access restrictions and evidence of trespassing:
    - Although there is a gate at the front, and a security guard was posted there for periods of time, START observed members of the public freely accessing the site. During the field sampling event, START met an off-road motorcyclist who was riding at the facility. START directed the motorcyclist to the entrance/exit of the facility.
    - In the recent past, an episode of a television series was filmed at the facility. The film crew had broken many windows in at least one building and spray-painted on the exterior of another building. Some of these filming locations appeared to be near uncontrolled and potential sources of contaminants.
    - Publicly available, online videos show members of the public readily driving and/or walking throughout the former facility.

<u>Settling Ponds and Outfall</u>

- The former facility has a system of catch basins to collect stormwater and any contaminants that flow into the water. The water flows into the lower settling pond on the southern end. At the northern end, a pipe transfers the water to the effluent outfall and discharges into Deadman Creek.
- According to the representative from Kaiser Aluminum, during operation of the former Kaiser Smelter Plant when the lower pond was full of sediment or needed maintenance, water and sediment were pumped into the upper settling pond. The lower pond was pumped into the upper pond approximately one to three times prior to the sale of the former Kaiser Smelter Plant. If the lower pond was closed, a bypass line was present to divert the stormwater directly to the outfall at Deadman Creek.

- According the Kaiser Aluminum Site Plan, the maximum water volume in the lower settling pond is 3.2 million gallons. During the field sampling event, the lower settling pond contained approximately 432,000 gallons of water. The estimated volume of contaminated sediment material is between 1,000 to 1,700 cubic yards.
- The upper pond is lined with black plastic. Visible plant and wildlife was observed to be present inside the footprint of the pond. Due to the size and type of plants growing in the upper pond, START assumes that the black plastic has been punctured by root growth.
- The Kaiser Aluminum representative stated that the lower pond sediment was pumped approximately one to three times into the upper pond during operations at Kaiser Aluminum. He did not believe the lower pond sediment has been pumped since the closing of Kaiser Aluminum. Assuming the lower settling pond contained 10 feet of sediment (from the bottom of the pond to the base of the baffles) when it was pumped, the upper pond contains roughly 1,300 to 3,900 cubic yards of contaminated sediment.

Table 3-1
Sample and Analysis Summary
Former Kaiser Smelter Plant Site
Mead, Washington

Sample Number	Location ID	Sample Collection Date	Matrix	Site Area	Sample Description	Asbestos PLM	PCBs (EPA Method 8082)	PCBs (EPA Method 1668)	NWTPH-Gx	NWTPH-Dx	SVOCs	TAL Metals	VOCs	Total Cabon, pH, Sulfur
Building Material - Pipe Insulation / Suspect ACM														
19050001	TSI01	5/22/2019	Building Material	Baghouse Building (Bay 20)	Piece of suspect TSI that had fallen onto the floor.	X								
19050002	MISC01	5/22/2019	Building Material	Baghouse Building (Bay 7)	Unknown material with white, chalky appearance	X								
19050003	TSI02	5/22/2019	Building Material	Building 32	Pile of damaged suspect TSI that had fallen to the floor.	X								
19050004	TSI03	5/22/2019	Building Material	Coal Tar Tank Farm	Damaged TSI	X								
19050005	TSI04	5/22/2019	Building Material	Coal Tar Tank Farm	Damaged TSI	X								
19050006	TSI05	5/22/2019	Building Material	Coal Tar Tank Farm	Damaged TSI	X								
19050007	TSI06	5/23/2019	Building Material	Building 48	Suspect TSI on exterior steam line	X								
19050008	TSI07	5/23/2019	Building Material	Building 62	Suspect TSI on damaged steam line	X								
Building Material - Robertson Protected Metal Siding														
19050101	GS01	5/22/2019	Building Material	Baghouse Building	Building siding on exterior by Baghouse Bay 19 (Potline 19)	X	X							
19050102	GS02	5/22/2019	Building Material	Baghouse Building	Building siding (or suspect roofing material) on the ground near Baghouse Bay 3 (Potline 3)	X	X							
19050103	GS03	5/22/2019	Building Material	Baghouse Building	Building siding on exterior at Baghouse Bay 3 (Potline 3), near SB02 and SP01	X		X						
19050104	GS04	5/22/2019	Building Material	Baghouse Building	Building siding on interior at Baghouse Bay 3	X	X							
19050105	GS05	5/22/2019	Building Material	Building 60	Building siding on exterior	X	X							
19050106	GS06	5/22/2019	Building Material	Building 52A	Building Siding on exterior	X	X							
19050107	GS07	5/22/2019	Building Material	Green Mill Building	Building siding on ground adjacent to exterior wall	X	X							
19050108	GS08	5/22/2019	Building Material	Green Mill Building	Building Siding on exterior, near SB03 and SP02	X		X						
Waste Material / Product														
19050701	CT01	5/21/2019	Product	Coal Tar Tank Farm	Coal Tar Pitch		X				X	X		
19050702	PP01	5/21/2019	Product	Potline Area	Alumina Pile at Potline 11							X		
19050801	WP01	5/21/2019	Product	Green Mill Building	Green Coke Pile		X				X	X		

Table 3-1
Sample and Analysis Summary
Former Kaiser Smelter Plant Site
Mead, Washington

Sample Number	Location ID	Sample Collection Date	Matrix	Site Area	Sample Description	Asbestos PLM	PCBs (EPA Method 8082)	PCBs (EPA Method 1668)	NWTPH-Gx	NWTPH-Dx	SVOCs	TAL Metals	VOCs	Total Cabon, pH, Sulfur
19050802	WP02	5/21/2019	Product	Green Mill Building	Green Coke Pile		X				X	X		
19050803	WP03	5/21/2019	Product	Green Mill Building	Green Coke Pile		X				X	X		X
19050804	WP04	5/21/2019	Product	Green Mill Building	Green Coke Pile		X				X	X		
19050805	WP05	5/23/2019	Product	Building 32	Baghouse Dust		X				X	X		
19050806	WP06	5/23/2019	Product	Building 35	Baghouse Dust		X				X	X		
19050807	WP07	5/23/2019	Product	Building 36	Baghouse Dust		X				X	X		
19050901	TR01	5/22/2019	Product	Transformer	Transformer Oil		X							
19050902	TR02	5/22/2019	Product	Transformer	Transformer Oil		X							
19050903	TR03	5/22/2019	Product	Transformer	Transformer Oil		X							
Catch Basins / Storm Drainage Areas near Buildings with Robertson Siding														
19050201	SB01	5/21/2019	Sediment	Potline Area	Sediment Catch Basin at Potline 19		X				X	X		
19050202	SB02	5/21/2019	Sediment	Potline Area	Sediment Catch Basin at Potline 3		X				X	X		
19050301	SP01	5/21/2019	Sediment	Potline Area	Soil/sediment on ground at Potline 3, near GS03 and SB02		X				X	X		
19050203	SB03	5/21/2019	Sediment	Green Mill Building	Sediment Catch Basin near NE corner of Green Mill Building		X				X	X		
19050302	SP02	5/21/2019	Surface Soil	Green Mill Building	Soil/sediment on ground at NE corner of Green Mill Building, between GS08 and SB03		X				X	X		
19050204	SB04	5/21/2019	Sediment	Green Mill Building	Sediment Catch Basin near Green Mill Building (TRC sample location SS-8)		X		X	X	X	X	X	
Storm Water Pathway Sediment														
19050401	OF01	5/20/2019	Sediment	Outfall to Deadman Creek	Sediment at outfall to Deadman Creek		X		X	X	X	X	X	
19050402	OF02	5/20/2019	Sediment	Lower Pond - outflow	Sediment at outflow (north) end of Lower Pond		X		X	X	X	X	X	
19050403	OF03	5/20/2019	Sediment	Lower Pond - inflow	Sediment at inflow (south) end of Lower Pond		X		X	X	X	X	X	
19050501	PD01	5/20/2019	Sediment	Upper Pond	Sediment from Upper Pond		X		X	X	X	X	X	
Stormwater Pathway Surface Water														
19050601	OF01	5/20/2019	Surface Water	Outfall to Deadman Creek	Discharge from outfall to Deadman Creek		X	X	X	X	X	X	X	
19050602	OF02	5/20/2019	Surface Water	Lower Pond - outflow	Surface water at outflow (north) end of Lower Pond		X	X	X	X	X	X	X	

Table 3-1
Sample and Analysis Summary
Former Kaiser Smelter Plant Site
Mead, Washington

Sample Number	Location ID	Sample Collection Date	Matrix	Site Area	Sample Description	Asbestos PLM	PCBs (EPA Method 8082)	PCBs (EPA Method 1668)	NWTPH-Gx	NWTPH-Dx	SVOCs	TAL Metals	VOCs	Total Cabon, pH, Sulfur
19050603	OF03	5/20/2019	Surface Water	Lower Pond - inflow	Surface water at inflow (south) end of Lower Pond		X	X	X	X	X	X	X	
19050604	PD01	5/20/2019	Surface Water	Upper Pond	Surface water from Upper Pond		X		X	X	X	X	X	
19050605	PD01 (Field Duplicate)	5/20/2019	Surface Water	Upper Pond	Surface water from Upper Pond		X		X	X	X	X	X	

Notes:

ACM = asbestos-containing material
bgs = below ground surface
BM = Building material
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
NWTPH-Dx = Northwest Total Petroleum Hydrocarbons - Extended Diesel Range (Semi-volatile Petroleum Products)
NWTPH-Gx = Northwest Total Petroleum Hydrocarbons - Extended Gasoline Range (Volatile Petroleum Products)
PCBs = Polychlorinated Biphenyls, EPA Method 8082A by GC/ECD
PLM = Polarized Light Microscopy
SS = Surface Soil
SVOCs = Semi-Volatile Organic Compounds, EPA Method 8270D by GC/MS
SW = Surface Water
TAL Metals = Target Analyte List Metals, EPA Method 6010C (ICP-AES) and 7471 (CVAA)
TSI = thermal system insulation
VOCs = Volatile Organic Compounds, EPA Method 8260C by GC/MS

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FIGURE 3-1
SAMPLE LOCATION AT FACILITY
FORMER KAISER SMELTER PLANT
Mead, Washington

Legend

- Sediment/Soil
- Surface Water
- Suspect ACM Bulk Material
- Waste Material/Product

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FIGURE 3-2
SAMPLE LOCATION AT OUTFALL AND PONDS
FORMER KAISER SMELTER PLANT
Mead, Washington

Legend

- Sediment/Soil
- Surface Water
- Suspect ACM Bulk Material
- Waste Material/Product

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4 RSE Results

The results of the 2019 field sampling event are summarized in Tables 4-1 to 4-9. Analytical data reports and data validation memoranda are included in Appendix B.

START collected samples of building material, Robertson siding, waste material, product, soil, catch basin sediment, and surface water. A total of 42 samples were analyzed for PCBs (EPA Method 8082), SVOCs, TAL metals, VOCs, NWTPH-Gx, and/or NWTPH-Dx.

Additionally, two Robertson siding samples and three surface water samples were analyzed for PCB congeners using EPA Method 1668. While EPA Method 8082 identifies and quantifies the concentrations of several common Aroclor technical mixtures (Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260, 1262, and 1268), EPA Method 1668 identifies and quantifies over 200 individual PCBs congeners. Additionally, EPA method 1668 can be used to provide low-level concentrations, which was necessary to compare the PCB concentrations in surface water samples to the relevant screening levels.

4.1 Screening Levels

The sample results were compared to applicable or relevant and appropriate screening levels, depending on the sample media.

Sample results of suspect materials analyzed for asbestos (Section 4.2) were compared to the definition of ACM in the Asbestos Hazard and Emergency Response Act of greater than 1% asbestos as determined by PLM.

The sample results for several types of site media, including Robertson siding (Section 4.3), waste material and product (Section 4.4), and facility soil and catch basin sediment (Section 4.5), were compared to the EPA Removal Management Levels (RMLs) for industrial soil. While many of these samples were collected from a variety of sources including building materials and waste piles, EPA believes that comparisons to the industrial soil RMLs are appropriate because the materials are located at or near the ground surface, are exposed to the elements, and pose a direct-contact risk to site visitors. The RMLs used for this comparison are based on a cancer risk level of 1 in 10,000 (1×10^{-4}) and a Hazard Quotient of

1. There are no RMLs for petroleum hydrocarbons, so those results were compared to Washington State MTCA Method A Cleanup Levels.

The sediment results from the settling ponds and outfall (Section 4.6) were compared to the Washington State Freshwater Sediment – Sediment Cleanup Objective (SCO) and the Washington State Freshwater Sediment – Cleanup Screening Level (CSL).

The surface water results (Section 4.7) were compared to MTCA Method C, MTCA Surface Water Aquatic Life – Freshwater (Acute), and MTCA Surface Water Aquatic Life – Freshwater (Chronic) screening levels. Additionally, the PCB results were compared to the Human Health Screening Level provided by the Spokane Tribe of Indians.

4.2 Asbestos Results

The results of PLM (EPA 600/R-94/134) asbestos analyses performed on the suspect ACM bulk material samples are presented in Table 4-1 and Figure 4-1. Overall, chrysotile and amosite asbestos were detected in three of the eight bulk material samples.

Chrysotile concentrations ranged from 8 per cent (%) to 20% with amosite concentrations ranging from 2% to 15%. Three of the eight suspect materials contained asbestos at concentrations greater than 1% and were thus ACM. Asbestos was detected in the suspect TSI material along an interior pipeline in the Building 32 (which continues into the Baghouse Building) and in Building 62. Additionally, asbestos was detected in suspect TSI on an exterior pipeline by Building 48.

The damaged TSI by the Coal Tar tanks, white chalky rectangular objects in the Baghouse Building, and some suspect fallen TSI in the Baghouse Building did not contain asbestos.

The results of PLM analyses performed on the suspect ACM Robertson siding samples are presented in Table 4-2. Chrysotile asbestos was detected in all Robertson siding samples. In seven of the eight samples, Robertson siding results were detected at concentrations ranging from 20% to 25%. One sample of the Robertson siding material, collected from the interior siding of Baghouse Bay 3, contained less than (<) 1% chrysotile.

4.3 Robertson Siding PCB Results

4.3.1 Analytical Results

Table 4-2 and Figure 4-2 present results from the Robertson siding samples that were analyzed using EPA Method 8082. All six samples contained Aroclor 1268 concentrations between 70,000 JQ to 39,000,000 µg/kg. All other Aroclors were non-detect.

The results of the PCB congener analyses analyzed using EPA Method 1668 are presented in Table 4-3. The 1668 method reports over 200 individual PCB congeners. The results indicate that a number of congeners were detected in both samples at relatively high concentrations, with several detected over 1,000,000 nanograms per gram (equivalent to parts per billion or µg/kg). The laboratory that performed the 1668 PCB analyses on the two Robertson siding samples did not provide concentrations for Aroclor equivalencies or total PCBs. However, the congeners that compose Aroclor 1268 (PCBs 198, 199, 206, 208, and 209) were among those congeners with the highest concentrations, which is consistent with the results of the 8082 PCB results that indicated high concentrations of Aroclor 1268 in the other Robertson siding samples.

4.3.2 Comparison to Screening Levels

The Method 8082 PCB results for the Robertson Siding samples were compared to the RMLs for industrial soil (Table 4-2). Five of the six samples exceeded the RML for high risk PCBs (94,000 µg/kg).

4.4 Waste Material and Product Results

4.4.1 Analytical Results

Green Coke Pile

Table 4-4 presents the results of PCBs, SVOCs, and TAL metals analyses on the green coke pile.

Aroclor 1268 was detected in one sample at a concentration of 54 µg/kg. The remaining samples were non-detect for PCBs.

For the SVOCs, the primary detections were PAHs. PAHs such as chrysene (48 to 500,000 JL µg/kg), fluoranthene (350 JL to 750,000 JL µg/kg), naphthalene (60 JQ to 2,200 JL µg/kg), and pyrene (400 JL to 650,000 JL µg/kg) were detected in all four samples. Benzo(a)pyrene was detected in three samples (74 JQ to 560,000 µg/kg). Other PAHs were also detected in the samples at similar or lower concentrations.

The metals detected at the highest concentrations in green coke were aluminum (ranging from 42.1 JK milligrams per kilogram [mg/kg] to 3,390 JK mg/kg), iron (74.3 to 1,460 mg/kg), and sodium (non-detect to 1,500 mg/kg). Other metals detected in all or most of the samples included barium (2.1 JK to 12.8 JK mg/kg), calcium (35.1 JQ to 343 mg/kg), cobalt (0.171 to 0.348 mg/kg), magnesium (6.76 JQ to 85.2 mg/kg), nickel (4.36 to 28.9 mg/kg), vanadium (12 JH to 38.5 mg/kg), and zinc (3.3 JK to 91.4 JK mg/kg). Mercury was the only metal not detected in any sample.

To determine the potential recycling value of the green coke, one sample was additionally analyzed for pH, total carbon, and total sulfur. The pH was 3.04, total carbon was 940,000 mg/kg, and total sulfur was 274 mg/kg.

Baghouse Dust

Table 4-4 presents the results of PCBs, SVOCs, and TAL metals analyses on the samples from the baghouse dust piles.

For PCBs, Aroclor 1268 was detected in all three samples with concentrations ranging from 190 to 1,200 JH µg/kg. Aroclor 1248 (120 to 690 µg/kg) was detected in two of three samples. Aroclor 1016 (2,500 JK µg/kg) was detected in one sample.

For PAHs, compounds such as benzo(b)fluoranthene (ranging from 1,000 to 3,200 µg/kg), benzo(g,h,i)perylene (350 to 1,800 µg/kg), benzo(k)fluoranthene (250 JQ to 1,700 µg/kg), chrysene (1,000 to 2,200 µg/kg), fluoranthene (520 to 1,500 µg/kg), indeno(1,2,3-cd)pyrene (300 to 1,600 µg/kg), and pyrene (320 to 1,000 µg/kg) were detected at concentrations greater than 1,000 µg/kg in all three samples. Benzene(a)pyrene was detected in all three samples at concentrations ranging from 220 JQ to 840 µg/kg). Other PAHs were also detected in all the samples at similar or lower concentrations.

The metals detected at the highest concentrations in baghouse dust were aluminum (ranging from 130,000 to 160,000 mg/kg), calcium (4,200 JH to 12,000 JH mg/kg) iron (4,500 JQ to 13,000 JK mg/kg), magnesium (560 to 1,300 mg/kg), potassium (380 JL to 1,700 JL mg/kg), and sodium (8,800 JL to 60,000 JL mg/kg). Other metals were also detected in all or most of the samples. Selenium and thallium were the only metals not detected in any sample.

Alumina Pile

Table 4-4 presents the results of TAL metals analyses on the sample collected from the alumina pile.

The metals detected at the highest concentrations in the alumina pile sample were aluminum (192,000 mg/kg), calcium (601 mg/kg), and sodium (1,050 mg/kg). Antimony, arsenic, cadmium, cobalt, copper, mercury, selenium, silver, and thallium were not detected in the sample.

Coal Tar

Table 4-4 presents the results of PCBs, SVOCs, and TAL metals analyses on the coal tar sample.

The sample did not contain concentrations of PCBs above laboratory reporting limits.

For PAHs, compounds such as benzo(a)anthracene (2,600,000 JK µg/kg), benzo(a)pyrene (3,400,000 JK µg/kg), benzo(b)fluoranthene (4,500,000 JK µg/kg), benzo(g,h,i)perylene (1,900,000 JK µg/kg), chrysene (2,800,000 JK µg/kg), fluoranthene (4,600,000 JK µg/kg), indeno(1,2,3-cd)pyrene (1,700,000 JK µg/kg), phenanthrene (2,500,000 JK µg/kg), and pyrene (4,000,000 JK µg/kg) were detected at concentrations greater than 1,000,000 µg/kg. Other PAHs were also detected in the sample at lower concentrations.

The metals detected at the highest concentrations in the coal tar sample were iron (2,050 mg/kg), aluminum (363 JK mg/kg), and calcium (305 mg/kg). Beryllium, copper, and silver were the only metals not detected in the sample.

Transformers

Table 4-4 presents the results of PCBs analyses of the samples of transformer oil. Aroclor 1254 was detected in one of three samples with a concentration of 1,400 JK µg/kg. No other Aroclors were detected, and the remaining samples were non-detect.

4.4.2 Comparison to Screening Levels

The waste material and product samples were compared to the RMLs for industrial soil. None of the PCB results exceeded any of the RMLs. The coal tar pitch sample (CT01) exceeded the RMLs for four PAHs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene. Additionally, one of the green coke pile samples (WP04) exceeded the RML for benzo(a)pyrene).

4.5 Soil and Sediment in the Former Facility Results

4.5.1 Analytical Results

Table 4-5 presents the results of PCBs, SVOCs, TAL metals, VOCs, NWTPH-Gx, and NWTPH-Dx analyses on the soil and catch basin sediment samples collected from the facility. Figure 4-2 presents the PCBs results.

For PCBs, Aroclor 1268 was detected in all six samples with concentrations ranging from 920 to 220,000 µg/kg. The highest concentrations were detected in the catch basins located by the Baghouse Building. Aroclor 1248 was detected in two samples with concentrations of 150 JQ and 400 JQ µg/kg. These two samples were collected from locations near the Green Mill building.

For PAHs, fluoranthene (7,200 to 1,700,000 µg/kg), phenanthrene (4,400 to 1,800,000 JK µg/kg), and pyrene (4,000 to 1,500,000 µg/kg) were detected at concentrations greater than 1,000,000 µg/kg. Benzo(a)pyrene was detected at concentrations ranging from 1,800 to 480,000 µg/kg. Other PAHs were also detected in the samples at similar or lower concentrations.

The metals detected at the highest concentrations in the catch basin sediment sample were aluminum (ranging from 9,700 JK to 183,000 JK mg/kg), calcium (1,900 to 28,300 mg/kg), iron (15,300 JL to 65,400 JL mg/kg), magnesium (3,800 to 6,320 mg/kg), potassium (1,240 to 3,630 mg/kg), and sodium (112 to 45,700 mg/kg). Other metals were detected in all or most of the samples.

One sample was analyzed for VOCs. Acetone was detected at a concentration of 210 µg/kg. Other VOCs including carbon disulfide bromomethane, ethylbenzene, m,p-xylenes, 2-butanone, methylene chloride, o-xylene, and toluene have concentrations ranging between 2 JQ to 54 JL µg/kg.

One sample was analyzed for NWTPH-Gx and NWTPH-Dx. The analyzed sample contained gasoline-range organics (5.9 JQ mg/kg), diesel-range organics (23,000 mg/kg), and heavy-range organics (32,000 mg/kg).

4.5.2 Comparison to Screening Levels

The results of the facility soil and catch basin sediment samples were compared to the RMLs for industrial soil. At the Baghouse Building, total PCB concentrations in soil/solids on the ground (SP01) and catch basin sediment (SB01 and SB02) samples exceeded the RML for high risk PCBs (94,000 µg/kg). At the Green Mill Building, the PAH benzo(a)pyrene exceeded the RML (210,000 µg/kg) in the soil (SP02) and one of the catch basin samples (SB04). Additionally, diesel-range organics and heavy oil-range organics exceeded MTCA Method Cleanup Levels (2,000 mg/kg for each) in catch basin sediment sample SB04.

4.6 Sediment in the Settling Ponds and Outfall Results

4.6.1 Analytical Results

Table 4-6 presents the results of PCBs, SVOCs, TAL metals, VOCs, NWTPH-Gx, and NWTPH-Dx analyses on the sediment samples collected at the settling ponds and outfall to Deadman Creek. Figure 4-3 presents the PCBs results.

For PCBs, Aroclor 1268 was detected in three of the four samples with concentrations ranging from 1,500 to 12,000 µg/kg. These concentrations were detected in the sediment samples from the lower and upper ponds. In the upper pond, Aroclor 1248 (2,400 JQ µg/kg) and Aroclor 1254 (1,600 JQ µg/kg) were detected in the sample. In the lower pond, Aroclor 1248 (160 µg/kg) was detected in one of the two samples. In the outfall, Aroclor 1248 (5.8 JQ µg/kg) was detected in the sample.

For PAHs, compounds such as benzo(a)anthracene (1,000 to 15,000 µg/kg), benzo(a)pyrene (1,100 to 18,000 µg/kg), benzo(b)fluoranthene (1,300 to 27,000 µg/kg), benzo(g,h,i)perylene (680 to 13,000 µg/kg), chrysene (1,200 to 17,000 µg/kg), fluoranthene (1,700 to 23,000 µg/kg), indeno(1,2,3-cd)pyrene (610 to 12,000 µg/kg), phenanthrene (1,400 to 14,000 µg/kg), and pyrene (1,900 to

23,000 µg/kg) were detected at concentrations greater than 10,000 µg/kg. Other SVOCs and PAHs were also detected in the samples at similar or lower concentrations.

The metals detected at the highest concentrations in sediment were aluminum (ranging from 11,000 JH to 131,000 mg/kg), calcium (3,640 JL to 13,800 JL mg/kg), iron (13,500 to 18,800 JL mg/kg), magnesium (3,200 to 6,660 JL mg/kg), potassium (1,210 to 2,120 JL mg/kg), and sodium (163 JK to 1,030 JK mg/kg). Other metals were also detected in the samples.

For VOCs, acetone was detected at a concentration of 890 µg/kg in the upper settling pond. Other VOCs including 4-methyl-2-pentanone, benzene, carbon disulfide, methyl acetate, methyl ethyl ketone, and toluene have concentrations ranging between 4 JQ to 80 µg/kg.

For NWTPH-Gx and NWTPH-Dx, diesel-range organics (9.9 JQ to 3,300 mg/kg) and heavy-range organics (31 JQ to 3,000 mg/kg) were detected. Gasoline-range organics concentrations were non-detect.

4.6.2 Comparison to Screening Levels

The results of the screening level comparison are shown in Table 4-6, and exceedances of screening levels are discussed below.

For total PCBs, three samples from the upper pond (PD01) and lower pond (OF02 and OF03) exceeded the SCO (110 µg/kg) screening level, and two samples (PD01 and OF02) also exceeded the CSL (2,500 µg/kg) screening level. The outfall sample, OF01, did not exceed any screening level for PCBs.

For SVOCs, carbazole and total PAHs exceeded the SCO and/or CSL screening levels for the three settling pond samples (PD01, OF02, and OF03). Dibenzofuran exceeded the SCO screening level for lower pond sample OF03. The outfall sample, OF01, did not exceed any screening level for SVOCs.

For TAL metals, arsenic, cadmium, copper, nickel, and silver exceeded the SCO and/or CSL screening levels for the upper pond sample (PD01) and one of the lower pond samples (OF02). Nickel exceeded the SCO screening level for lower pond sample OF03. The outfall sample, OF01, did not exceed any screening level for metals.

For NWTPH-Dx, diesel-range organics exceeded the SCO and CSL screening levels in the lower settling pond sample OF02. There were no exceedances for heavy-range organics. The outfall sample, OF01, did not exceed any screening level for NWTPH-Dx.

4.7 Surface Water Results

4.7.1 Analytical Results

Tables 4-7 and 4-8 presents the results of PCBs, SVOCs, TAL metals, VOCs, NWTPH-Gx, and NWTPH-Dx analyses of the surface water samples from the settling ponds and outfall.

There were no detections of PCBs in the surface water samples using Method 8082. For the PCB Method 1668 results from the lower pond and outfall samples, Aroclor 1242 concentrations ranged from 13.8 to 816 pg/L, Aroclor 1254 ranged from 225 to 1,570 pg/L, Aroclor 1260 ranged from 843 to 18,800 pg/L, and Aroclor 1268 ranged from 793 to 23,831 pg/L.

For PAHs, benzo(a)anthracene, chrysene, and fluoranthene were detected at trace concentrations ranging between 0.1 JQ to 0.2 JQ µg/L in the field duplicate sample collected from the upper pond. PAHs and other SVOCs were non-detect in the other samples.

The metals detected at the highest concentrations in surface water were aluminum (ranging from 0.0919 JQ to 0.585 milligrams per liter [mg/L]), calcium (18.7 to 78.1 mg/L), iron (0.0364 JQ to 1.14 mg/L), magnesium (2.06 to 32.1 mg/L), potassium (2.22 to 4.49 mg/L), and sodium (6.69 to 28.9 mg/L). Other metals detected in the samples at lower concentrations. Chromium, cobalt, copper, mercury, selenium, silver, and thallium were not detected in any of the samples.

For VOCs, acetone was detected at concentrations ranging from 0.8 JQ to 5 JQ µg/L. No other VOCs were detected.

NWTPH-Dx analyses detected diesel-range organics and heavy-range organics. Diesel-range organics ranged from non-detect in the outfall sample OF01 to 90 JQ µg/L in one of the upper pond samples. Heavy-range organics ranged from non-detect in the outfall sample OF01 and the two lower pond samples to 180 JQ µg/L in one of the upper pond samples). No gasoline-range organics concentrations were detected in any of the samples.

4.7.2 Comparison to Screening Levels

The results of the screening level comparisons are shown in Table 4-7, and exceedances of screening levels are discussed below.

All three surface water samples (two samples from the lower pond, and one from the outfall to Deadman Creek) analyzed by Method 1668 contained total PCB concentrations that exceeded the MTCA Human Health – Freshwater (7 pg/L) and the Spokane Tribe of Indians (1.3 pg/L) screening levels for the Spokane River. Additionally, all of the Aroclor 1254 concentrations for these samples exceeded

the MTCA Method C non-cancer (4.18 pg/L) and the MTCA Method C cancer (2.61 pg/L) screening levels.

For the TAL Metals results, arsenic exceeded screening levels in the settling pond samples. Also, the PAHs benzo(a)anthracene and chrysene were detected at trace concentrations that exceeded screening levels in one of the settling pond samples. However, none of the metals or PAHs in the outfall sample OF01 exceeded any of the screening levels. For the NWTPH-Dx results, heavy-range organics exceeded one of the screening levels in one of the upper pond samples, but not in the lower pond or outfall samples. None of the diesel-range organics results exceeded any of the screening levels in any of the samples. None of the VOCs or NWTPH-Gx results exceeded a screening level for any of the surface water samples.

Table 4-1
Asbestos Sample Results
Former Kaiser Smelter Plant
Mead, Washington

EPA Sample Number	Location ID	Site Area	Sample Description	Collection Date	Collection Time	Material	Friability	Asbestos (Percent)
Thermal System Insulation / Miscellaneous Material Samples								
19050001	TSI01	Baghouse Building (Bay 20)	Piece of suspect TSI that had fallen onto the floor.	5/22/2019	11:45	TSI	Friable, Poor Condition	NAD
19050002	MISC01	Baghouse Building (Bay 7)	Unknown material with white, chalky appearance	5/22/2019	12:02	Miscellaneous	Good	NAD
19050003	TSI02	Building 32	Pile of damaged suspect TSI that had fallen to the floor.	5/22/2019	12:42	TSI	Friable, Poor Condition	2% Amosite 20% Chrysotile
19050004	TSI03	Coal Tar Tank Farm	Damaged TSI	5/22/2019	17:25	TSI	Friable, Poor Condition	NAD
19050005	TSI04	Coal Tar Tank Farm	Damaged TSI	5/22/2019	17:30	TSI	Friable, Poor Condition	NAD
19050006	TSI05	Coal Tar Tank Farm	Damaged TSI	5/22/2019	17:35	TSI	Friable, Poor Condition	NAD
19050007	TSI06	Building 48	Suspect TSI on exterior steam line	5/23/2019	9:35	TSI	Friable, Poor Condition	3% Amosite 20% Chrysotile
19050008	TSI07	Building 62	Suspect TSI on damaged steam line	5/23/2019	10:35	TSI	Friable, Poor Condition	15% Amosite 8% Chrysotile
Robertson Protected Metal Siding								
19050101	GS01	Baghouse Building	Building siding on exterior by Baghouse Bay 19 (Potline 19)	5/22/2019	11:45	Building Siding	Friable, Poor Condition	20% Chrysotile
19050102	GS02	Baghouse Building	Building siding (or suspect roofing material) on the ground at Baghouse Bay 3 (Potline 3)	5/22/2019	12:15	Building Siding	Friable, Poor Condition	20% Chrysotile
19050103	GS03	Baghouse Building	Building siding on exterior at Baghouse Bay 3 (Potline 3), near SB02 and SP01	5/22/2019	12:18	Building Siding	Friable, Poor Condition	25% Chrysotile
19050104	GS04	Baghouse Building	Building siding on interior at Baghouse Bay 3	5/22/2019	12:25	Building Siding	Friable, Poor Condition	<1% Chrysotile
19050105	GS05	Building 60	Building siding on exterior	5/22/2019	17:45	Building Siding	Friable, Poor Condition	25% Chrysotile
19050106	GS06	Building 52A	Building Siding on exterior	5/22/2019	16:45	Building Siding	Friable, Poor Condition	20% Chrysotile
19050107	GS07	Green Mill Building	Building siding on ground adjacent to exterior wall	5/22/2019	16:55	Building Siding	Friable, Poor Condition	20% Chrysotile
19050108	GS08	Green Mill Building	Building Siding on exterior, near SB03 and SP02	5/22/2019	17:10	Building Siding	Friable, Poor Condition	20% Chrysotile

Notes:
NAD = No Asbestos Detected
ID = identification
TSI = thermal system insulation

Table 4-2
PCB Results for Robertson Protected Metal Siding Samples
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	Removal Management Level [1] (Industrial Soil)	Decision Unit	Baghouse Building						Building 60		Green Mill Building Area			
			Sample Area	Ext Siding, Bay 19		Ext. Siding/Roofing on Ground, near Bay 3		Int. Siding, Bay 3		Ext. Siding		Ext. Siding, Bdg 52A		Ext. Siding on Ground	
			Date	5/22/2019		5/22/2019		5/22/2019		5/22/2019		5/22/2019		5/22/2019	
			EPA Sample Number	19050101		19050102		19050104		19050105		19050106		19050107	
			Field Sample Number	GS01		GS02		GS04		GS05		GS06		GS07	
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PCBs (Method 8082)															
PCB-1016	12674-11-2	51,000	µg/kg	3,600,000	U	18,000	U	5,100,000	U	3,500,000	U	7,500,000	U	3,300,000	U
PCB-1221	11104-28-2	83,000	µg/kg	4,600,000	U	23,000	U	6,500,000	U	4,500,000	U	9,600,000	U	4,200,000	U
PCB-1232	11141-16-5	72,000	µg/kg	7,900,000	U	39,000	U	11,000,000	U	7,700,000	U	17,000,000	U	7,400,000	U
PCB-1242	53469-21-9	95,000	µg/kg	3,300,000	U	16,000	U	4,700,000	U	3,200,000	U	6,900,000	U	3,000,000	U
PCB-1248	12672-29-6	95,000	µg/kg	3,300,000	U	16,000	U	4,700,000	U	3,200,000	U	6,900,000	U	3,000,000	U
PCB-1254	11097-69-1	15,000	µg/kg	3,300,000	U	16,000	U	4,700,000	U	3,200,000	U	6,900,000	U	3,000,000	U
PCB-1260	37324-23-5	99,000	µg/kg	4,900,000	U	24,000	U	7,000,000	U	4,700,000	U	10,000,000	U	4,500,000	U
PCB-1262	11100-14-4	---	µg/kg	3,300,000	U	16,000	U	4,700,000	U	3,200,000	U	6,900,000	U	3,000,000	U
PCB-1268	11096-82-5	---	µg/kg	**27,000,000**		**70,000**	**JQ**	**22,000,000**	**JQ**	**39,000,000**		**25,000,000**	**JQ**	**22,000,000**	
Total PCBs [2]	1336-36-3	94,000 [3]	µg/kg	**27,000,000**		**70,000**		**22,000,000**		**39,000,000**		**25,000,000**		**22,000,000**	

Notes:

(1) Removal Management Levels are based on a 10^{-4} risk level for carcinogens and a Hazard Quotient of 1 for non-carcinogens.

(2) Total PCBs were calculated as the sum of the concentrations of any detected Aroclor.

(3) The Removal Management Level for total PCBs is the value for "Polychlorinated Biphenyls (high risk)," CAS number 1336-36-3.

Detected results are in bold type.

--- = Not Applicable

µg/kg = micrograms per kilogram

CAS = Chemical Abstracts Service

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

N/A = Not Avaliable

Q = Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

Qual = Qualifier

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

Table 4-3
PCB Results for Robertson Protected Metal Siding Samples
Former Kaiser Smelter Plant
Mead, Washington

		Date	5/22/2019		5/22/2019	
		EPA Sample Number	19050103		19050108	
		Field Sample Number	GS03		GS08	
Chemical Analysis	CAS Number	Units	Result	Qual	Result	Qual
Low Level PCB						
PCB-1	2051-60-7	ng/g	4,900	U	7,400	U
PCB-2	2051-61-8	ng/g	4,900	U	7,400	U
PCB-3	2051-62-9	ng/g	4,900	U	7,400	U
PCB-4	13029-08-8	ng/g	9,800	U	15,000	U
PCB-5	16605-91-7	ng/g	**3,500**	**JH**	7,400	U
PCB-6	25569-80-6	ng/g	4,900	U	7,400	U
PCB-7	33284-50-3	ng/g	4,900	U	7,400	U
PCB-8	34883-43-7	ng/g	9,800	U	15,000	U
PCB-9	34883-39-1	ng/g	4,900	U	7,400	U
PCB-10	33146-45-1	ng/g	4,900	U	7,400	U
PCB-11	2050-67-1	ng/g	9,800	U	15,000	U
PCB-12	2974-92-7	ng/g	9,800	U	15,000	U
PCB-13	2974-90-5	ng/g	9,800	U	15,000	U
PCB-14	34883-41-5	ng/g	4,900	U	7,400	U
PCB-15	2050-68-2	ng/g	4,900	U	7,400	U
PCB-16	38444-78-9	ng/g	4,900	U	7,400	U
PCB-17	37680-66-3	ng/g	4,900	U	7,400	U
PCB-18	37680-65-2	ng/g	9,800	U	15,000	U
PCB-19	38444-73-4	ng/g	4,900	U	7,400	U
PCB-20	38444-84-7	ng/g	9,800	U	15,000	U
PCB-21	55702-46-0	ng/g	9,800	U	15,000	U
PCB-22	38444-85-8	ng/g	4,900	U	7,400	U
PCB-23	55720-44-0	ng/g	**6,900**	**JH**	7,400	U
PCB-24	55702-45-9	ng/g	**12,000**		7,400	U
PCB-25	55712-37-3	ng/g	**720**	**JH**	7,400	U
PCB-26	38444-81-4	ng/g	**3,200**	**JK**	15,000	U
PCB-27	38444-76-7	ng/g	4,900	U	7,400	U
PCB-28	7012-37-5	ng/g	9,800	U	15,000	U
PCB-29	15862-07-4	ng/g	**3,200**	**JK**	15,000	U
PCB-30	35693-92-6	ng/g	9,800	U	15,000	U
PCB-31	16606-02-3	ng/g	9,800	U	15,000	U
PCB-32	38444-77-8	ng/g	4,900	U	7,400	U
PCB-33	38444-86-9	ng/g	9,800	U	15,000	U
PCB-34	37680-68-5	ng/g	**11,000**	**JH**	7,400	U
PCB-35	37680-69-6	ng/g	4,900	U	7,400	U
PCB-36	38444-87-0	ng/g	4,900	U	7,400	U
PCB-37	38444-90-5	ng/g	4,900	U	7,400	U
PCB-38	53555-66-1	ng/g	4,900	U	7,400	U
PCB-39	38444-88-1	ng/g	4,900	U	7,400	U

Table 4-3
PCB Results for Robertson Protected Metal Siding Samples
Former Kaiser Smelter Plant
Mead, Washington

		Date	5/22/2019		5/22/2019	
		EPA Sample Number	19050103		19050108	
		Field Sample Number	GS03		GS08	
Chemical Analysis	CAS Number	Units	Result	Qual	Result	Qual
PCB-40	38444-93-8	ng/g	15,000	U	22,000	U
PCB-41	52663-59-9	ng/g	15,000	U	22,000	U
PCB-42	36559-22-5	ng/g	4,900	U	7,400	U
PCB-43	70362-46-8	ng/g	9,800	U	15,000	U
PCB-44	41464-39-5	ng/g	15,000	U	22,000	U
PCB-45	70362-45-7	ng/g	9,800	U	15,000	U
PCB-46	41464-47-5	ng/g	4,900	U	7,400	U
PCB-47	2437-79-8	ng/g	15,000	U	22,000	U
PCB-48	70362-47-9	ng/g	4,900	U	7,400	U
PCB-49	41464-40-8	ng/g	9,800	U	15,000	U
PCB-50	62796-65-0	ng/g	9,800	U	15,000	U
PCB-51	68194-04-7	ng/g	9,800	U	15,000	U
PCB-52	35693-99-3	ng/g	4,900	U	7,400	U
PCB-53	41464-41-9	ng/g	9,800	U	15,000	U
PCB-54	15968-05-5	ng/g	4,900	U	7,400	U
PCB-55	74338-24-2	ng/g	4,900	U	7,400	U
PCB-56	41464-43-1	ng/g	4,900	U	7,400	U
PCB-57	70424-67-8	ng/g	4,900	U	7,400	U
PCB-58	41464-49-7	ng/g	4,900	U	7,400	U
PCB-59	74472-33-6	ng/g	15,000	U	22,000	U
PCB-60	33025-41-1	ng/g	4,900	U	7,400	U
PCB-61	33284-53-6	ng/g	20,000	U	29,000	U
PCB-62	54230-22-7	ng/g	15,000	U	22,000	U
PCB-63	74472-34-7	ng/g	4,900	U	7,400	U
PCB-64	52663-58-8	ng/g	4,900	U	7,400	U
PCB-65	33284-54-7	ng/g	15,000	U	22,000	U
PCB-66	32598-10-0	ng/g	4,900	U	7,400	U
PCB-67	73575-53-8	ng/g	4,900	U	7,400	U
PCB-68	73575-52-7	ng/g	4,900	U	7,400	U
PCB-69	60233-24-1	ng/g	9,800	U	15,000	U
PCB-70	32598-11-1	ng/g	20,000	U	29,000	U
PCB-71	41464-46-4	ng/g	15,000	U	22,000	U
PCB-72	41464-42-0	ng/g	4,900	U	7,400	U
PCB-73	74338-23-1	ng/g	9,800	U	15,000	U
PCB-74	32690-93-0	ng/g	20,000	U	29,000	U
PCB-75	32598-12-2	ng/g	15,000	U	22,000	U
PCB-76	70362-48-0	ng/g	20,000	U	29,000	U
PCB-77	32598-13-3	ng/g	4,900	U	**3,900**	**JH**
PCB-78	70362-49-1	ng/g	4,900	U	7,400	U
PCB-79	41464-48-6	ng/g	4,900	U	7,400	U

Table 4-3
PCB Results for Robertson Protected Metal Siding Samples
Former Kaiser Smelter Plant
Mead, Washington

		Date	5/22/2019		5/22/2019	
		EPA Sample Number	19050103		19050108	
		Field Sample Number	GS03		GS08	
Chemical Analysis	CAS Number	Units	Result	Qual	Result	Qual
PCB-80	33284-52-5	ng/g	4,900	U	7,400	U
PCB-81	70362-50-4	ng/g	4,900	U	7,400	U
PCB-82	52663-62-4	ng/g	8,400	U	**3,600**	**JH**
PCB-83	60145-20-2	ng/g	9,800	U	15,000	U
PCB-84	52663-60-2	ng/g	8,500	U	7,400	U
PCB-85	65510-45-4	ng/g	15,000	U	**4,300**	**JK**
PCB-86	55312-69-1	ng/g	29,000	U	44,000	U
PCB-87	38380-02-8	ng/g	29,000	U	44,000	U
PCB-88	55215-17-3	ng/g	9,800	U	15,000	U
PCB-89	73575-57-2	ng/g	8,300	U	7,400	U
PCB-90	68194-07-0	ng/g	15,000	U	22,000	U
PCB-91	68194-05-8	ng/g	9,800	U	15,000	U
PCB-92	52663-61-3	ng/g	7,200	U	7,400	U
PCB-93	73575-56-1	ng/g	9,800	U	15,000	U
PCB-94	73575-55-0	ng/g	8,300	U	7,400	U
PCB-95	38379-99-6	ng/g	8,000	U	7,400	U
PCB-96	73575-54-9	ng/g	6,200	U	7,400	U
PCB-97	41464-51-1	ng/g	29,000	U	44,000	U
PCB-98	60233-25-2	ng/g	9,800	U	15,000	U
PCB-99	38380-01-7	ng/g	9,800	U	15,000	U
PCB-100	39485-83-1	ng/g	9,800	U	15,000	U
PCB-101	37680-73-2	ng/g	15,000	U	22,000	U
PCB-102	68194-06-9	ng/g	9,800	U	15,000	U
PCB-103	60145-21-3	ng/g	7,300	U	7,400	U
PCB-104	56558-16-8	ng/g	5,600	U	7,400	U
PCB-105	32598-14-4	ng/g	4,900	U	7,400	U
PCB-106	70424-69-0	ng/g	4,900	U	7,400	U
PCB-107	70424-68-9	ng/g	4,900	U	7,400	U
PCB-108	70362-41-3	ng/g	9,800	U	15,000	U
PCB-109	74472-35-8	ng/g	29,000	U	44,000	U
PCB-110	38380-03-9	ng/g	9,800	U	15,000	U
PCB-111	39635-32-0	ng/g	5,100	U	**9,900**	
PCB-112	74472-36-9	ng/g	5,400	U	7,400	U
PCB-113	68194-10-5	ng/g	15,000	U	22,000	U
PCB-114	74472-37-0	ng/g	4,900	U	7,400	U
PCB-115	74472-38-1	ng/g	9,800	U	15,000	U
PCB-116	18259-05-7	ng/g	15,000	U	**4,300**	**JK**
PCB-117	68194-11-6	ng/g	15,000	U	**4,300**	**JK**
PCB-118	31508-00-6	ng/g	4,900	U	**7,900**	**JH**
PCB-119	56558-17-9	ng/g	29,000	U	44,000	U

Table 4-3
PCB Results for Robertson Protected Metal Siding Samples
Former Kaiser Smelter Plant
Mead, Washington

		Date	5/22/2019		5/22/2019	
		EPA Sample Number	19050103		19050108	
		Field Sample Number	GS03		GS08	
Chemical Analysis	CAS Number	Units	Result	Qual	Result	Qual
PCB-120	68194-12-7	ng/g	5,200	U	7,400	U
PCB-121	56558-18-0	ng/g	5,400	U	7,400	U
PCB-122	76842-07-4	ng/g	4,900	U	7,400	U
PCB-123	65510-44-3	ng/g	4,900	U	7,400	U
PCB-124	70424-70-3	ng/g	9,800	U	15,000	U
PCB-125	74472-39-2	ng/g	29,000	U	44,000	U
PCB-126	57465-28-8	ng/g	4,900	U	7,400	U
PCB-127	39635-33-1	ng/g	4,900	U	7,400	U
PCB-128	38380-07-3	ng/g	**40,000**	**JK**	**180,000**	**JK**
PCB-129	55215-18-4	ng/g	**7,300**	**JK**	**170,000**	**JK**
PCB-130	52663-66-8	ng/g	4,900	U	9,000	U
PCB-131	61798-70-7	ng/g	4,900	U	9,300	U
PCB-132	38380-05-1	ng/g	4,900	U	**48,000**	**JH**
PCB-133	35694-04-3	ng/g	4,900	U	8,500	U
PCB-134	52704-70-8	ng/g	9,800	U	15,000	U
PCB-135	52744-13-5	ng/g	**19,000**	**JK**	**220,000**	**JK**
PCB-136	38411-22-2	ng/g	4,900	U	7,400	U
PCB-137	35694-06-5	ng/g	4,900	U	7,600	U
PCB-138	35065-28-2	ng/g	**7,300**	**JK**	**170,000**	**JK**
PCB-139	56030-56-9	ng/g	9,800	U	15,000	U
PCB-140	59291-64-4	ng/g	9,800	U	15,000	U
PCB-141	52712-04-6	ng/g	4,900	U	**73,000**	
PCB-142	41411-61-4	ng/g	4,900	U	8,400	U
PCB-143	68194-15-0	ng/g	9,800	U	15,000	U
PCB-144	68194-14-9	ng/g	**4,200**	**JH**	**30,000**	**JH**
PCB-145	74472-40-5	ng/g	4,900	U	7,400	U
PCB-146	51908-16-8	ng/g	**5,900**		**75,000**	
PCB-147	68194-13-8	ng/g	**12,000**	**JK**	**250,000**	**JK**
PCB-148	74472-41-6	ng/g	4,900	U	7,400	U
PCB-149	38380-04-0	ng/g	**12,000**	**JK**	**250,000**	**JK**
PCB-150	68194-08-1	ng/g	4,900	U	7,400	U
PCB-151	52663-63-5	ng/g	**19,000**	**JK**	**220,000**	**JK**
PCB-152	68194-09-2	ng/g	4,900	U	7,400	U
PCB-153	35065-27-1	ng/g	**75,000**	**JK**	**740,000**	**JK**
PCB-154	60145-22-4	ng/g	**3,600**	**JH**	7,400	U
PCB-155	33979-03-2	ng/g	**7,000**	**JH**	7,400	U
PCB-156	38380-08-4	ng/g	9,800	U	15,000	U
PCB-157	69782-90-7	ng/g	9,800	U	15,000	U
PCB-158	74472-42-7	ng/g	4,900	U	7,400	U
PCB-159	39635-35-3	ng/g	**12,000**		**23,000**	**JH**

Table 4-3
PCB Results for Robertson Protected Metal Siding Samples
Former Kaiser Smelter Plant
Mead, Washington

		Date	5/22/2019		5/22/2019	
		EPA Sample Number	19050103		19050108	
		Field Sample Number	GS03		GS08	
Chemical Analysis	CAS Number	Units	Result	Qual	Result	Qual
PCB-160	41411-62-5	ng/g	**7,300**	**JK**	**170,000**	**JK**
PCB-161	74472-43-8	ng/g	4,900	U	7,400	U
PCB-162	39635-34-2	ng/g	4,900	U	7,400	U
PCB-163	74472-44-9	ng/g	**7,300**	**JK**	**170,000**	**JK**
PCB-164	74472-45-0	ng/g	4,900	U	7,400	U
PCB-165	74472-46-1	ng/g	4,900	U	7,400	U
PCB-166	41411-63-6	ng/g	**40,000**	**JK**	**180,000**	**JK**
PCB-167	52663-72-6	ng/g	**8,600**		**12,000**	
PCB-168	59291-65-5	ng/g	**75,000**	**JK**	**740,000**	**JK**
PCB-169	32774-16-6	ng/g	4,900	U	7,400	U
PCB-170	35065-30-6	ng/g	**93,000**	**JH**	**220,000**	
PCB-171	52663-71-5	ng/g	**23,000**	**JK**	**38,000**	**JK**
PCB-172	52663-74-8	ng/g	**75,000**		**92,000**	
PCB-173	68194-16-1	ng/g	**23,000**	**JK**	**38,000**	**JK**
PCB-174	38411-25-5	ng/g	**420,000**		**950,000**	
PCB-175	40186-70-7	ng/g	**14,000**		12,000	U
PCB-176	52663-65-7	ng/g	**15,000**		**69,000**	
PCB-177	52663-70-4	ng/g	**110,000**		**300,000**	
PCB-178	52663-67-9	ng/g	**120,000**		**280,000**	
PCB-179	52663-64-6	ng/g	**96,000**		**610,000**	
PCB-180	35065-29-3	ng/g	**2,500,000**	**JK**	**4,300,000**	**JK**
PCB-181	74472-47-2	ng/g	4,900	U	12,000	U
PCB-182	60145-23-5	ng/g	**12,000**		11,000	U
PCB-183	52663-69-1	ng/g	**540,000**	**JK**	**1,200,000**	**JK**
PCB-184	74472-48-3	ng/g	4,900	U	9,600	U
PCB-185	52712-05-7	ng/g	**540,000**	**JK**	**1,200,000**	**JK**
PCB-186	74472-49-4	ng/g	4,900	U	9,300	U
PCB-187	52663-68-0	ng/g	**1,700,000**		**4,200,000**	
PCB-188	74487-85-7	ng/g	4,900	U	8,600	U
PCB-189	39635-31-9	ng/g	**21,000**	**JH**	**19,000**	**JH**
PCB-190	41411-64-7	ng/g	**63,000**		**110,000**	
PCB-191	74472-50-7	ng/g	4,900	U	8,800	U
PCB-192	74472-51-8	ng/g	4,900	U	9,900	U
PCB-193	69782-91-8	ng/g	**2,500,000**	**JK**	**4,300,000**	**JK**
PCB-194	35694-08-7	ng/g	**4,200,000**		**8,000,000**	
PCB-195	52663-78-2	ng/g	**500,000**		**1,000,000**	
PCB-196	42740-50-1	ng/g	**2,300,000**		**3,300,000**	
PCB-197	33091-17-7	ng/g	**75,000**	**JH**	**110,000**	
PCB-198	68194-17-2	ng/g	**7,900,000**	**JK**	**13,000,000**	**JK**
PCB-199	52663-75-9	ng/g	**7,900,000**	**JK**	**13,000,000**	**JK**

Table 4-3
PCB Results for Robertson Protected Metal Siding Samples
Former Kaiser Smelter Plant
Mead, Washington

		Date	5/22/2019		5/22/2019	
		EPA Sample Number	19050103		19050108	
		Field Sample Number	GS03		GS08	
Chemical Analysis	CAS Number	Units	Result	Qual	Result	Qual
PCB-200	52663-73-7	ng/g	**340,000**		**870,000**	
PCB-201	40186-71-8	ng/g	**510,000**		**1,100,000**	
PCB-202	2136-99-4	ng/g	**1,000,000**		**2,900,000**	
PCB-203	52663-76-0	ng/g	**5,500,000**		**9,100,000**	
PCB-204	74472-52-9	ng/g	4,900	U	7,400	U
PCB-205	74472-53-0	ng/g	**120,000**		**170,000**	**JH**
PCB-206	40186-72-9	ng/g	**6,900,000**		**13,000,000**	
PCB-207	52663-79-3	ng/g	**770,000**		**1,400,000**	
PCB-208	52663-77-1	ng/g	**1,700,000**		**3,400,000**	
PCB-209	2051-24-3	ng/g	**870,000**		**1,300,000**	

Notes:

Detected results are in bold type.

–– = Not Applicable

CAS = Chemical Abstracts Service

H = The sample result is biased high.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte.

K = The bias of the sample is not known.

ng/g = nanograms per gram

PCBs = Polychlorinated Biphenyls (PCBs), EPA Method 8082A by GC/ECD

Q = Detected concencentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

Qual = Qualifier

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

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Table 4-4
Material and Product Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	Removal Management Level [1] (Industrial Soil)	Decision Unit	Green Mill Building								Baghouse Building						Potline Area		Coal Tar Tank Farm		Rectifier Building					
			Sample Area	Green Coke Pile		Green Coke Pile		Green Coke Pile		Green Coke Pile		Baghouse Dust		Baghouse Dust		Baghouse Dust		Alumina Pile Potline 13		Coal Tar Pitch		Transformer Oil		Transformer Oil		Transformer Oil	
			Date	5/21/2019		5/21/2019		5/21/2019		5/21/2019		5/23/2019		5/23/2019		5/23/2019		5/21/2019		5/21/2019		5/22/2019		5/22/2019		5/22/2019	
			EPA Sample Number	19050801		19050802		19050803		19050804		19050805		19050806		19050807		19050702		19050701		19050901		19050902		19050903	
			Field Sample Number	WP01		WP02		WP03		WP04		WP05		WP06		WP07		PP01		CT01		TR01		TR02		TR03	
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PCBs																											
PCB-1016	12674-11-2	51,000	µg/kg	3.6	U	36	U	18	U	180	U	20	U	19	U	**2,500**	**JK**	—		18	U	980	U	1,000	U	860	U
PCB-1221	11104-28-2	83,000	µg/kg	4.6	U	46	U	23	U	230	U	20	U	19	U	25	U	—		23	U	980	U	1,000	U	860	U
PCB-1232	11141-16-5	72,000	µg/kg	8	U	80	U	40	U	400	U	20	U	19	U	25	U	—		40	U	980	U	1,000	U	860	U
PCB-1242	53469-21-9	95,000	µg/kg	3.3	U	33	U	17	U	170	U	20	U	19	U	25	U	—		17	U	980	U	1,000	U	860	U
PCB-1248	12672-29-6	95,000	µg/kg	3.3	U	33	U	17	U	170	U	**690**		**120**		25	U	—		17	U	980	U	1,000	U	860	U
PCB-1254	11097-69-1	15,000	µg/kg	3.3	U	33	U	17	U	170	U	20	U	19	U	25	U	—		17	U	**1,400**	**JK**	1,000	U	860	U
PCB-1260	11096-82-5	99,000	µg/kg	4.9	U	49	U	25	U	250	U	20	U	19	U	25	U	—		25	U	980	U	1,000	U	860	U
PCB-1262	11100-14-4	—	µg/kg	3.3	U	33	U	17	U	170	U	20	U	19	U	25	U	—		17	U	980	U	1000	U	860	U
PCB-1268	11096-82-5	—	µg/kg	**54**		33	U	17	U	170	U	**390**		**1,200**	**JH**	**190**		—		17	U	980	U	1000	U	860	U
Total PCBs [2]	1336-36-3	94,000 [3]	µg/kg	**54**		Not Detected		Not Detected		Not Detected		**1,080**		**1,320**		**2,690**		—		Not Detected		**1,400**	**JK**	Not Detected		Not Detected	
SVOCs																											
1,2,4-Trichlorobenzene	120-82-1	260,000	µg/Kg	—		—		—		—		230	U	250	U	630	U	—		—		—		—		—	
1,2-Dichlorobenzene	95-50-1	9,300,000	µg/Kg	—		—		—		—		230	U	250	U	630	U	—		—		—		—		—	
1,3-Dichlorobenzene	541-73-1	#N/A	µg/Kg	—		—		—		—		230	U	250	U	630	U	—		—		—		—		—	
1,4-Dichlorobenzene	106-46-7	1,100,000	µg/Kg	—		—		—		—		230	U	250	U	630	U	—		—		—		—		—	
1-Methylnaphthalene	90-12-0	7,300,000	µg/Kg	—		—		—		—		140	U	150	U	380	U	—		—		—		—		—	
1,1'-Biphenyl	92-52-4	200,000	µg/Kg	**70**		**130**	**JQ**	83	U	**190**	**JQ**	—		—		—		—		8,400	UJK	—		—		—	
1,2,4,5-Tetrachlorobenzene	95-94-3	350,000	µg/Kg	16	U	98	UJL	83	U	170	UJL	—		—		—		—		8,400	UJK	—		—		—	
1,4-Dioxane	123-91-1	2,400,000	µg/Kg	99	U	590	UJL	500	U	990	UJL	—		—		—		—		50,000	UJK	—		—		—	
2,2'-oxybis(1-Chloropropane)	108-60-1	47,000,000	µg/Kg	20	U	120	UJL	100	U	200	UJL	—		—		—		—		10,000	UJK	—		—		—	
2,3,4,6-Tetrachlorophenol	58-90-2	25,000,000	µg/Kg	66	U	390	UJL	330	U	660	UJL	—		—		—		—		33,000	U	—		—		—	
2,4,5-Trichlorophenol	95-95-4	82,000,000	µg/Kg	30	U	180	UJL	150	U	300	UJL	930	U	1,000	U	2,500	U	—		15,000	U	—		—		—	
2,4,6-Trichlorophenol	88-06-2	820,000	µg/Kg	26	U	160	UJL	130	U	260	UJL	700	U	750	U	1,900	U	—		13,000	U	—		—		—	
2,4-Dichlorophenol	120-83-2	2,500,000	µg/Kg	20	U	120	UJL	100	U	200	UJL	460	U	500	U	1,300	U	—		10,000	U	—		—		—	
2,4-Dimethylphenol	105-67-9	16,000,000	µg/Kg	30	U	180	UJL	150	U	300	UJL	460	UJL	500	UJL	1,300	UJL	—		15,000	U	—		—		—	
2,4-Dinitrophenol	51-28-5	1,600,000	µg/Kg	330	U	2,000	UJL	1,700	U	3,300	UJL	4,600	U	5,000	U	13,000	U	—		170,000	U	—		—		—	
2,4-Dinitrotoluene	121-14-2	740,000	µg/Kg	66	U	390	UJL	330	U	660	UJL	930	U	1,000	U	2,500	U	—		33,000	UJK	—		—		—	
2,6-Dinitrotoluene	606-20-2	150,000	µg/Kg	23	U	140	UJL	120	U	230	UJL	700	U	750	U	1,900	U	—		12,000	UJK	—		—		—	
2-Chloronaphthalene	91-58-7	60,000,000	µg/Kg	7	U	39	UJL	33	U	66	UJL	120	U	130	U	320	U	—		3,300	UJK	—		—		—	
2-Chlorophenol	95-57-8	5,800,000	µg/Kg	16	U	98	UJL	83	U	170	UJL	930	U	1,000	U	2,500	U	—		8,400	U	—		—		—	
2-Methylnaphthalene	91-57-6	3,000,000	µg/Kg	**490**		**1,000**	**JL**	**19**	**JQ**	**1,100**	**JL**	230	U	250	U	630	U	—		**11,000**	**JQ**	—		—		—	
2-Methylphenol	95-48-7	41,000,000	µg/Kg	16	U	98	UJL	83	U	170	UJL	700	U	750	U	1,900	U	—		8,400	U	—		—		—	
2-Nitroaniline	88-74-4	8,000,000	µg/Kg	16	U	98	UJL	83	U	170	UJL	460	U	500	U	1,300	U	—		8,400	UJK	—		—		—	
2-Nitrophenol	88-75-5	—	µg/Kg	26	U	160	UJL	130	U	260	UJL	930	U	1,000	U	2,500	U	—		13,000	U	—		—		—	
3 & 4 Methylphenol	15831-10-4	—	µg/Kg	—		—		—		—		930	U	1,000	U	2,500	U	—		—		—		—		—	
3,3'-Dichlorobenzidine	91-94-1	510,000	µg/Kg	99	U	590	UJL	500	U	990	UJL	1,900	U	2,000	U	5,000	U	—		50,000	UJK	—		—		—	
3-Nitroaniline	99-09-2	—	µg/Kg	66	U	390	UJL	330	U	660	UJL	930	U	1,000	U	2,500	U	—		33,000	UJK	—		—		—	
4,6-Dinitro-2-methylphenol	534-52-1	66,000	µg/Kg	230	U	1,400	UJL	1,200	U	2,300	UJL	4,600	U	5,000	U	13,000	U	—		120,000	U	—		—		—	
4-Bromophenyl phenyl ether	101-55-3	—	µg/Kg	23	U	140	UJL	120	U	230	UJL	930	U	1,000	U	2,500	U	—		12,000	UJK	—		—		—	
4-Chloro-3-methylphenol	59-50-7	82,000,000	µg/Kg	23	U	140	UJL	120	U	230	UJL	700	U	750	U	1,900	U	—		12,000	U	—		—		—	
4-Chloroaniline	106-47-8	1,100,000	µg/Kg	33	U	200	UJL	170	U	330	UJL	7,000	UJL	7,500	UJL	19,000	UJL	—		17,000	UJK	—		—		—	
4-Chlorophenyl phenyl ether	7005-72-3	—	µg/Kg	20	U	120	UJL	100	U	200	UJL	930	U	1,000	U	2,500	U	—		10,000	UJK	—		—		—	
4-Methylphenol	106-44-5	82,000,000	µg/Kg	16	U	98	UJL	83	U	170	UJL	—		—		—		—		8,400	U	—		—		—	
4-Nitroaniline	100-01-6	3,300,000	µg/Kg	66	U	390	UJL	330	U	660	UJL	700	U	750	U	1,900	U	—		33,000	UJK	—		—		—	
4-Nitrophenol	100-02-7	—	µg/Kg	160	U	980	UJL	830	U	1,700	UJL	7,000	U	7,500	U	19,000	U	—		84,000	U	—		—		—	
Acenaphthene	83-32-9	45,000,000	µg/Kg	**170**		**81**	**JQ**	**68**	**JQ**	**22,000**	**JL**	**44**	**JQ**	130	U	**68**	**JQ**	—		**210,000**	**JK**	—		—		—	
Acenaphthylene	208-96-8	—	µg/Kg	**27**		20	UJL	17	U	**290**	**JL**	120	U	130	U	320	U	—		**3,300**	**JQ**	—		—		—	
Acetophenone	98-86-2	120,000,000	µg/Kg	16	U	98	UJL	83	U	170	UJL	—		—		—		—		8,400	UJK	—		—		—	
Anthracene	120-12-7	230,000,000	µg/Kg	**280**		**68**	**JQ**	**64**	**JQ**	**71,000**	**JL**	**74**	**JQ**	130	U	320	U	—		**470,000**	**JK**	—		—		—	
Atrazine	1912-24-9	1,000,000	µg/Kg	200	U	1,200	UJL	1,000	U	2,000	UJL	—		—		—		—		100,000	UJK	—		—		—	
Benzaldehyde	100-52-7	82,000,000	µg/Kg	**160**	**JQ**	390	UJL	330	U	660	UJL	—		—		—		—		33,000	UJK	—		—		—	

Table 4-4
Material and Product Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	Removal Management Level [1] (Industrial Soil)	Decision Unit	Green Mill Building								Baghouse Building						Potline Area		Coal Tar Tank Farm		Rectifier Building					
			Sample Area	Green Coke Pile		Green Coke Pile		Green Coke Pile		Green Coke Pile		Baghouse Dust		Baghouse Dust		Baghouse Dust		Alumina Pile Potline 13		Coal Tar Pitch		Transformer Oil		Transformer Oil		Transformer Oil	
			Date	5/21/2019		5/21/2019		5/21/2019		5/21/2019		5/23/2019		5/23/2019		5/23/2019		5/21/2019		5/21/2019		5/22/2019		5/22/2019		5/22/2019	
			EPA Sample Number	19050801		19050802		19050803		19050804		19050805		19050806		19050807		19050702		19050701		19050901		19050902		19050903	
			Field Sample Number	WP01		WP02		WP03		WP04		WP05		WP06		WP07		PP01		CT01		TR01		TR02		TR03	
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Benzo[a]anthracene	56-55-3	2,100,000	µg/Kg	**2,100**		39	UJL	**170**		**430,000**	**JL**	**290**		**380**		**600**		—		**2,600,000**	**JK**	—		—		—	
Benzo[a]pyrene	50-32-8	210,000	µg/Kg	**3,000**		20	UJL	**74**	**JQ**	**560,000**	**JL**	**300**		**220**	**JQ**	**840**		—		**3,400,000**	**JK**	—		—		—	
Benzo[b]fluoranthene	205-99-2	2,100,000	µg/Kg	**3,000**		20	UJL	**97**		**720,000**	**JL**	**1,000**		**2,100**		**3,200**		—		**4,500,000**	**JK**	—		—		—	
Benzo[g,h,i]perylene	191-24-2	—	µg/Kg	**2,800**		20	UJL	17	U	**380,000**	**JL**	**350**		**540**		**1,800**		—		**1,900,000**	**JK**	—		—		—	
Benzo[k]fluoranthene	207-08-9	21,000,000	µg/Kg	**1,100**		20	UJL	**66**	**JQ**	**320,000**	**JL**	**250**	**JQ**	**530**		**1,700**		—		**1,300,000**	**JK**	—		—		—	
Benzoic acid	65-85-0	3,300,000,000	µg/Kg	—		—		—		—		9,300	UJL	10,000	UJL	25,000	UJL	—		—		—		—		—	
Benzyl alcohol	100-51-6	82,000,000	µg/Kg	—		—		—		—		2,300	U	2,500	U	6,300	U	—		—		—		—		—	
Bis(2-chloroethoxy)methane	111-91-1	2,500,000	µg/Kg	16	U	98	UJL	83	U	170	UJL	930	U	1,000	U	2,500	U	—		8,400	UJK	—		—		—	
Bis(2-chloroethyl)ether	111-44-4	100,000	µg/Kg	23	U	140	UJL	120	U	230	UJL	460	U	500	U	1,300	U	—		12,000	UJK	—		—		—	
Bis(2-ethylhexyl) phthalate	117-81-7	16,000,000	µg/Kg	66	U	390	UJL	330	U	660	UJL	2,800	U	3,000	U	7,600	U	—		33,000	UJK	—		—		—	
bis(chloroisopropyl) ether	108-60-1	47,000,000	µg/Kg	—		—		—		—		930	U	1,000	U	2,500	U	—		—		—		—		—	
Butyl benzyl phthalate	85-68-7	120,000,000	µg/Kg	66	U	390	UJL	330	U	660	UJL	930	UJL	1,000	UJL	2,500	UJL	—		33,000	UJK	—		—		—	
Caprolactam	105-60-2	400,000,000	µg/Kg	33	U	200	UJL	170	U	330	UJL	—		—		—		—		17,000	UJK	—		—		—	
Carbazole	86-74-8	—	µg/Kg	**240**		98	UJL	83	U	**95,000**	**JL**	**89**	**JQ**	750	U	1,900	U	—		**710,000**	**JK**	—		—		—	
Chrysene	218-01-9	210,000,000	µg/Kg	**3,000**		**48**	**JQ**	**180**		**500,000**	**JL**	**1,000**		**1,200**		**2,200**		—		**2,800,000**	**JK**	—		—		—	
Dibenz(a,h)anthracene	53-70-3	210,000	µg/Kg	**980**		39	UJL	33	U	**92,000**	**JL**	230	U	**270**		**330**	**JQ**	—		**480,000**	**JK**	—		—		—	
Dibenzofuran	132-64-9	1,000,000	µg/Kg	**210**		**100**	**JQ**	83	U	**10,000**	**JL**	700	U	750	U	1,900	U	—		**94,000**	**JK**	—		—		—	
Diethyl phthalate	84-66-2	660,000,000	µg/Kg	66	U	390	UJL	330	U	660	UJL	7,000	U	7,500	U	19,000	U	—		33,000	UJK	—		—		—	
Dimethyl phthalate	131-11-3	—	µg/Kg	66	U	390	UJL	330	U	660	UJL	700	U	750	U	1,900	U	—		33,000	UJK	—		—		—	
Di-n-butyl phthalate	84-74-2	82,000,000	µg/Kg	66	U	390	UJL	330	U	660	UJL	2,300	U	2,500	U	6,300	U	—		33,000	UJK	—		—		—	
Di-n-octyl phthalate	117-84-0	8,200,000	µg/Kg	66	U	390	UJL	330	U	660	UJL	700	U	750	U	1,900	U	—		33,000	UJK	—		—		—	
Fluoranthene	206-44-0	30,000,000	µg/Kg	**2,400**		**350**	**JL**	**460**		**750,000**	**JL**	**1,500**		**520**		**1,100**		—		**4,600,000**	**JK**	—		—		—	
Fluorene	86-73-7	30,000,000	µg/Kg	**100**		20	UJL	**55**	**JQ**	**21,000**	**JL**	120	U	130	U	320	U	—		**210,000**	**JK**	—		—		—	
Hexachlorobenzene	118-74-1	96,000	µg/Kg	7	U	39	UJL	33	U	66	UJL	230	U	250	U	630	U	—		3,300	UJK	—		—		—	
Hexachlorobutadiene	87-68-3	530,000	µg/Kg	36	U	220	UJL	180	U	360	UJL	230	U	250	U	630	U	—		18,000	UJK	—		—		—	
Hexachlorocyclopentadiene	77-47-4	7,500	µg/Kg	200	U	1,200	UJL	1,000	U	2,000	UJL	460	U	500	U	1,300	U	—		100,000	UJK	—		—		—	
Hexachloroethane	67-72-1	460,000	µg/Kg	33	U	200	UJL	170	U	330	UJL	700	U	750	U	1,900	U	—		17,000	UJK	—		—		—	
Indeno[1,2,3-cd]pyrene	193-39-5	2,100,000	µg/Kg	**1,400**		20	UJL	**35**	**JQ**	**350,000**	**JL**	**300**		**600**		**1,600**		—		**1,700,000**	**JK**	—		—		—	
Isophorone	78-59-1	160,000,000	µg/Kg	16	U	98	UJL	83	U	170	UJL	700	U	750	U	1,900	U	—		8,400	UJK	—		—		—	
Naphthalene	91-20-3	590,000	µg/Kg	**400**		**2,200**	**JL**	**60**	**JQ**	**1,300**	**JL**	120	U	130	U	320	U	—		**14,000**	**JK**	—		—		—	
Nitrobenzene	98-95-3	1,300,000	µg/Kg	26	U	160	UJL	130	U	260	UJL	930	U	1,000	U	2,500	U	—		13,000	UJK	—		—		—	
N-Nitrosodi-n-propylamine	621-64-7	33,000	µg/Kg	23	U	140	UJL	120	U	230	UJL	R		R		R		—		12,000	UJK	—		—		—	
N-Nitrosodiphenylamine	86-30-6	47,000,000	µg/Kg	16	U	98	UJL	83	U	170	UJL	280	U	300	U	760	U	—		8,400	UJK	—		—		—	
Pentachlorophenol	87-86-5	400,000	µg/Kg	66	U	390	U	330	U	660	UJL	2,100	U	2,300	U	5,700	U	—		33,000	U	—		—		—	
Phenanthrene	85-01-8	—	µg/Kg	**1,500**		**540**	**JL**	**470**		**400,000**	**JL**	**580**		**110**	**JQ**	**590**	**JQ**	—		**2,500,000**	**JK**	—		—		—	
Phenol	108-95-2	250,000,000	µg/Kg	**34**	**JQ**	98	UJL	83	U	170	UJL	700	U	750	U	1,900	U	—		8,400	U	—		—		—	
Pyrene	129-00-0	23,000,000	µg/Kg	**3,100**		**400**	**JL**	**430**		**650,000**	**JL**	**830**		**320**		**1,000**		—		**4,000,000**	**JK**	—		—		—	
TAL Metals																											
Aluminum	7429-90-5	1,100,000	mg/Kg	**42.1**	**JK**	**372**	**JK**	**51.1**	**JK**	**3,390**	**JK**	**160,000**		**150,000**		**130,000**		**192,000**	**JK**	**363**	**JK**	—		—		—	
Antimony	7440-36-0	470	mg/Kg	**0.897**	**JK**	**0.671**	**JK**	0.104	U	**0.446**	**JK**	**9**		**5.6**		**4.6**		0.15	U	**0.117**	**JQ**	—		—		—	
Arsenic	7440-38-2	300	mg/Kg	0.107	U	**1.42**	**JH**	0.328	U	**1.39**	**JH**	**14**	**JL**	**14**	**JL**	**10**	**JL**	0.473	U	**0.916**	**JH**	—		—		—	
Barium	7440-39-3	220,000	mg/Kg	**2.1**	**JK**	**2.01**	**JK**	**2.44**	**JK**	**12.8**	**JK**	**180**		**110**		**32**		**4.83**	**JK**	**3.13**	**JK**	—		—		—	
Beryllium	7440-41-7	2,300	mg/Kg	0.0182	U	0.0153	U	0.0187	U	**0.167**		**15**		**9.7**		**1.6**		**0.323**		0.0191	U	—		—		—	
Cadmium	7440-43-9	980	mg/Kg	0.0403	U	0.0338	U	0.164	U	**1.46**	**JK**	**2**		**2.4**		**1.6**		0.237	U	**0.339**	**JK**	—		—		—	
Calcium	7440-70-2	—	mg/Kg	**58.2**		**103**		**35.1**	**JQ**	**343**		**9,500**	**JH**	**12,000**	**JH**	**4,200**	**JH**	**601**		**305**		—		—		—	
Chromium	7440-47-3	1,800,000	mg/Kg	0.640	U	0.537	U	**1.08**	**JK**	**3.71**	**JK**	**5.3**	**JK**	**14**	**JK**	**5.8**	**JK**	**1.11**	**JK**	**0.992**	**JK**	—		—		—	
Cobalt	7440-48-4	350	mg/Kg	**0.335**		**0.279**		**0.171**		**0.348**		**1.1**	**JK**	**1.8**	**JK**	**2.8**	**JK**	0.237	U	**0.186**		—		—		—	
Copper	7440-50-8	47,000	mg/Kg	2.86	U	**7.98**	**JK**	2.93	U	**11.5**	**JK**	**220**	**JK**	**1,700**	**JK**	**81**	**JK**	9.47	U	6.7	U	—		—		—	
Iron	7439-89-6	820,000	mg/Kg	**74.3**		**354**		**176**		**1460**		**4,500**	**JQ**	**10,000**	**JK**	**13,000**	**JK**	**344**		**2050**		—		—		—	
Lead	7439-92-1	800	mg/Kg	0.48	U	**0.432**	**JK**	**2.33**	**JK**	**18.7**	**JK**	**29**	**JQ**	**81**	**JQ**	**53**	**JK**	**9.67**	**JK**	**6.88**	**JK**	—		—		—	
Magnesium	7439-95-4	—	mg/Kg	**6.76**	**JQ**	**7.04**		**10.3**		**85.2**		**610**		**1,300**		**560**		**48.7**		**54.9**		—		—		—	

Table 4-4
Material and Product Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	Removal Management Level [1] (Industrial Soil)	Decision Unit	Green Mill Building								Baghouse Building						Potline Area		Coal Tar Tank Farm		Rectifier Building					
			Sample Area	Green Coke Pile		Green Coke Pile		Green Coke Pile		Green Coke Pile		Baghouse Dust		Baghouse Dust		Baghouse Dust		Alumina Pile Potline 13		Coal Tar Pitch		Transformer Oil		Transformer Oil		Transformer Oil	
			Date	5/21/2019		5/21/2019		5/21/2019		5/21/2019		5/23/2019		5/23/2019		5/23/2019		5/21/2019		5/21/2019		5/22/2019		5/22/2019		5/22/2019	
			EPA Sample Number	19050801		19050802		19050803		19050804		19050805		19050806		19050807		19050702		19050701		19050901		19050902		19050903	
			Field Sample Number	WP01		WP02		WP03		WP04		WP05		WP06		WP07		PP01		CT01		TR01		TR02		TR03	
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Manganese	7439-96-5	26,000	mg/Kg	1.6	U	**4.64**	**JK**	1.64	U	**16.1**	**JK**	**50**	**JK**	**100**	**JK**	**98**	**JK**	**5.61**	**JK**	**18.3**	**JK**	––		––		––	
Mercury	7439-97-6	46	mg/Kg	0.0288	U	0.0292	U	0.0307	U	0.0302	U	**0.12**		**0.013**	**JQ**	**0.032**	**JQ**	0.0443	U	**2.55**		––		––		––	
Nickel	7440-02-0	22,000	mg/Kg	**12.9**		**4.36**		**28.9**		**18.8**		**210**		**230**		**320**		**4.46**		**2.61**		––		––		––	
Potassium	9/7/7440	––	mg/Kg	15.8	U	13.3	U	16.2	U	**99.1**		**1,700**	**JL**	**1,300**	**JL**	**380**	**JL**	**33.8**	**JQ**	**30.1**	**JQ**	––		––		––	
Selenium	7782-49-2	5,800	mg/Kg	0.104	U	0.0875	U	0.107	U	**0.453**		4.2	UJL	4.2	UJL	5.7	UJL	0.154	U	**0.123**	**JQ**	––		––		––	
Silver	7440-22-4	5,800	mg/Kg	0.0325	U	0.0272	U	0.0333	U	**0.0491**	**JQ**	2.1	U	2.1	U	**0.88**	**JQ**	0.048	U	0.034	U	––		––		––	
Sodium	7440-23-5	––	mg/Kg	37	U	**489**		**99.2**		**1,500**		**60,000**	**JL**	**52,000**	**JL**	**8,800**	**JL**	**1,050**		**44.3**	**JQ**	––		––		––	
Thallium	7440-28-0	12	mg/Kg	0.0314	U	0.0263	U	0.0321	U	**0.092**		420	U	420	U	5.7	U	0.0464	U	**0.313**		––		––		––	
Vanadium	7440-62-2	5,800	mg/Kg	**30.8**	**JH**	**12**	**JH**	**38.5**	**JH**	**33.1**	**JH**	**32**		**33**		**26**		**7.31**	**JH**	**0.766**	**JH**	––		––		––	
Zinc	7440-66-6	350,000	mg/Kg	**3.3**	**JK**	**4.55**	**JK**	**8.63**	**JK**	**91.4**	**JK**	340	U	330	U	**200**	**JK**	**13.6**	**JK**	**54.5**	**JK**	––		––		––	
General Chemistry Parameters																											
Sulfur	7704-34-9	––	mg/Kg	––		––		**274**		––		––		––		––		––		––		––		––		––	
Total Carbon	––	––	mg/Kg	––		––		**940,000**		––		––		––		––		––		––		––		––		––	
pH	––	––	s.u.	––		––		**3.04**	**JK**	––		––		––		––		––		––		––		––		––	

Notes:

(1) Removal Management Levels are based on a 10^{-4} risk level for carcinogens and a Hazard Quotient of 1 for non-carcinogens.

(2) Total PCBs were calculated as the sum of the concentrations of any detected Aroclor.

(3) The Removal Management Level for total PCBs is the value for "Polychlorinated Biphenyls (high risk)," CAS number 1336-36-3.

Screening levels from EPA Region Removal Management Levels for Chemicals (May 2019) are risk-based concentrations derived from standardized equations combining exposure assumptions with toxicity data from the Superfund program's hierarchy..

Detected results are in bold type.

Yellow highlight indicates a result that exceeds at least one of the listed screening levels.

–– = Not Applicable
µg/kg = micrograms per kilogram
CAS = Chemical Abstracts Service
H = The sample result is biased high.
J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
K = The bias of the sample is not known.
L = The sample result is biased low.
mg/Kg = milligrams per kilogram
PCBs = Polychlorinated Biphenyls (PCBs), EPA Method 8082A by GC/ECD
Q = Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.
Qual = Qualifier
SVOCs = Semi-Volatile Organic Compounds, EPA Method 8270D by GC/MS
s.u. = standard units
TAL Metals = Target Analyte List Metals, EPA Method 6010C (ICP-AES) and 7471 (CVAA)
U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
VOCs = Volatile Organic Compounds, EPA Method 8260C by GC/MS

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Table 4-5
Catch Basin and Soil Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	Removal Management Level [1] (Industrial Soil)	Decision Unit	Baghouse Building						Green Mill Building					
			Sample Area	Catchbasin, Bay 19		Soil by Ext. Siding, Bay 3		Catchbasin, Bay 2		Soil by Ext. Siding		Catchbasin		Catchbasin	
			Date	5/21/2019		5/21/2019		5/21/2019		5/21/2019		5/21/2019		5/21/2019	
			EPA Sample Number	19050201		19050301		19050202		19050302		19050203		19050204	
			Field Sample Number	SB01		SP01		SB02		SP02		SB03		SB04	
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PCBs															
PCB-1016	12674-11-2	51,000	µg/kg	16,000	U	3,700	U	11,000	U	76	U	220	U	11,000	U
PCB-1221	11104-28-2	83,000	µg/kg	20,000	U	4,800	U	14,000	U	97	U	290	U	15,000	U
PCB-1232	11141-16-5	72,000	µg/kg	35,000	U	8,300	U	25,000	U	170	U	500	U	25,000	U
PCB-1242	53469-21-9	95,000	µg/kg	14,000	U	3,400	U	10,000	U	70	U	200	U	10,000	U
PCB-1248	12672-29-6	95,000	µg/kg	14,000	U	3,400	U	10,000	U	**150**	**JQ**	**400**	**JQ**	10,000	U
PCB-1254	11097-69-1	15,000	µg/kg	14,000	U	3,400	U	10,000	U	70	U	200	U	10,000	U
PCB-1260	37324-23-5	99,000	µg/kg	21,000	U	5,100	U	15,000	U	100	U	300	U	16,000	U
PCB-1262	11100-14-4	—	µg/kg	14,000	U	3,400	U	10,000	U	70	U	200	U	10,000	U
PCB-1268	11096-82-5	—	µg/kg	**130,000**		**170,000**		**220,000**		**920**		**3,500**		**70,000**	
Total PCBs [2]	1336-36-3	94,000 [3]	µg/kg	**130,000**		**170,000**		**220,000**		**1,070**		**3,900**		**70,000**	
SVOCs															
1,1'-Biphenyl	92-52-4	200,000	µg/kg	180	U	**160**	**JQ**	**710**		**12,000**		**1,400**		**8,200**	**JK**
1,2,4,5-Tetrachlorobenzene	95-94-3	350,000	µg/kg	180	U	85	U	130	U	880	U	100	U	1,300	UJK
1,4-Dioxane	123-91-1	2,400,000	µg/kg	1,100	U	510	U	770	U	5,300	U	620	U	7,800	UJK
2,2'-oxybis(1-Chloropropane)	108-60-1	47,000,000	µg/kg	220	U	100	U	150	U	1,100	U	120	U	1,600	UJK
2,3,4,6-Tetrachlorophenol	58-90-2	25,000,000	µg/kg	720	U	340	U	510	U	3,500	U	410	U	5,200	UJK
2,4,5-Trichlorophenol	95-95-4	82,000,000	µg/kg	330	U	150	U	230	U	1,600	U	190	U	2,400	UJK
2,4,6-Trichlorophenol	88-06-2	820,000	µg/kg	290	U	140	U	200	U	1,400	U	160	U	2,100	UJK
2,4-Dichlorophenol	120-83-2	2,500,000	µg/kg	220	U	100	U	150	U	1,100	U	120	U	1,600	UJK
2,4-Dimethylphenol	105-67-9	16,000,000	µg/kg	330	U	150	U	230	U	1,800	JQ	**230**	**JQ**	2,400	UJK
2,4-Dinitrophenol	51-28-5	1,600,000	µg/kg	3,600	U	1,700	U	2,600	U	18,000	U	2,100	U	26,000	UJK
2,4-Dinitrotoluene	121-14-2	740,000	µg/kg	720	U	340	U	510	U	3,500	U	410	U	5,200	UJK
2,6-Dinitrotoluene	606-20-2	150,000	µg/kg	250	U	120	U	180	U	1,200	U	140	U	1,800	UJK
2-Chloronaphthalene	91-58-7	60,000,000	µg/kg	72	U	34	U	51	U	350	U	41	U	520	UJK
2-Chlorophenol	95-57-8	5,800,000	µg/kg	180	U	85	U	130	U	880	U	100	U	1,300	UJK
2-Methylnaphthalene	91-57-6	3,000,000	µg/kg	**48**	**JQ**	**490**		**1,900**		**44,000**		**5,400**		**30,000**	**JK**
2-Methylphenol	95-48-7	41,000,000	µg/kg	180	U	85	U	130	U	880	U	100	U	1,300	UJK
2-Nitroaniline	88-74-4	8,000,000	µg/kg	180	U	85	U	130	U	880	U	100	U	1,300	UJK
2-Nitrophenol	88-75-5	—	µg/kg	290	U	140	U	200	U	1,400	U	160	U	2,100	UJK
3,3'-Dichlorobenzidine	91-94-1	510,000	µg/kg	1,100	U	510	U	770	U	5,300	U	620	U	7,800	UJK
3-Nitroaniline	99-09-2	—	µg/kg	720	U	340	U	510	U	3,500	U	410	U	5,200	UJK
4,6-Dinitro-2-methylphenol	534-52-1	66,000	µg/kg	2,500	U	1,200	U	1,800	U	12,000	U	1,400	U	18,000	UJK
4-Bromophenyl-phenylether	101-55-3	—	µg/kg	250	U	120	U	180	U	1,200	U	140	U	1,800	UJK
4-Chloro-3-methylphenol	59-50-7	82,000,000	µg/kg	250	U	120	U	180	U	1,200	U	140	U	1,800	UJK
4-Chloroaniline	106-47-8	1,100,000	µg/kg	360	U	170	U	260	U	1,800	U	210	U	2,600	UJK
4-Chlorophenyl-phenylether	7005-72-3	—	µg/kg	220	U	100	U	150	U	1,100	U	120	U	1,600	UJK
4-Methylphenol	106-44-5	82,000,000	µg/kg	180	U	85	U	130	U	**3,100**		**500**		**3,200**	**JQ**
4-Nitroaniline	100-01-6	3,300,000	µg/kg	720	U	340	U	510	U	3,500	U	410	U	5,200	UJK
4-Nitrophenol	100-02-7	—	µg/kg	1,800	U	850	U	1,300	U	8,800	U	1,000	U	13,000	UJK
Acenaphthene	83-32-9	45,000,000	µg/kg	**88**	**JQ**	**3,600**		**16,000**		**200,000**		**37,000**		**170,000**	**JK**
Acenaphthylene	208-96-8	—	µg/kg	**48**	**JQ**	**210**		**680**		**9,600**		**1,200**		**7,200**	**JK**
Acetophenone	98-86-2	120,000,000	µg/kg	180	U	**110**	**JQ**	**140**	**JQ**	880	U	100	U	1,300	UJK
Anthracene	120-12-7	230,000,000	µg/kg	**570**		**5,500**		**28,000**		**220,000**		**49,000**		**230,000**	**JK**
Atrazine	1912-24-9	1,000,000	µg/kg	2,200	U	1,000	U	1,500	U	11,000	U	1,200	U	16,000	UJK
Benzaldehyde	100-52-7	82,000,000	µg/kg	720	U	340	U	510	U	3,500	U	410	U	5,200	UJK
Benzo(a)anthracene	56-55-3	2,100,000	µg/kg	**2,100**		**17,000**		**87,000**		**560,000**		**160,000**		**510,000**	**JK**
Benzo(a)pyrene	50-32-8	210,000	µg/kg	**1,800**		**17,000**		**66,000**		**480,000**		**160,000**		**470,000**	**JK**
Benzo(b)fluoranthene	205-99-2	2,100,000	µg/kg	**5,400**		**25,000**		**100,000**		**620,000**		**190,000**		**610,000**	**JK**

Table 4-5
Catch Basin and Soil Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	Removal Management Level [1] (Industrial Soil)	Decision Unit	Baghouse Building						Green Mill Building					
			Sample Area	Catchbasin, Bay 19		Soil by Ext. Siding, Bay 3		Catchbasin, Bay 2		Soil by Ext. Siding		Catchbasin		Catchbasin	
			Date	5/21/2019		5/21/2019		5/21/2019		5/21/2019		5/21/2019		5/21/2019	
			EPA Sample Number	19050201		19050301		19050202		19050302		19050203		19050204	
			Field Sample Number	SB01		SP01		SB02		SP02		SB03		SB04	
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Benzo(ghi)perylene	191-24-2	—	µg/kg	**1,600**		**9,900**		**30,000**		**230,000**		**95,000**		**240,000**	**JK**
Benzo(k)fluoranthene	207-08-9	21,000,000	µg/kg	**1,400**		**9,400**		**34,000**		**210,000**		**21,000**		**270,000**	**JK**
bis(2-Chloroethoxy)methane	111-91-1	2,500,000	µg/kg	180	U	85	U	130	U	880	U	100	U	1,300	UJK
bis(2-Chloroethyl)ether	111-44-4	100,000	µg/kg	250	U	120	U	180	U	1,200	U	140	U	1,800	UJK
bis(2-Ethylhexyl)phthalate	117-81-7	16,000,000	µg/kg	**2,100**		340	U	510	U	3,500	U	410	U	5,200	UJK
Butylbenzylphthalate	85-68-7	120,000,000	µg/kg	720	U	340	U	510	U	3,500	U	410	U	5,200	UJK
Caprolactam	105-60-2	400,000,000	µg/kg	360	U	170	U	260	U	1,800	U	210	U	2,600	UJK
Carbazole	86-74-8	—	µg/kg	**530**		**5,000**		**19,000**		**200,000**		**42,000**		**190,000**	**JK**
Chrysene	218-01-9	210,000,000	µg/kg	**4,500**		**25,000**		**100,000**		**790,000**		**190,000**		**710,000**	**JK**
Dibenzo(a,h)anthracene	53-70-3	210,000	µg/kg	**450**		**3,300**		**11,000**		**90,000**		**31,000**		**73,000**	**JK**
Dibenzofuran	132-64-9	1,000,000	µg/kg	**260**	**JQ**	**1,700**		**7,400**		**120,000**		**14,000**		**81,000**	**JK**
Diethyl phthalate	84-66-2	660,000,000	µg/kg	720	U	340	U	510	U	3,500	U	410	U	5,200	UJK
Dimethyl phthalate	131-11-3	—	µg/kg	720	U	340	U	510	U	3,500	U	410	U	5,200	UJK
Di-n-butylphthalate	84-74-2	82,000,000	µg/kg	720	U	340	U	510	U	3,500	U	410	U	5,200	UJK
Di-n-octylphthalate	117-84-0	8,200,000	µg/kg	720	U	340	U	**13,000**		3,500	U	410	U	5,200	UJK
Fluoranthene	206-44-0	30,000,000	µg/kg	**7,200**		**46,000**		**210,000**		**1,700,000**		**340,000**		**1,500,000**	**JK**
Fluorene	86-73-7	30,000,000	µg/kg	**170**	**JQ**	**2,300**		**9,700**		**120,000**		**21,000**		**98,000**	**JK**
Hexachlorobenzene	118-74-1	96,000	µg/kg	72	U	34	U	51	U	350	U	41	U	520	UJK
Hexachlorobutadiene	87-68-3	530,000	µg/kg	400	U	190	U	280	U	1,900	U	230	U	2,900	UJK
Hexachlorocyclopentadiene	77-47-4	7,500	µg/kg	2,200	U	1,000	U	1,500	U	11,000	U	1,200	U	16,000	UJK
Hexachloroethane	67-72-1	460,000	µg/kg	360	U	170	U	260	U	1,800	U	210	U	2,600	UJK
Indeno(1,2,3-cd)pyrene	193-39-5	2,100,000	µg/kg	**1,300**		**9,400**		**30,000**		**230,000**		**93,000**		**250,000**	**JK**
Isophorone	78-59-1	160,000,000	µg/kg	180	U	85	U	130	U	880	U	100	U	1,300	UJK
Naphthalene	91-20-3	590,000	µg/kg	72	U	**1,800**		**4,100**		**96,000**		**11,000**		**63,000**	**JK**
Nitrobenzene	98-95-3	1,300,000	µg/kg	290	U	140	U	200	U	1,400	U	160	U	2,100	UJK
N-Nitrosodi-n-propylamine	621-64-7	33,000	µg/kg	250	U	120	U	180	U	1,200	U	140	U	1,800	UJK
N-Nitrosodiphenylamine	86-30-6	47,000,000	µg/kg	180	U	85	U	130	U	880	U	100	U	**3,700**	**JK**
Pentachlorophenol	87-86-5	400,000	µg/kg	720	U	340	U	510	U	3,500	U	410	U	5,200	UJK
Phenanthrene	85-01-8	—	µg/kg	**4,400**		**40,000**		**190,000**		**1,800,000**		**300,000**		**1,500,000**	**JK**
Phenol	108-95-2	250,000,000	µg/kg	180	U	85	U	**160**	**JQ**	**1,700**	**JQ**	**280**		**1,900**	**JQ**
Pyrene	129-00-0	23,000,000	µg/kg	**4,000**		**45,000**		**200,000**		**1,500,000**		**330,000**		**1,400,000**	**JK**
TAL Metals															
Aluminum	7429-90-5	1,100,000	mg/kg	**183,000**	**JK**	**181,000**	**JK**	**136,000**	**JL**	**9,700**	**JK**	**29,100**	**JL**	**11,800**	**JH**
Calcium	7440-70-2	—	mg/kg	**22,500**		**28,300**		**18,300**	**JL**	**1,900**		**3,300**	**JL**	**3,840**	
Iron	7439-89-6	820,000	mg/kg	**36,200**		**55,600**		**65,400**	**JL**	**15,700**		**15,300**	**JL**	**21,300**	
Magnesium	7439-95-4	—	mg/kg	**4,900**		**5,210**		**3,920**	**JL**	**6,320**		**5,300**	**JL**	**3,800**	
Potassium	2023695	—	mg/kg	**3,630**		**1,240**		**1,240**	**JL**	**1,550**		**1,970**	**JL**	**1,450**	
Sodium	7440-23-5	—	mg/kg	**45,700**		**2,410**		**3,440**		**112**		**264**		**291**	
Antimony	7440-36-0	470	mg/kg	**45.7**	**JK**	**2.3**	**JK**	**5.96**	**JH**	**14.1**	**JK**	**0.411**	**JQ**	**43.6**	**JK**
Arsenic	7440-38-2	300	mg/kg	**99**	**JH**	**20.1**	**JH**	**51**		**9.88**	**JH**	**12.3**		**6.04**	**JH**
Barium	7440-39-3	220,000	mg/kg	**814**	**JK**	**197**	**JK**	**372**	**JL**	**50.4**	**JK**	**79.5**	**JL**	**381**	**JK**
Beryllium	7440-41-7	2,300	mg/kg	**6.15**		**2.06**		**3.78**		**0.359**		**0.998**		**0.361**	
Cadmium	7440-43-9	980	mg/kg	**18**	**JK**	**5.98**	**JK**	**7.37**		**0.219**	**JK**	**0.718**		**2.37**	**JK**
Chromium	7440-47-3	1,800,000	mg/kg	**65**	**JK**	**32.8**	**JK**	**67**		**10.3**	**JK**	**15.6**		**44.7**	**JK**
Cobalt	7440-48-4	350	mg/kg	**18.3**		**11.9**		**15.1**		**3.2**		**4.83**		**4.87**	
Copper	7440-50-8	47,000	mg/kg	**763**	**JK**	**1,570**	**JK**	**1,830**		**14.3**	**JK**	**140**		**201**	**JK**
Lead	7439-92-1	800	mg/kg	**771**	**JK**	**333**	**JK**	**381**	**JL**	**21.6**	**JK**	**34**	**JL**	**597**	**JK**
Manganese	7439-96-5	26,000	mg/kg	**184**	**JK**	**617**	**JK**	**582**	**JL**	**214**	**JK**	**340**	**JL**	**189**	**JK**
Mercury	7439-97-6	46	mg/kg	0.286	U	0.0307	U	**0.0921**	**JQ**	0.0309	U	0.0386	U	0.0463	U

Table 4-5
Catch Basin and Soil Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	Removal Management Level [1] (Industrial Soil)	Decision Unit	Baghouse Building						Green Mill Building					
			Sample Area	Catchbasin, Bay 19		Soil by Ext. Siding, Bay 3		Catchbasin, Bay 2		Soil by Ext. Siding		Catchbasin		Catchbasin	
			Date	5/21/2019		5/21/2019		5/21/2019		5/21/2019		5/21/2019		5/21/2019	
			EPA Sample Number	19050201		19050301		19050202		19050302		19050203		19050204	
			Field Sample Number	SB01		SP01		SB02		SP02		SB03		SB04	
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Nickel	7440-02-0	22,000	mg/kg	**1,120**		**130**		**376**		**10.1**		**31.5**		**29**	
Selenium	7782-49-2	5,800	mg/kg	**17.9**		**0.922**		**2.63**		0.135	U	**0.161**	**JQ**	**0.264**	**JQ**
Silver	7440-22-4	5,800	mg/kg	**0.495**		**1.17**		**0.802**		**0.0568**	**JQ**	**0.169**		**0.257**	
Thallium	7440-28-0	12	mg/kg	**0.65**		**0.0758**		0.207	U	0.104	U	**0.15**		0.131	U
Vanadium	7440-62-2	5,800	mg/kg	**379**	**JH**	**51**	**JH**	**96**	**JL**	**16.9**	**JH**	**37.5**	**JL**	**43.9**	**JH**
Zinc	7440-66-6	350,000	mg/kg	**1,210**	**JK**	**3,670**	**JK**	**1,310**	**JL**	**170**	**JK**	**271**	**JL**	**1,020**	**JK**
VOCs															
1,1,1-Trichloroethane	71-55-6	36,000,000	µg/kg	––		––		––		––		––		1	U
1,1,2,2-Tetrachloroethane	79-34-5	270,000	µg/kg	––		––		––		––		––		0.9	U
1,1,2-Trichloroethane	79-00-5	6,300	µg/kg	––		––		––		––		––		1	U
1,1-Dichloroethane	75-34-3	1,600,000	µg/kg	––		––		––		––		––		1	U
1,1-Dichloroethene	75-35-4	1,000,000	µg/kg	––		––		––		––		––		1	U
1,2,3-Trichlorobenzene	87-61-6	930,000	µg/kg	––		––		––		––		––		12	U
1,2,4-Trichlorobenzene	120-82-1	260,000	µg/kg	––		––		––		––		––		12	U
1,2-Dibromo-3-chloropropane	96-12-8	6,400	µg/kg	––		––		––		––		––		0.9	U
1,2-Dibromoethane	106-93-4	16,000	µg/kg	––		––		––		––		––		0.9	U
1,2-Dichlorobenzene	95-50-1	9,300,000	µg/kg	––		––		––		––		––		1	U
1,2-Dichloroethane	107-06-2	140,000	µg/kg	––		––		––		––		––		1	U
1,2-Dichloropropane	78-87-5	66,000	µg/kg	––		––		––		––		––		1	U
1,3-Dichlorobenzene	541-73-1	––	µg/kg	––		––		––		––		––		1	U
1,4-Dichlorobenzene	106-46-7	1,100,000	µg/kg	––		––		––		––		––		0.9	U
2-Hexanone	591-78-6	1,300,000	µg/kg	––		––		––		––		––		2	U
4-Methyl-2-pentanone	108-10-1	140,000,000	µg/kg	––		––		––		––		––		2	U
Acetone	67-64-1	670,000,000	µg/kg	––		––		––		––		––		**210**	
Benzene	71-43-2	420,000	µg/kg	––		––		––		––		––		1	U
Bromochloromethane	74-97-5	630,000	µg/kg	––		––		––		––		––		1	U
Bromodichloromethane	75-27-4	130,000	µg/kg	––		––		––		––		––		0.9	U
Bromoform	75-25-2	8,600,000	µg/kg	––		––		––		––		––		12	U
Bromomethane	74-83-9	30,000	µg/kg	––		––		––		––		––		2	U
Carbon disulfide	75-15-0	3,500,000	µg/kg	––		––		––		––		––		**54**	**JL**
Carbon tetrachloride	56-23-5	290,000	µg/kg	––		––		––		––		––		1	U
Chlorobenzene	108-90-7	1,300,000	µg/kg	––		––		––		––		––		1	U
Chloroethane	75-00-3	57,000,000	µg/kg	––		––		––		––		––		2	U
Chloroform	67-66-3	140,000	µg/kg	––		––		––		––		––		1	U
Chloromethane	74-87-3	460,000	µg/kg	––		––		––		––		––		1	U
cis-1,2-Dichloroethene	156-59-2	2,300,000	µg/kg	––		––		––		––		––		1	U
cis-1,3-Dichloropropene	10061-01-5	––	µg/kg	––		––		––		––		––		0.9	U
Cyclohexane	110-82-7	27,000,000	µg/kg	––		––		––		––		––		1	U
Dibromochloromethane	124-48-1	3,900,000	µg/kg	––		––		––		––		––		0.9	U
Dichlorodifluoromethane	75-71-8	370,000	µg/kg	––		––		––		––		––		1	U
Ethylbenzene	100-41-4	2,500,000	µg/kg	––		––		––		––		––		**2**	**JQ**
Freon 113	76-13-1	28,000,000	µg/kg	––		––		––		––		––		1	U
Isopropylbenzene	98-82-8	9,900,000	µg/kg	––		––		––		––		––		0.9	U
m,p-Xylenes	179601-23-1	2,400,000	µg/kg	––		––		––		––		––		**4**	**JQ**
Methyl acetate	79-20-9	1,200,000,000	µg/kg	––		––		––		––		––		2	U
Methyl ethyl ketone (2-Butanone)	78-93-3	190,000,000	µg/kg	––		––		––		––		––		**40**	
Methyl tert-Butyl Ether (MTBE)	1634-04-4	21,000,000	µg/kg	––		––		––		––		––		1	U
Methylcyclohexane	108-87-2	––	µg/kg	––		––		––		––		––		1	UJL
Methylene chloride	75-09-2	3,200,000	µg/kg	––		––		––		––		––		**6**	**JQ**

Table 4-5
Catch Basin and Soil Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	Removal Management Level [(1)] (Industrial Soil)	Decision Unit	Baghouse Building						Green Mill Building					
			Sample Area	Catchbasin, Bay 19		Soil by Ext. Siding, Bay 3		Catchbasin, Bay 2		Soil by Ext. Siding		Catchbasin		Catchbasin	
			Date	5/21/2019		5/21/2019		5/21/2019		5/21/2019		5/21/2019		5/21/2019	
			EPA Sample Number	19050201		19050301		19050202		19050302		19050203		19050204	
			Field Sample Number	SB01		SP01		SB02		SP02		SB03		SB04	
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
o-Xylene	95-47-6	2,800,000	µg/kg	––		––		––		––		––		**3**	**JQ**
Styrene	100-42-5	35,000,000	µg/kg	––		––		––		––		––		0.7	U
Tetrachloroethene	127-18-4	390,000	µg/kg	––		––		––		––		––		1	U
Toluene	108-88-3	47,000,000	µg/kg	––		––		––		––		––		**4**	**JQ**
trans-1,2-Dichloroethene	156-60-5	23,000,000	µg/kg	––		––		––		––		––		1	U
trans-1,3-Dichloropropene	10061-02-6	––	µg/kg	––		––		––		––		––		0.7	U
Trichloroethene	79-01-6	19,000	µg/kg	––		––		––		––		––		1	U
Trichlorofluoromethane	75-69-4	350,000,000	µg/kg	––		––		––		––		––		2	U
Vinyl chloride	75-01-4	170,000	µg/kg	––		––		––		––		––		1	U
NWTPH-Gx		**Washington MTCA Method A Soil Cleanup Level for Industrial Soil**													
NWTPH-GX Soil C7-C12	NWTPH-Gx modified	100	mg/kg	––		––		––		––		––		**5.9**	**JQ**
NWTPH-Dx															
Diesel Range Organics C12-C24	NWTPH-Dx modified	2,000	mg/kg	––		––		––		––		––		**23,000**	
Heavy Range Organics C24-C40	NWTPH-Dx modified	2,000	mg/kg	––		––		––		––		––		**32,000**	

Notes:

(1) Removal Management Levels are based on a 10^{-4} risk level for carcinogens and a Hazard Quotient of 1 for non-carcinogens.

(2) Total PCBs were calculated as the sum of the concentrations of any detected Aroclor.

(3) The Removal Management Level for total PCBs is the value for "Polychlorinated Biphenyls (high risk)," CAS number 1336-36-3.

Screening levels from EPA Region Removal Management Levels for Chemicals (May 2019) are risk-based concentrations derived from standardized equations combining exposure assumptions with toxicity data from the Superfund program's hierarchy..

Detected results are in bold type.

Yellow highlight indicates a result that exceeds at least one of the listed screening levels.

–– = Not Applicable
µg/kg = micrograms per kilogram
CAS = Chemical Abstracts Service
H = The sample result is biased high.
J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
K = The bias of the sample is not known.
L = The sample result is biased low.
mg/Kg = milligrams per kilogram
MTCA = Model Toxics Control Act
NWTPH-Dx = Northwest Total Petroleum Hydrocarbons - Extended Diesel Range (Semi-volatile Petroleum Products)
NWTPH-Gx = Northwest Total Petroleum Hydrocarbons - Extended Gasoline Range (Volatile Petroleum Products)
PCBs = Polychlorinated Biphenyls (PCBs), EPA Method 8082A by GC/ECD
Q = Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.
Qual = Qualifier
RSL = Regional Removal Management Levels
SVOCs = Semi-Volatile Organic Compounds, EPA Method 8270D by GC/MS
TAL Metals = Target Analyte List Metals, EPA Method 6010C (ICP-AES) and 7471 (CVAA)
U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
VOCs = Volatile Organic Compounds, EPA Method 8260C by GC/MS

Table 4-6
Sediment Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	Washington State Freshwater Sediment Sediment Cleanup Objective (SCO) WAC 173-204-563	Washington State Freshwater Sediment Cleanup Screening Level (CSL) WAC 173-204-563	Decision Unit	Upper Pond		Lower Pond				Outfall	
				Sample Area	Pond		Pipe into Pond		Pond into Aqueduct		Aqueduct to Creek	
				Date	5/20/2019		5/20/2019		5/20/2019		5/20/2019	
				EPA Sample Number	19050501		19050403		19050402		19050401	
				Field Sample Number	PD01		OF03		OF02		OF01	
				Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PCBs												
PCB-1016	12674-11-2	--	--	µg/kg	880	U	23	U	190	U	4.8	U
PCB-1221	11104-28-2	--	--	µg/kg	1,100	U	29	U	240	U	6.2	U
PCB-1232	11141-16-5	--	--	µg/kg	2,000	U	51	U	410	U	11	U
PCB-1242	53469-21-9	--	--	µg/kg	810	U	21	U	170	U	4.4	U
PCB-1248	12672-29-6	--	--	µg/kg	**2,400**	**JQ**	**160**		170	U	**5.8**	**JQ**
PCB-1254	11097-69-1	--	--	µg/kg	**1,600**	**JQ**	21	U	170	U	4.4	U
PCB-1260	37324-23-5	--	--	µg/kg	1,200	U	31	U	250	U	6.6	U
PCB-1262	11100-14-4	--	--	µg/kg	810	U	21	U	170	U	4.4	U
PCB-1268	11096-82-5	--	--	µg/kg	**11,000**		**1,500**		**12,000**		4.4	U
Total PCBs [(1)]	N/A	110	2,500	µg/kg	**15,000**		**1,660**		**12,000**		**5.8**	
SVOCs												
1,1'-Biphenyl	92-52-4	--	--	µg/kg	40	U	**24**	**JQ**	85	U	22	U
1,2,4,5-Tetrachlorobenzene	95-94-3	--	--	µg/kg	40	U	21	U	85	U	22	U
1,4-Dioxane	123-91-1	--	--	µg/kg	240	U	130	U	510	U	130	U
2,2'-oxybis(1-Chloropropane)	108-60-1	--	--	µg/kg	48	U	26	U	100	U	27	U
2,3,4,6-Tetrachlorophenol	58-90-2	--	--	µg/kg	160	U	86	U	340	U	89	U
2,4,5-Trichlorophenol	95-95-4	--	--	µg/kg	72	U	39	U	150	U	40	U
2,4,6-Trichlorophenol	88-06-2	--	--	µg/kg	64	U	34	U	140	U	36	U
2,4-Dichlorophenol	120-83-2	--	--	µg/kg	48	U	26	U	100	U	27	U
2,4-Dimethylphenol	105-67-9	--	--	µg/kg	72	U	39	U	150	U	40	U
2,4-Dinitrophenol	51-28-5	--	--	µg/kg	810	U	430	UJL	1700	U	450	U
2,4-Dinitrotoluene	121-14-2	--	--	µg/kg	160	U	86	U	340	U	89	U
2,6-Dinitrotoluene	606-20-2	--	--	µg/kg	56	U	30	U	120	U	31	U
2-Chloronaphthalene	91-58-7	--	--	µg/kg	16	U	9	U	34	U	9	U
2-Chlorophenol	95-57-8	--	--	µg/kg	40	U	21	U	85	U	22	U
2-Methylnaphthalene	91-57-6	--	--	µg/kg	**59**	**JQ**	**130**		**91**	**JQ**	**35**	**JQ**
2-Methylphenol	95-48-7	--	--	µg/kg	40	U	21	U	85	U	22	U
2-Nitroaniline	88-74-4	--	--	µg/kg	40	U	21	U	85	U	22	U
2-Nitrophenol	88-75-5	--	--	µg/kg	64	U	34	U	140	U	36	U
3,3'-Dichlorobenzidine	91-94-1	--	--	µg/kg	240	U	130	U	510	U	130	U
3-Nitroaniline	99-09-2	--	--	µg/kg	160	U	86	U	340	U	89	U
4,6-Dinitro-2-methylphenol	534-52-1	--	--	µg/kg	560	U	300	UJL	1200	U	310	U
4-Bromophenyl-phenylether	101-55-3	--	--	µg/kg	56	U	30	U	120	U	31	U
4-Chloro-3-methylphenol	59-50-7	--	--	µg/kg	56	U	30	U	120	U	31	U

Table 4-6
Sediment Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	Washington State Freshwater Sediment Sediment Cleanup Objective (SCO) WAC 173-204-563	Washington State Freshwater Sediment Cleanup Screening Level (CSL) WAC 173-204-563	Decision Unit	Upper Pond		Lower Pond				Outfall	
				Sample Area	Pond		Pipe into Pond		Pond into Aqueduct		Aqueduct to Creek	
				Date	5/20/2019		5/20/2019		5/20/2019		5/20/2019	
				EPA Sample Number	19050501		19050403		19050402		19050401	
				Field Sample Number	PD01		OF03		OF02		OF01	
				Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual
4-Chloroaniline	106-47-8	––	––	µg/kg	81	U	43	UJK	170	U	45	U
4-Chlorophenyl-phenylether	7005-72-3	––	––	µg/kg	48	U	26	U	100	U	27	U
4-Methylphenol	106-44-5	260	2,000	µg/kg	**44**	**JQ**	21	U	85	U	22	U
4-Nitroaniline	100-01-6	––	––	µg/kg	160	U	86	U	340	U	89	U
4-Nitrophenol	100-02-7	––	––	µg/kg	400	U	210	U	850	U	220	U
Acenaphthene	83-32-9	––	––	µg/kg	**420**		**1,100**		**260**		**220**	
Acenaphthylene	208-96-8	––	––	µg/kg	**29**	**JQ**	**24**		**70**	**JQ**	4	U
Acetophenone	98-86-2	––	––	µg/kg	40	U	21	U	**230**	**JQ**	22	U
Anthracene	120-12-7	––	––	µg/kg	**710**		**2,300**	**JL**	**920**		**340**	
Atrazine	1912-24-9	––	––	µg/kg	480	U	260	U	1,000	U	270	U
Benzaldehyde	100-52-7	––	––	µg/kg	160	U	86	U	**950**		89	U
Benzo(a)anthracene	56-55-3	––	––	µg/kg	**7,000**		**15,000**		**3,600**		**1,000**	
Benzo(a)pyrene	50-32-8	––	––	µg/kg	**9,400**		**18,000**		**4,900**		**1,100**	
Benzo(b)fluoranthene	205-99-2	––	––	µg/kg	**16,000**		**27,000**		**9,400**		**1,300**	
Benzo(ghi)perylene	191-24-2	––	––	µg/kg	**12,000**		**13,000**		**5,100**		**680**	
Benzo(k)fluoranthene	207-08-9	––	––	µg/kg	**5,800**		**8,600**		**3,500**		**500**	
bis(2-Chloroethoxy)methane	111-91-1	––	––	µg/kg	40	U	21	U	85	U	22	U
bis(2-Chloroethyl)ether	111-44-4	––	––	µg/kg	56	U	30	U	120	U	31	U
bis(2-Ethylhexyl)phthalate	117-81-7	500	22,000	µg/kg	160	U	86	U	340	U	89	U
Butylbenzylphthalate	85-68-7	––	––	µg/kg	160	U	86	U	340	U	89	U
Caprolactam	105-60-2	––	––	µg/kg	81	U	43	U	170	U	45	U
Carbazole	86-74-8	900	1,100	µg/kg	**920**		**1,900**	**JL**	**1,000**		**190**	
Chrysene	218-01-9	––	––	µg/kg	**8,000**		**17,000**		**5,400**		**1,200**	
Dibenzo(a,h)anthracene	53-70-3	––	––	µg/kg	**2,600**		**2,400**	**JL**	**1,400**		**130**	
Dibenzofuran	132-64-9	200	680	µg/kg	**110**		**330**		**170**	**JQ**	**68**	
Diethyl phthalate	84-66-2	––	––	µg/kg	160	U	86	U	340	U	89	U
Dimethyl phthalate	131-11-3	––	––	µg/kg	160	U	86	U	340	U	89	U
Di-n-butylphthalate	84-74-2	380	1,000	µg/kg	160	U	86	U	340	U	89	U
Di-n-octylphthalate	117-84-0	39	>1,100	µg/kg	160	U	86	U	340	U	89	U
Fluoranthene	206-44-0	––	––	µg/kg	**8,900**		**23,000**		**6,700**		**1,700**	
Fluorene	86-73-7	––	––	µg/kg	**170**		**670**		**180**		**150**	
Hexachlorobenzene	118-74-1	––	––	µg/kg	16	U	9	U	34	U	9	U
Hexachlorobutadiene	87-68-3	––	––	µg/kg	89	U	47	U	190	U	49	U
Hexachlorocyclopentadiene	77-47-4	––	––	µg/kg	480	U	260	UJL	1,000	U	270	U
Hexachloroethane	67-72-1	––	––	µg/kg	81	U	43	UJL	170	U	45	U
Indeno(1,2,3-cd)pyrene	193-39-5	––	––	µg/kg	**8,600**		**12,000**		**4,300**		**610**	
Isophorone	78-59-1	––	––	µg/kg	40	U	21	U	85	U	22	U

Table 4-6
Sediment Sample Results
Former Kaiser Smelter Plant
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Chemical Analysis	CAS Number	Washington State Freshwater Sediment Sediment Cleanup Objective (SCO) WAC 173-204-563	Washington State Freshwater Sediment Cleanup Screening Level (CSL) WAC 173-204-563	Decision Unit	Upper Pond		Lower Pond				Outfall	
				Sample Area	Pond		Pipe into Pond		Pond into Aqueduct		Aqueduct to Creek	
				Date	5/20/2019		5/20/2019		5/20/2019		5/20/2019	
				EPA Sample Number	19050501		19050403		19050402		19050401	
				Field Sample Number	PD01		OF03		OF02		OF01	
				Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Naphthalene	91-20-3	––	––	µg/kg	**76**		**200**		**180**		**75**	
Nitrobenzene	98-95-3	––	––	µg/kg	64	U	34	U	140	U	36	U
N-Nitrosodi-n-propylamine	621-64-7	––	––	µg/kg	56	U	30	U	120	U	31	U
N-Nitrosodiphenylamine	86-30-6	––	––	µg/kg	40	U	21	U	85	U	22	U
Pentachlorophenol	87-86-5	1,200	>1,200	µg/kg	160	U	86	U	340	U	89	U
Phenanthrene	85-01-8	––	––	µg/kg	**3,600**		**14,000**		**3,700**		**1,400**	
Phenol	108-95-2	120	210	µg/kg	40	U	21	U	85	U	22	U
Pyrene	129-00-0	––	––	µg/kg	**11,000**		**23,000**		**6,400**		**1,900**	
Total PAHs	––	17,000	30,000	µg/kg	**94,364**		**177,424**		**56,101**		**12,344**	
TAL Metals												
Aluminum	7429-90-5	––	––	mg/kg	**131,000**		**29,300**	**JH**	**42,200**	**JH**	**11,000**	**JH**
Calcium	7440-70-2	––	––	mg/kg	**11,600**		**3,640**	**JL**	**10,300**	**JL**	**13,800**	**JL**
Iron	7439-89-6	––	––	mg/kg	**13,500**		**18,800**	**JL**	**15,500**	**JL**	**15,400**	**JL**
Magnesium	7439-95-4	––	––	mg/kg	**3,200**		**6,660**	**JL**	**3,810**	**JL**	**6,500**	**JL**
Potassium	2023695	––	––	mg/kg	**1,210**		**2,120**	**JL**	**1,930**	**JL**	**2,010**	**JL**
Sodium	7440-23-5	––	––	mg/kg	**787**		**257**	**JK**	**1,030**	**JK**	**163**	**JK**
Antimony	7440-36-0	––	––	mg/kg	**2.92**		**0.352**	**JQ**	**4.6**	**JK**	**0.259**	**JQ**
Arsenic	7440-38-2	14	120	mg/kg	**46.1**		**12.4**	**JK**	**51.6**	**JK**	**13**	**JK**
Barium	7440-39-3	––	––	mg/kg	**143**		**121**	**JK**	**138**	**JK**	**83**	**JK**
Beryllium	7440-41-7	––	––	mg/kg	**4.17**		**0.734**	**JK**	**1.85**	**JK**	**0.491**	**JK**
Cadmium	7440-43-9	2.1	5.4	mg/kg	**3.29**		**0.708**		**9.32**		**0.232**	
Chromium	7440-47-3	72	88	mg/kg	**26.3**		**14.6**	**JK**	**45.6**	**JK**	**10.9**	**JK**
Cobalt	7440-48-4	––	––	mg/kg	**5.93**		**5.75**	**JK**	**12.4**	**JK**	**4.48**	**JK**
Copper	7440-50-8	400	1,200	mg/kg	**771**		**106**		**659**		**15.8**	
Lead	7439-92-1	360	>1,300	mg/kg	**86.7**		**23**	**JL**	**264**	**JL**	**11.2**	**JL**
Manganese	7439-96-5	––	––	mg/kg	**136**		**290**	**JL**	**580**	**JL**	**368**	**JL**
Mercury	7439-97-6	0.66	0.8	mg/kg	**0.384**		**0.0702**	**JQ**	**0.433**	**JQ**	0.0416	UJL
Nickel	7440-02-0	26	110	mg/kg	**464**		**40.3**		**336**		**13.8**	
Selenium	7782-49-2	11	>20	mg/kg	**1.01**		**0.174**	**JQ**	**4.13**	**JK**	0.146	UJK
Silver	7440-22-4	0.57	1.7	mg/kg	**1.15**		**0.0899**	**JQ**	**0.664**	**JK**	**0.0494**	**JQ**
Thallium	7440-28-0	––	––	mg/kg	0.33	U	**0.145**	**JK**	0.849	UJK	0.112	UJK
Vanadium	7440-62-2	––	––	mg/kg	**119**		**28.2**	**JL**	**102**	**JL**	**16.8**	**JL**
Zinc	7440-66-6	3,200	>4,200	mg/kg	**966**		**178**	**JK**	**1,190**	**JK**	**97.9**	**JK**

Table 4-6
Sediment Sample Results
Former Kaiser Smelter Plant
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Chemical Analysis	CAS Number	Washington State Freshwater Sediment Sediment Cleanup Objective (SCO) WAC 173-204-563	Washington State Freshwater Sediment Cleanup Screening Level (CSL) WAC 173-204-563	Decision Unit	Upper Pond		Lower Pond				Outfall	
				Sample Area	Pond		Pipe into Pond		Pond into Aqueduct		Aqueduct to Creek	
				Date	5/20/2019		5/20/2019		5/20/2019		5/20/2019	
				EPA Sample Number	19050501		19050403		19050402		19050401	
				Field Sample Number	PD01		OF03		OF02		OF01	
				Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs												
1,1,1-Trichloroethane	71-55-6	––	––	µg/kg	3	U	0.8	U	6	U	0.8	U
1,1,2,2-Tetrachloroethane	79-34-5	––	––	µg/kg	2	U	0.5	U	4	U	0.6	U
1,1,2-Trichloroethane	79-00-5	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
1,1-Dichloroethane	75-34-3	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
1,1-Dichloroethene	75-35-4	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
1,2,3-Trichlorobenzene	87-61-6	––	––	µg/kg	23	U	7	UJL	46	U	7	U
1,2,4-Trichlorobenzene	120-82-1	––	––	µg/kg	23	U	7	UJL	46	U	7	U
1,2-Dibromo-3-chloropropane	96-12-8	––	––	µg/kg	2	U	0.5	U	4	U	0.6	U
1,2-Dibromoethane	106-93-4	––	––	µg/kg	2	U	0.5	U	4	U	0.6	U
1,2-Dichlorobenzene	95-50-1	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
1,2-Dichloroethane	107-06-2	––	––	µg/kg	3	U	0.8	U	6	U	0.8	U
1,2-Dichloropropane	78-87-5	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
1,3-Dichlorobenzene	541-73-1	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
1,4-Dichlorobenzene	106-46-7	––	––	µg/kg	2	U	0.5	U	4	U	0.6	U
2-Hexanone	591-78-6	––	––	µg/kg	5	U	1	U	9	U	1	U
4-Methyl-2-pentanone	108-10-1	––	––	µg/kg	5	U	1	U	**11**	**JQ**	1	U
Acetone	67-64-1	––	––	µg/kg	**890**		92	U	2,100	U	230	U
Benzene	71-43-2	––	––	µg/kg	2	U	0.7	U	**5**	**JQ**	0.7	U
Bromochloromethane	74-97-5	––	––	µg/kg	3	U	0.8	U	6	U	0.8	U
Bromodichloromethane	75-27-4	––	––	µg/kg	2	U	0.5	U	4	U	0.6	U
Bromoform	75-25-2	––	––	µg/kg	23	U	7	U	46	U	7	U
Bromomethane	74-83-9	––	––	µg/kg	3	U	0.9	U	6	U	1	U
Carbon disulfide	75-15-0	––	––	µg/kg	**8**	**JQ**	7	U	46	U	0.8	U
Carbon tetrachloride	56-23-5	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
Chlorobenzene	108-90-7	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
Chloroethane	75-00-3	––	––	µg/kg	5	U	1	U	9	U	1	U
Chloroform	67-66-3	––	––	µg/kg	3	U	0.8	U	6	U	0.8	U
Chloromethane	74-87-3	––	––	µg/kg	3	U	0.8	U	6	U	0.8	U

Table 4-6
Sediment Sample Results
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Chemical Analysis	CAS Number	Washington State Freshwater Sediment Sediment Cleanup Objective (SCO) WAC 173-204-563	Washington State Freshwater Sediment Cleanup Screening Level (CSL) WAC 173-204-563	Decision Unit	Upper Pond		Lower Pond				Outfall	
				Sample Area	Pond		Pipe into Pond		Pond into Aqueduct		Aqueduct to Creek	
				Date	5/20/2019		5/20/2019		5/20/2019		5/20/2019	
				EPA Sample Number	19050501		19050403		19050402		19050401	
				Field Sample Number	PD01		OF03		OF02		OF01	
				Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual
cis-1,2-Dichloroethene	156-59-2	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
cis-1,3-Dichloropropene	10061-01-5	––	––	µg/kg	2	U	0.5	U	4	U	0.6	U
Cyclohexane	110-82-7	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
Dibromochloromethane	124-48-1	––	––	µg/kg	2	U	0.5	U	4	U	0.6	U
Dichlorodifluoromethane	75-71-8	––	––	µg/kg	3	U	0.8	U	6	U	0.8	U
Ethylbenzene	100-41-4	––	––	µg/kg	2	U	0.5	U	4	U	0.6	U
Freon 113	76-13-1	––	––	µg/kg	3	U	0.8	U	6	U	0.8	U
Isopropylbenzene	98-82-8	––	––	µg/kg	2	U	0.5	U	4	U	0.6	U
m,p-Xylenes	179601-23-1	––	––	µg/kg	5	U	1	U	9	U	1	U
Methyl acetate	79-20-9	––	––	µg/kg	5	U	1	U	**30**	**JQ**	1	U
Methyl ethyl ketone	78-93-3	––	––	µg/kg	**80**		13	U	170	U	18	U
Methyl tert-Butyl Ether (MTBE)	1634-04-4	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
Methylcyclohexane	108-87-2	––	––	µg/kg	3	U	0.8	U	6	U	0.8	U
Methylene chloride	75-09-2	––	––	µg/kg	9	U	3	U	18	U	3	U
o-Xylene	95-47-6	––	––	µg/kg	2	U	0.5	U	4	U	0.6	U
Styrene	100-42-5	––	––	µg/kg	1	U	0.4	U	3	U	0.4	U
Tetrachloroethene	127-18-4	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
Toluene	108-88-3	––	––	µg/kg	**4**	**JQ**	7	U	46	U	7	U
trans-1,2-Dichloroethene	156-60-5	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
trans-1,3-Dichloropropene	10061-02-6	––	––	µg/kg	1	U	0.4	U	3	U	0.4	U
Trichloroethene	79-01-6	––	––	µg/kg	2	U	0.7	U	5	U	0.7	U
Trichlorofluoromethane	75-69-4	––	––	µg/kg	3	U	0.9	U	6	U	1	U
Vinyl chloride	75-01-4	––	––	µg/kg	3	U	0.8	U	6	U	0.8	U
NWTPH-Gx												
Gasoline Range Organics C7-C12	PHCC7C12	––	––	mg/kg	14	U	0.3	U	34	U	4	U
NWTPH-Dx												
Diesel Range Organics C12-C24	NWTPH-Dx modified	340	510	mg/kg	**230**		**170**	**JK**	**3,300**		**9.9**	**JQ**
Heavy Range Organics C24-C40	NWTPH-Dx modified	3,600	4,400	mg/kg	**1,200**		**580**	**JH**	**3,000**		**31**	**JQ**

Table 4-6
Sediment Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	Washington State Freshwater Sediment Sediment Cleanup Objective (SCO) WAC 173-204-563	Washington State Freshwater Sediment Cleanup Screening Level (CSL) WAC 173-204-563	Decision Unit	Upper Pond		Lower Pond				Outfall	
				Sample Area	Pond		Pipe into Pond		Pond into Aqueduct		Aqueduct to Creek	
				Date	5/20/2019		5/20/2019		5/20/2019		5/20/2019	
				EPA Sample Number	19050501		19050403		19050402		19050401	
				Field Sample Number	PD01		OF03		OF02		OF01	
				Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual

Notes:

(1) Total PCBs were calculated as the sum of the concentrations of any detected Aroclor.

Screening levels from Washington State Legislature, WAC 173-204-563, Sediment cleanup levels based on protection of the benthic community in freshwater sediment, Table VI Freshwater Sediment Cleanup Objectives and Cleanup Screening Levels Chemical Criteria

Detected results are in bold type.

Yellow highlight indicates a result that exceeds at least one of the listed screening levels.

-- = Not Applicable
µg/kg = micrograms per kilogram
CAS = Chemical Abstracts Service
H = The sample result is biased high.
J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
K = The bias of the sample is not known.
L = The sample result is biased low.
mg/Kg = milligrams per kilogram
NWTPH-Dx = Northwest Total Petroleum Hydrocarbons - Extended Diesel Range (Semi-volatile Petroleum Products)
NWTPH-Gx = Northwest Total Petroleum Hydrocarbons - Extended Gasoline Range (Volatile Petroleum Products)
PCBs = Polychlorinated Biphenyls (PCBs), EPA Method 8082A by GC/ECD
Q = Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.
Qual = Qualifier
SVOCs = Semi-Volatile Organic Compounds, EPA Method 8270D by GC/MS
TAL Metals = Target Analyte List Metals, EPA Method 6010C (ICP-AES) and 7471 (CVAA)
U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
VOCs = Volatile Organic Compounds, EPA Method 8260C by GC/MS

Table 4-7
Surface Water Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	MTCA Method C (non-cancer)	MTCA Method C (cancer)	MTCA Surface Water, Aquatic Life, Fresh Water (Acute) 173-201A WAC	MTCA Surface Water, Aquatic Life, Fresh Water (Chronic) 173-201A WAC	Human Health Fresh Water 40 CFR 131.45	MTCA Human Health Fresh Water Spokane River	Spokane Tribe of Indians Human Health Spokane River	Decision Unit	Upper Pond				Lower Pond				Outfall	
									Sample Area	Pond		Pond		Pipe into Pond		Pond into Aqueduct		Aqueduct to Creek	
									Date	5/20/2019		5/20/2019		5/20/2019		5/20/2019		5/20/2019	
									EPA Sample Number	19050604		19050605		19050603		19050602		19050601	
									Field Sample Number	PD01		PD01 DUP		OF03		OF02		OF01	
									Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PCBs (EPA Method 8082)																			
PCB-1016	12674-11-2	0.015	0.0747	--	--	--	--	--	µg/L	0.11	U	0.099	U	0.12	U	0.11	U	0.12	U
PCB-1221	11104-28-2	--	--	--	--	--	--	--	µg/L	0.11	U	0.099	U	0.12	U	0.11	U	0.12	U
PCB-1232	11141-16-5	--	--	--	--	--	--	--	µg/L	0.11	U	0.099	U	0.12	U	0.11	U	0.12	U
PCB-1242	53469-21-9	--	--	--	--	--	--	--	µg/L	0.11	U	0.099	U	0.12	U	0.11	U	0.12	U
PCB-1248	12672-29-6	--	--	--	--	--	--	--	µg/L	0.11	U	0.099	U	0.12	U	0.11	U	0.12	U
PCB-1254	11097-69-1	0.0042	0.00261	--	--	--	--	--	µg/L	0.11	U	0.099	U	0.12	U	0.11	U	0.12	U
PCB-1260	11096-82-5	--	--	--	--	--	--	--	µg/L	0.11	U	0.099	U	0.12	U	0.11	U	0.12	U
PCB-1262	37324-23-5	--	--	--	--	--	--	--	µg/L	0.11	U	0.099	U	0.12	U	0.11	U	0.12	U
PCB-1268	11100-14-4	--	--	--	--	--	--	--	µg/L	0.11	U	0.099	U	0.12	U	0.11	U	0.12	U
Total PCBs [1]	--	--	--	2.0	0.014	0.00017	0.000007	0.0000013	µg/L	Not Detected		Not Detected		Not Detected		Not Detected		Not Detected	
PCBs (EPA Method 1668)																			
PCB-1016	12674-11-2	15,000	74,700	--	--	--	--	--	pg/L	--		--		1.74	U	1.5	U	1.91	U
PCB-1221	11104-28-2	--	--	--	--	--	--	--	pg/L	--		--		0.857	U	0.776	U	0.993	U
PCB-1232	11141-16-5	--	--	--	--	--	--	--	pg/L	--		--		1.99	U	1.88	U	1.87	U
PCB-1242	53469-21-9	--	--	--	--	--	--	--	pg/L	--		--		**816**		**266**		**13.8**	
PCB-1248	12672-29-6	--	--	--	--	--	--	--	pg/L	--		--		7.63	U	5.24	U	3.36	U
PCB-1254	11097-69-1	4,200	2,610	--	--	--	--	--	pg/L	--		--		**1,570**		**1,560**		**225**	
PCB-1260	11096-82-5	--	--	--	--	--	--	--	pg/L	--		--		**10,300**		**18,800**		**843**	
PCB-1268 [2]	11100-14-4	--	--	--	--	--	--	--	pg/L	--		--		**10,803**		**23,821**		**793**	
Total PCBs [1]	--	--	--	2,000,000	14,000	170	7	1.3	pg/L	--		--		**23,489**		**44,447**		**1,875**	
SVOCs																			
1,1'-Biphenyl	92-52-4	--	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
1,2,4,5-Tetrachlorobenzene	95-94-3	--	--	--	--	--	--	--	µg/L	0.6	U	0.6	U	0.7	U	0.6	U	0.6	U
1,4-Dioxane	123-91-1	--	--	--	--	--	--	--	µg/L	1	U	1	U	1	U	1	U	1	U
2,2'-oxybis(1-Chloropropane)	108-60-1	100,000	940	--	--	400	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
2,3,4,6-Tetrachlorophenol	58-90-2	--	--	--	--	--	--	--	µg/L	0.7	U	0.7	U	0.8	U	0.7	U	0.7	U
2,4,5-Trichlorophenol	95-95-4	--	--	--	--	--	--	--	µg/L	0.7	U	0.7	U	0.8	U	0.7	U	0.7	U
2,4,6-Trichlorophenol	88-06-2	43	98	--	--	--	--	--	µg/L	0.6	U	0.6	U	0.7	U	0.6	U	0.6	U
2,4-Dichlorophenol	120-83-2	480	--	--	--	10	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
2,4-Dimethylphenol	105-67-9	1,400	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
2,4-Dinitrophenol	51-28-5	8,600	--	--	--	30	--	--	µg/L	11	U	10	U	12	U	10	U	11	U
2,4-Dinitrotoluene	121-14-2	3,400	140	--	--	--	--	--	µg/L	1	U	1	U	1	U	1	U	1	U
2,6-Dinitrotoluene	606-20-2	--	--	--	--	--	--	--	µg/L	0.7	U	0.7	U	0.8	U	0.7	U	0.7	U
2-Chloronaphthalene	91-58-7	2,600	--	--	--	100	--	--	µg/L	0.4	U	0.4	U	0.5	U	0.4	U	0.4	U
2-Chlorophenol	95-57-8	240	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
2-Methylnaphthalene	91-57-6	--	--	--	--	--	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
2-Methylphenol	95-48-7	--	--	--	--	--	--	--	µg/L	0.7	U	0.7	U	0.8	U	0.7	U	0.7	U
2-Nitroaniline	88-74-4	--	--	--	--	--	--	--	µg/L	0.7	U	0.7	U	0.8	U	0.7	U	0.7	U
2-Nitrophenol	88-75-5	--	--	--	--	--	--	--	µg/L	0.7	U	0.7	U	0.8	U	0.7	U	0.7	U
3,3'-Dichlorobenzidine	91-94-1	--	1.2	--	--	--	--	--	µg/L	2	U	2	U	2	U	2	U	2	U
3-Nitroaniline	99-09-2	--	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
4,6-Dinitro-2-methylphenol	534-52-1	--	--	--	--	3	--	--	µg/L	5	U	5	U	6	U	5	U	5	U
4-Bromophenyl-phenylether	101-55-3	--	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
4-Chloro-3-methylphenol	59-50-7	--	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
4-Chloroaniline	106-47-8	--	--	--	--	--	--	--	µg/L	2	U	2	U	2	U	2	U	2	U
4-Chlorophenyl-phenylether	7005-72-3	--	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
4-Methylphenol	106-44-5	--	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
4-Nitroaniline	100-01-6	--	--	--	--	--	--	--	µg/L	0.6	U	0.6	U	0.7	U	0.6	U	0.6	U
4-Nitrophenol	100-02-7	--	--	--	--	--	--	--	µg/L	11	U	10	U	12	U	10	U	11	U
Acenaphthene	83-32-9	1,600	--	--	--	30	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Acenaphthylene	208-96-8	--	--	--	--	--	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Acetophenone	98-86-2	--	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
Anthracene	120-12-7	65,000	--	--	--	100	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Atrazine	1912-24-9	--	--	--	--	--	--	--	µg/L	2	U	2	U	2	U	2	U	2	U
Benzaldehyde	100-52-7	--	--	--	--	--	--	--	µg/L	1	U	1	U	1	U	1	U	1	U
Benzo(a)anthracene	56-55-3	--	--	--	--	0.00016	--	--	µg/L	0.1	U	**0.1**	**JQ**	0.1	U	0.1	U	0.1	U
Benzo(a)pyrene	50-32-8	65	0.88	--	--	0.000016	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(b)fluoranthene	205-99-2	--	--	--	--	0.00016	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Benzo(ghi)perylene	191-24-2	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U

Table 4-7
Surface Water Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	MTCA Method C (non-cancer)	MTCA Method C (cancer)	MTCA Surface Water, Aquatic Life, Fresh Water (Acute) 173-201A WAC	MTCA Surface Water, Aquatic Life, Fresh Water (Chronic) 173-201A WAC	Human Health Fresh Water 40 CFR 131.45	MTCA Human Health Fresh Water Spokane River	Spokane Tribe of Indians Human Health Spokane River	Decision Unit	Upper Pond				Lower Pond				Outfall	
									Sample Area	Pond		Pond		Pipe into Pond		Pond into Aqueduct		Aqueduct to Creek	
									Date	5/20/2019		5/20/2019		5/20/2019		5/20/2019		5/20/2019	
									EPA Sample Number	19050604		19050605		19050603		19050602		19050601	
									Field Sample Number	PD01		PD01 DUP		OF03		OF02		OF01	
									Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Benzo(k)fluoranthene	207-08-9	--	--	--	--	0.0016	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
bis(2-Chloroethoxy)methane	111-91-1	--	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
bis(2-Chloroethyl)ether	111-44-4	--	21	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
bis(2-Ethylhexyl)phthalate	117-81-7	1,000	89	--	--	0.045	--	--	µg/L	2	U	2	U	2	U	2	U	2	U
Butylbenzylphthalate	85-68-7	3,100	210	--	--	0.013	--	--	µg/L	2	U	2	U	2	U	2	U	2	U
Caprolactam	105-60-2	--	--	--	--	--	--	--	µg/L	5	U	5	U	6	U	5	U	5	U
Carbazole	86-74-8	--	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
Chrysene	218-01-9	--	--	--	--	0.016	--	--	µg/L	0.1	U	**0.1**	**JQ**	0.1	U	0.1	U	0.1	U
Dibenzo(a,h)anthracene	53-70-3	--	--	--	--	0.000016	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	UJK	0.1	U
Dibenzofuran	132-64-9	--	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
Diethyl phthalate	84-66-2	71,000	--	--	--	200	--	--	µg/L	2	U	2	U	2	U	2	U	2	U
Dimethyl phthalate	131-11-3	--	--	--	--	600	--	--	µg/L	2	U	2	U	2	U	2	U	2	U
Di-n-butylphthalate	84-74-2	7,300	--	--	--	8	--	--	µg/L	2	U	2	U	2	U	2	U	2	U
Di-n-octylphthalate	117-84-0	--	--	--	--	--	--	--	µg/L	2	U	2	U	2	U	2	U	2	U
Fluoranthene	206-44-0	230	--	--	--	6	--	--	µg/L	0.1	U	**0.2**	**JQ**	0.1	U	0.1	U	0.1	U
Fluorene	86-73-7	8,600	--	--	--	10	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Hexachlorobenzene	118-74-1	0.6	0.012	--	--	0.000005	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Hexachlorobutadiene	87-68-3	2,300	750	--	--	0.01	--	--	µg/L	1	U	1	U	1	U	1	U	1	U
Hexachlorocyclopentadiene	77-47-4	9,000	--	--	--	1	--	--	µg/L	5	U	5	U	6	U	5	U	5	U
Hexachloroethane	67-72-1	52	47	--	--	0.02	--	--	µg/L	1	U	1	U	1	U	1	U	1	U
Indeno(1,2,3-cd)pyrene	193-39-5	--	--	--	--	0.00016	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Isophorone	78-59-1	300,000	39,000	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
Naphthalene	91-20-3	12,000	--	--	--	--	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Nitrobenzene	98-95-3	4,500	--	--	--	30	--	--	µg/L	0.8	U	0.8	U	0.9	U	0.8	U	0.8	U
N-Nitrosodi-n-propylamine	621-64-7	--	20	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
N-Nitrosodiphenylamine	86-30-6	--	240	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
Pentachlorophenol	87-86-5	2,900	37	20	13	0.002	--	--	µg/L	1	U	1	U	1	U	1	U	1	U
Phenanthrene	85-01-8	--	--	--	--	--	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Phenol	108-95-2	1,400,000	--	--	--	9000	--	--	µg/L	0.5	U	0.5	U	0.6	U	0.5	U	0.5	U
Pyrene	129-00-0	6,500	--	--	--	8	--	--	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
TAL Metals																			
Aluminum	7429-90-5	--	--	--	--	--	--	--	mg/L	**0.452**		**0.585**		**0.326**	**JQ**	**0.0919**	**JQ**	0.0197	U
Antimony	7440-36-0	2.6	--	--	--	0.006	--	--	mg/L	0.00041	U	0.00041	U	**0.00061**	**JQ**	0.00041	U	0.00041	U
Arsenic	7440-38-2	0.044	0.0025	0.36	0.19	0.000018	--	--	mg/L	**0.0045**		**0.0056**		**0.0071**		0.002	U	0.002	U
Barium	7440-39-3	--	--	--	--	--	--	--	mg/L	**0.0283**		**0.0344**		**0.0121**		**0.0334**		**0.0799**	
Beryllium	7440-41-7	0.68	--	--	--	--	--	--	mg/L	**0.00022**	**JQ**	**0.00027**	**JQ**	0.000091	U	0.000091	U	0.000091	U
Cadmium [3]	7440-43-9	0.1	--	0.0037	0.001	--	--	--	mg/L	0.00015	U	0.00015	U	**0.00022**	**JQ**	0.00015	U	0.00015	U
Calcium	7440-70-2	--	--	--	--	--	--	--	mg/L	**21.1**		**19.8**		**18.7**		**25.4**		**78.1**	
Chromium [3]	7440-47-3	610	--	0.55	0.18	--	--	--	mg/L	0.0007	U	0.004	U	0.004	U	0.0007	U	0.0007	U
Cobalt	7440-48-4	--	--	--	--	--	--	--	mg/L	0.00016	U	0.001	U	0.00016	U	0.001	U	0.00016	U
Copper [3]	7440-50-8	7.2	--	0.017	0.011	--	--	--	mg/L	0.0099	U	0.0099	U	0.0099	U	0.0099	U	0.0099	U
Iron	7439-89-6	--	--	--	--	--	--	--	mg/L	**0.638**		**1.14**		**0.0364**	**JQ**	**0.472**		0.0228	U
Lead [3]	7439-92-1	--	--	0.065	0.0025	--	--	--	mg/L	0.0011	U	0.0011	U	0.0011	U	**0.0015**	**JQ**	0.0011	U
Magnesium	7439-95-4	--	--	--	--	--	--	--	mg/L	**8.14**		**7.79**		**2.06**		**7.01**		**32.1**	
Manganese	7439-96-5	--	--	--	--	--	--	--	mg/L	**0.106**		**0.194**		0.0049	U	**0.1**		0.0049	U
Mercury	7439-97-6	--	--	0.0021	0.000012	--	--	--	mg/L	0.00005	U	0.00005	U	0.00005	U	0.00005	U	0.00005	U
Nickel [3]	7440-02-0	2.8	--	1.4	0.16	0.08	--	--	mg/L	**0.006**		**0.0063**		0.004	U	0.004	U	0.004	U
Potassium	7440-09-7	--	--	--	--	--	--	--	mg/L	**4.14**		**4.03**		**2.22**		**4.48**		**4.49**	
Selenium	7782-49-2	6.8	--	0.02	0.005	0.06	--	--	mg/L	0.00065	U	0.00065	U	0.00065	U	0.00065	U	0.00065	U
Silver [3]	7440-22-4	65	--	0.0034	--	--	--	--	mg/L	0.00017	U	0.00017	U	0.00017	U	0.00017	U	0.00017	U
Sodium	7440-23-5	--	--	--	--	--	--	--	mg/L	**12.3**		**12.2**		**6.69**		**9.03**		**28.9**	
Thallium	7440-28-0	0.00056	--	--	--	0.0017	--	--	mg/L	0.00011	U	0.00011	U	0.00011	U	0.00011	U	0.00011	U
Vanadium	7440-62-2	--	--	--	--	--	--	--	mg/L	0.001	U	**0.0018**		**0.0018**		0.001	U	0.001	U
Zinc [3]	7440-66-6	41	--	0.11	0.1	1	--	--	mg/L	**0.0082**	**JQ**	**0.0152**		**0.0096**	**JQ**	**0.0179**		0.0062	U

Table 4-7
Surface Water Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	MTCA Method C (non-cancer)	MTCA Method C (cancer)	MTCA Surface Water, Aquatic Life, Fresh Water (Acute) 173-201A WAC	MTCA Surface Water, Aquatic Life, Fresh Water (Chronic) 173-201A WAC	Human Health Fresh Water 40 CFR 131.45	MTCA Human Health Fresh Water Spokane River	Spokane Tribe of Indians Human Health Spokane River	Decision Unit	Upper Pond		Upper Pond		Lower Pond		Lower Pond		Outfall	
									Sample Area	Pond		Pond		Pipe into Pond		Pond into Aqueduct		Aqueduct to Creek	
									Date	5/20/2019		5/20/2019		5/20/2019		5/20/2019		5/20/2019	
									EPA Sample Number	19050604		19050605		19050603		19050602		19050601	
									Field Sample Number	PD01		PD01 DUP		OF03		OF02		OF01	
									Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
VOCs																			
1,1,1-Trichloroethane	71-55-6	2,300,000	--	--	--	20,000	--	--	µg/L	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
1,1,2,2-Tetrachloroethane	79-34-5	26,000	160	--	--	0.1	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,1,2-Trichloroethane	79-00-5	5,800	630	--	--	0.35	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,1-Dichloroethane	75-34-3	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,1-Dichloroethene	75-35-4	58,000	--	--	--	700	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,2,3-Trichlorobenzene	87-61-6	--	--	--	--	--	--	--	µg/L	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
1,2,4-Trichlorobenzene	120-82-1	570	49	--	--	0.036	--	--	µg/L	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
1,2-Dibromo-3-chloropropane	96-12-8	--	--	--	--	--	--	--	µg/L	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
1,2-Dibromoethane	106-93-4	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,2-Dichlorobenzene	95-50-1	10,000		--	--	720	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,2-Dichloroethane	107-06-2	32,000	1,500	--	--	8.9	--	--	µg/L	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
1,2-Dichloropropane	78-87-5	63,000	1,100	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,3-Dichlorobenzene	541-73-1	--	--	--	--	2	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,4-Dichlorobenzene	106-46-7	8,200	540	--	--	200	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2-Hexanone	591-78-6	--	--	--	--	--	--	--	µg/L	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
4-Methyl-2-pentanone	108-10-1	--	--	--	--	--	--	--	µg/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Acetone	67-64-1	--	--	--	--	--	--	--	µg/L	**5**	**JQ**	**5**	**JQ**	**0.9**	**JQ**	**4**	**JQ**	**0.8**	**JQ**
Benzene	71-43-2	5,000	570	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Bromochloromethane	74-97-5	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Bromodichloromethane	75-27-4	35,000	700	--	--	0.73	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Bromoform	75-25-2	35,000	5,500	--	--	4.6	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Bromomethane	74-83-9	2,400	--	--	--	300	--	--	µg/L	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
Carbon disulfide	75-15-0	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Carbon tetrachloride	56-23-5	1,400	120	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Chlorobenzene	108-90-7	13,000	--	--	--	100	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Chloroethane	75-00-3	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Chloroform	67-66-3	17,000	1,400	--	--	100	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Chloromethane	74-87-3	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
cis-1,2-Dichloroethene	156-59-2	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
cis-1,3-Dichloropropene	10061-01-5	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Cyclohexane	110-82-7	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Dibromochloromethane	124-48-1	35,000	510	--	--	0.6	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Dichlorodifluoromethane	75-71-8	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Ethylbenzene	100-41-4	17,000	--	--	--	29	--	--	µg/L	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
Freon 113	76-13-1	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Isopropylbenzene	98-82-8	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
m,p-Xylenes	179601-23-1	--	--	--	--	--	--	--	µg/L	1	U	1	U	1	U	1	U	1	U
Methyl acetate	79-20-9	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Methyl ethyl ketone	78-93-3	--	--	--	--	--	--	--	µg/L	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
Methyl tert-Butyl Ether (MTBE)	1634-04-4	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Methylcyclohexane	108-87-2	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Methylene chloride	75-09-2	43,000	90,000	--	--	10	--	--	µg/L	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
o-Xylene	95-47-6	--	--	--	--	--	--	--	µg/L	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
Styrene	100-42-5	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Tetrachloroethene	127-18-4	1,300	2,500	--	--	2.4	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Toluene	108-88-3	48,000	--	--	--	72	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
trans-1,2-Dichloroethene	156-60-5	82,000	--	--	--	200	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
trans-1,3-Dichloropropene	10061-02-6	--	--	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Trichloroethene	79-01-6	290	320	--	--	0.3	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Trichlorofluoromethane	75-69-4	--	--	--	--	--	--	--	µg/L	0.2	UJL	0.2	UJL	0.2	UJL	0.2	UJL	0.2	UJL
Vinyl chloride	75-01-4	17,000	92	--	--	--	--	--	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
NWTPH-Gx		**Washington MTCA Method A [4]**	**Washington No Effects Concentration (NOEC) [5]**																
NWTPH-Gx water C7-C12	PHCC7C12	1,000	1,000	--	--	--	--	--	µg/L	19	U	19	U	19	U	19	U	19	U
NWTPH-Dx																			
Diesel Range Organics C12-C24	PHCDC12C24	500	150	--	--	--	--	--	µg/L	**90**	**JQ**	**69**	**JQ**	**60**	**JQ**	**81**	**JQ**	33	U
Heavy Range Organics C24-C40	HROC24C40	500	150	--	--	--	--	--	µg/L	**180**	**JQ**	**110**	**JQ**	81	U	75	U	75	U

Table 4-7
Surface Water Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	MTCA Method C (non-cancer)	MTCA Method C (cancer)	MTCA Surface Water, Aquatic Life, Fresh Water (Acute) 173-201A WAC	MTCA Surface Water, Aquatic Life, Fresh Water (Chronic) 173-201A WAC	Human Health Fresh Water 40 CFR 131.45	MTCA Human Health Fresh Water Spokane River	Spokane Tribe of Indians Human Health Spokane River	Decision Unit	Upper Pond		Upper Pond		Lower Pond		Lower Pond		Outfall	
									Sample Area	Pond		Pond		Pipe into Pond		Pond into Aqueduct		Aqueduct to Creek	
									Date	5/20/2019		5/20/2019		5/20/2019		5/20/2019		5/20/2019	
									EPA Sample Number	19050604		19050605		19050603		19050602		19050601	
									Field Sample Number	PD01		PD01 DUP		OF03		OF02		OF01	
									Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual

Notes:

(1) Total PCBs were calculated as the sum of the concentrations of any detected Aroclor.

(2) Aroclor 1268 PCBs were calculated using the equation Aroclor 1268 = (PCB 198/199 + PCB 206 + PCB 208 + PCB 209) * 1.3

(3) Fresh surface water criteria for this metal are hardness-dependent. The values provided are based on a hardness of 100 mg/L.

(4) Per WAC 173-340-730(3)(b)(iii)(C), the Method A groundwater cleanup levels from WAC 173-340-730, Table 720-1, are used here for surface water.

(5) Washington State Department of Ecology, February 2018, Environmental Effects-Based Concentrations for Total Petroleum Hydrocarbons (TPH): Toxicity in Marine Water and Freshwater, Publication No. 18-03-0002.

Detected results are in bold type.

Yellow highlight indicates a result that exceeds at least one of the listed screening levels.

-- = Not Applicable

µg/L = micrograms per liter

CAS = Chemical Abstracts Service

EPA RML = Environmental Protection Agency Regional (EPA) Removal Management Levels (RML), 40 CFR Part 300, November 2018

EPA RSL = Environmental Protection Agency Regional (EPA) Regional Screening Levels (RSL), 40 CFR Part 300, November 2018

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K = The bias of the sample is not known.

L = The sample result is biased low.

mg/L = milligrams per liter

PCBs = Polychlorinated Biphenyls (PCBs), EPA Method 8082A by GC/ECD

Q = Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

Qual = Qualifier

SVOCs = Semi-Volatile Organic Compounds, EPA Method 8270D by GC/MS

TAL Metals = Target Analyte List Metals, EPA Method 6010C (ICP-AES) and 7471 (CVAA)

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

WA MTCA Method C = Washington State (WA) Model Toxics Control Act (MTCA) Cleanup Regulation Method C (industrial) value from the Cleanup and Risk Calculations tables (CLARC), chapter 173-340 WAC, May 2019

Table 4-8
Low-Level PCB (1668) Water Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Chemical Analysis	CAS Number	Decision Unit	Lower Pond				Outfall	
		Sample Area	Pipe into Pond		Pond into Aqueduct		Aqueduct to Creek	
		Date	5/20/2019		5/20/2019		5/20/2019	
		EPA Sample Number	19050603		19050602		19050601	
		Field Sample Number	OF03		OF02		OF01	
		Units	Result	Qual	Result	Qual	Result	Qual
Low Level PCB								
PCB-1	2051-60-7	pg/L	23.357	U	22.166	U	22.011	U
PCB-2	2051-61-8	pg/L	0.584	U	0.554	U	0.550	U
PCB-3	2051-62-9	pg/L	23.36	U	22.166	U	22.011	U
PCB-4	13029-08-8	pg/L	23.36	U	22.17	U	22.01	U
PCB-5	16605-91-7	pg/L	0.738	U	0.607	U	0.855	U
PCB-6	25569-80-6	pg/L	**1.07**	**JQ**	**1.52**	**JQ**	0.774	U
PCB-7	33284-50-3	pg/L	23.36	U	0.562	U	0.793	U
PCB-8	34883-43-7	pg/L	23.36	U	22.17	U	22.01	U
PCB-9	34883-39-1	pg/L	0.643	U	0.554	U	0.745	U
PCB-10	33146-45-1	pg/L	**1.76**	**JQ**	**0.626**	**JQ**	0.754	U
PCB-11	2050-67-1	pg/L	23.36	U	30	U	22.01	U
PCB-12 + 13	2974-92-7 2974-90-5	pg/L	**1.88**	**JQ**	**0.980**	**JQ**	0.896	U
PCB-14	34883-41-5	pg/L	0.711	U	0.584	U	0.823	U
PCB-15	2050-68-2	pg/L	**19.70**	**JQ**	**9.65**	**JQ**	**1.82**	**JQ**
PCB-16	38444-78-9	pg/L	**40.20**		**4.13**	**JQ**	22.01	U
PCB-17	37680-66-3	pg/L	**28.50**		**6.91**	**JQ**	22.01	U
PCB-18 + 30	37680-65-2 35693-92-6	pg/L	**79.90**		**14**	**JQ**	**4.61**	**JQ**
PCB-19	38444-73-4	pg/L	**52.50**		**4.58**	**JQ**	**1.27**	**JQ**
PCB-20 + 28	38444-84-7 7012-37-5	pg/L	**117**		**46.70**		22.01	U
PCB-21 + 33	55702-46-0 38444-86-9	pg/L	**14.20**	**JQ**	**7.12**	**JQ**	22.01	U
PCB-22	38444-85-8	pg/L	**53.60**		**14.60**	**JQ**	22.01	U
PCB-23	55720-44-0	pg/L	0.697	U	0.554	U	0.550	U
PCB-24	55702-45-9	pg/L	**3.15**	**JQ**	0.554	U	0.550	U
PCB-25	55712-37-3	pg/L	**6.36**	**JQ**	**1.59**	**JQ**	0.550	U
PCB-26 + 29	38444-81-4 15862-07-4	pg/L	**13.80**	**JQ**	**4.99**	**JQ**	**0.772**	**JQ**
PCB-27	38444-76-7	pg/L	**20.30**	**JQ**	**2.02**	**JQ**	0.550	U
PCB-31	16606-02-3	pg/L	**75**		**28.10**		22.01	U
PCB-32	38444-77-8	pg/L	**49.60**		**8.34**	**JQ**	22.01	U
PCB-34	37680-68-5	pg/L	0.679	U	0.554	U	0.550	U
PCB-35	37680-69-6	pg/L	**2.31**	**JQ**	**1.07**	**JQ**	0.550	U
PCB-36	38444-87-0	pg/L	0.678	U	0.554	U	0.550	U
PCB-37	38444-90-5	pg/L	**51.60**		**23.50**		**1.65**	**JQ**
PCB-38	53555-66-1	pg/L	0.676	U	0.554	U	0.550	U
PCB-39	38444-88-1	pg/L	0.686	U	0.554	U	0.550	U
PCB-40 + 41 + 71	38444-93-8 52663-59-9 41464-46-4	pg/L	**206**		**38.50**		**7.84**	**JQ**
PCB-42	36559-22-5	pg/L	**81**		**20**	**JQ**	**4.28**	**JQ**
PCB-43	70362-46-8	pg/L	**14.30**	**JQ**	**2.65**	**JQ**	0.550	U
PCB-44 + 47 + 65	41464-39-5 2437-79-8 33284-54-7	pg/L	**291**		**68.20**		**19.90**	**JQ**
PCB-45 + 51	70362-45-7 68194-04-7	pg/L	**93.60**		**9.81**	**JQ**	**3.80**	**JQ**
PCB-46	41464-47-5	pg/L	**37.60**		**3.26**	**JQ**	**1.81**	**JQ**
PCB-48	70362-47-9	pg/L	**43.50**		**12.70**	**JQ**	**1.96**	**JQ**
PCB-49 + 69	41464-40-8 60233-24-1	pg/L	**141**		**39.90**		**8.32**	**JQ**
PCB-50 + 53	62796-65-0 41464-41-9	pg/L	**69.50**		**7.84**	**JQ**	**4.15**	**JQ**
PCB-52	35693-99-3	pg/L	**326**		**80.30**		**28.80**	
PCB-54	15968-05-5	pg/L	**1.23**	**JQ**	0.55	U	0.55	U
PCB-55	74338-24-2	pg/L	**6.08**	**JQ**	0.912	U	0.55	U
PCB-56	41464-43-1	pg/L	**110**		**43.90**		**4.88**	**JQ**
PCB-57	70424-67-8	pg/L	1.20	U	0.826	U	0.55	U
PCB-58	41464-49-7	pg/L	1.24	U	0.850	U	0.55	U
PCB-59 + 62 + 75	74472-33-6 54230-22-7 32598-12-2	pg/L	**32.40**		**9.21**	**JQ**	**1.42**	**JQ**

Table 4-8
Low-Level PCB (1668) Water Sample Results
Former Kaiser Smelter Plant
Mead, Washington

PCB-60	33025-41-1	pg/L	**46.10**		**25.90**		**1.16**	**JQ**
PCB-61 + 70 + 74 + 76	33284-53-6 32598-11-1 32690-93-0 70362-48-0	pg/L	**240**		**134**		**9.80**	**JQ**
PCB-63	74472-34-7	pg/L	**4.91**	**JQ**	**3.12**	**JQ**	0.55	U
PCB-64	52663-58-8	pg/L	**139**		**39.00**		**5.08**	**JQ**
PCB-66	32598-10-0	pg/L	**144**		**92.50**		**6.44**	**JQ**
PCB-67	73575-53-8	pg/L	**3.21**	**JQ**	**1.46**	**JQ**	0.55	U
PCB-68	73575-52-7	pg/L	1.10	U	0.759	U	0.55	U
PCB-72	41464-42-0	pg/L	**1.35**	**JQ**	**0.824**	**JQ**	0.55	U
PCB-73	74338-23-1	pg/L	0.58	U	0.554	U	0.55	U
PCB-77	32598-13-3	pg/L	**19**	**JQ**	**18.30**	**JQ**	**1.12**	**JQ**
PCB-78	70362-49-1	pg/L	1.34	U	0.923	U	0.55	U
PCB-79	41464-48-6	pg/L	**2.41**	**JQ**	**1.93**	**JQ**	0.55	U
PCB-80	33284-52-5	pg/L	1.18	U	0.81	U	0.55	U
PCB-81	70362-50-4	pg/L	1.38	U	0.96	U	0.55	U
PCB-82	52663-62-4	pg/L	**35.20**		**18.10**	**JQ**	**3.13**	**JQ**
PCB-83 + 99	60145-20-2 38380-01-7	pg/L	**66.50**		**62.50**		**12.30**	**JQ**
PCB-84	52663-60-2	pg/L	**72.70**		**20.80**	**JQ**	**8.61**	**JQ**
PCB-85 + 116 + 117	65510-45-4 18259-05-7 68194-11-6	pg/L	**31.70**		**29.80**		**5.61**	**JQ**
PCB-86 + 87 + 97 + 109 + 119 +	55312-69-1 38380-02-8 41464-51-1 74472-35-8 56558-17-9 74472-39-2	pg/L	**130.00**		**132**		**15.80**	**JQ**
PCB-88 + 91	55215-17-3 68194-05-8	pg/L	**27.40**		**14.80**	**JQ**	**4.89**	**JQ**
PCB-89	73575-57-2	pg/L	**5.24**	**JQ**	**1.65**	**JQ**	0.55	U
PCB-90 + 101 + 113	68194-07-0 37680-73-2 68194-10-5	pg/L	**128**		**91.70**		**18.40**	**JQ**
PCB-92	52663-61-3	pg/L	**28.40**	**JH**	**19.50**	**JQ**	**4.54**	**JQ**
PCB-93 + 95 + 98 + 100 + 102	73575-56-1 38379-99-6 60233-25-2 39485-83-1 68194-06-9	pg/L	**159**		**54.10**		**27.50**	**JK**
PCB-94	73575-55-0	pg/L	1.98	U	**0.786**	**JQ**	0.55	U
PCB-96	73575-54-9	pg/L	**2.50**	**JQ**	**0.759**	**JQ**	0.55	U
PCB-103	60145-21-3	pg/L	1.63	U	**1.03**	**JQ**	0.55	U
PCB-104	56558-16-8	pg/L	0.584	U	0.55	U	0.55	U
PCB-105	32598-14-4	pg/L	**63.10**		**80**		**3.35**	**JQ**
PCB-106	70424-69-0	pg/L	1.35	U	0.78	U	0.55	U
PCB-107	70424-68-9	pg/L	**7.33**	**JQ**	**9.37**	**JQ**	**0.632**	**JQ**
PCB-108 + 124	70362-41-3 70424-70-3	pg/L	**4.14**	**JQ**	**4.73**	**JQ**	0.55	U
PCB-110 + 115	38380-03-9 74472-38-1	pg/L	**221**		**130**		**24.50**	
PCB-111	39635-32-0	pg/L	1.43	U	**0.926**	**JQ**	0.55	U
PCB-112	74472-36-9	pg/L	1.44	U	0.55	U	0.55	U
PCB-114	74472-37-0	pg/L	**3.91**	**JQ**	**4.30**	**JQ**	0.55	U
PCB-118	31508-00-6	pg/L	**95.40**		**103**		**6.61**	**JQ**
PCB-120	68194-12-7	pg/L	1.40	U	**1.93**	**JQ**	0.55	U
PCB-121	56558-18-0	pg/L	1.47	U	0.55	U	0.55	U
PCB-122	76842-07-4	pg/L	**2.36**	**JQ**	**2.13**	**JQ**	0.55	U
PCB-123	65510-44-3	pg/L	1.52	U	**2.71**	**JQ**	0.55	U
PCB-126	57465-28-8	pg/L	1.79	U	**2.24**	**JQ**	0.55	U
PCB-127	39635-33-1	pg/L	1.43	U	0.826	U	0.55	U
PCB-128 + 166	38380-07-3 41411-63-6	pg/L	**12**	**JQ**	**22.00**	**JQ**	0.55	U
PCB-129 + 138 + 160 + 163	55215-18-4 35065-28-2 41411-62-5 74472-44-9	pg/L	**105**		**148**		**11.60**	**JQ**
PCB-130	52663-66-8	pg/L	**9.97**	**JQ**	**13.20**	**JQ**	0.55	U
PCB-131	61798-70-7	pg/L	**1.71**	**JQ**	1.04	U	0.55	U
PCB-132	38380-05-1	pg/L	**40**		**29.20**		**5.24**	**JQ**
PCB-133	35694-04-3	pg/L	**10.40**	**JQ**	**17.20**	**JQ**	**1.04**	**JQ**

Table 4-8
Low-Level PCB (1668) Water Sample Results
Former Kaiser Smelter Plant
Mead, Washington

PCB-134 + 143	52704-70-8 68194-15-0	pg/L	**7.27**	**JQ**	**4.64**	**JQ**	**1.02**	**JQ**
PCB-135 + 151 + 154	52744-13-5 52663-63-5 60145-22-4	pg/L	**85.20**		**90.10**		**15**	**JQ**
PCB-136	38411-22-2	pg/L	**12.50**	**JQ**	**7.33**	**JQ**	**2.41**	**JQ**
PCB-137	35694-06-5	pg/L	**5.49**	**JQ**	**8.03**	**JQ**	0.55	U
PCB-139 + 140	56030-56-9 59291-64-4	pg/L	**2.06**	**JQ**	**2.58**	**JQ**	0.55	U
PCB-141	52712-04-6	pg/L	**29.40**		**34.70**		**3.36**	**JQ**
PCB-142	41411-61-4	pg/L	1.23	U	1.07	U	0.55	U
PCB-144	68194-14-9	pg/L	**7.82**	**JQ**	**8.13**	**JQ**	**1.08**	**JQ**
PCB-145	74472-40-5	pg/L	0.584	U	0.55	U	0.55	U
PCB-146	51908-16-8	pg/L	**61.90**		**149**		**5.29**	**JQ**
PCB-147 + 149	68194-13-8 38380-04-0	pg/L	**129.00**		**119**		**18.30**	**JQ**
PCB-148	74472-41-6	pg/L	**1.97**	**JQ**	**4.84**	**JQ**	0.55	U
PCB-150	68194-08-1	pg/L	**1.94**	**JQ**	**1.68**	**JQ**	0.55	U
PCB-152	68194-09-2	pg/L	0.58	U	0.55	U	0.55	U
PCB-153 + 168	35065-27-1 59291-65-5	pg/L	**186**		**268**		**22.90**	
PCB-155	33979-03-2	pg/L	0.58	U	**0.64**	**JQ**	0.55	U
PCB-156 + 157	38380-08-4 69782-90-7	pg/L	**13.20**	**JQ**	**42.70**	**JQ**	0.55	U
PCB-158	74472-42-7	pg/L	**20**	**JQ**	**25.60**		**2.14**	**JQ**
PCB-159	39635-35-3	pg/L	0.91	U	0.79	U	**2.58**	**JQ**
PCB-161	74472-43-8	pg/L	0.81	U	0.70	U	0.55	U
PCB-162	39635-34-2	pg/L	0.89	U	0.77	U	0.55	U
PCB-164	74472-45-0	pg/L	**8.96**	**JQ**	**9.56**	**JQ**	**0.91**	**JQ**
PCB-165	74472-46-1	pg/L	0.99	U	0.86	U	0.55	U
PCB-167	52663-72-6	pg/L	**12.90**	**JQ**	**26.70**		**0.79**	**JQ**
PCB-169	32774-16-6	pg/L	1.09	U	0.93	U	0.55	U
PCB-170	35065-30-6	pg/L	**70.10**		**144**		**4.85**	**JQ**
PCB-171 + 173	52663-71-5 69782-90-7	pg/L	**23.90**		**45.30**		**3.11**	**JQ**
PCB-172	52663-74-8	pg/L	**125**		**267**		**6.61**	**JQ**
PCB-174	38411-25-5	pg/L	**323**		**496**		**49.60**	
PCB-175	40186-70-7	pg/L	**29.70**		**51.20**		**2.19**	**JQ**
PCB-176	52663-65-7	pg/L	**24.30**		**42.30**		**3.52**	**JQ**
PCB-177	52663-70-4	pg/L	**79.70**		**147**		**9.33**	**JQ**
PCB-178	52663-67-9	pg/L	**142**		**264**		**18.80**	**JQ**
PCB-179	52663-64-6	pg/L	**133**		**177**		**22.60**	
PCB-180 + 193	35065-29-3 69782-91-8	pg/L	**1640**		**2900**		**126**	
PCB-181	74472-47-2	pg/L	0.58	U	**2.82**	**JQ**	0.55	U
PCB-182	60145-23-5	pg/L	**19.00**	**JQ**	**42.10**		0.55	U
PCB-183 + 185	52663-69-1 52712-05-7	pg/L	**354**		**712**		**37.80**	
PCB-184	74472-48-3	pg/L	**2.77**	**JQ**	**7.66**	**JQ**	0.55	U
PCB-186	74472-49-4	pg/L	0.58	U	0.55	U	0.55	U
PCB-187	52663-68-0	pg/L	**1160**		**2370**		**165**	
PCB-188	74487-85-7	pg/L	**10**	**JQ**	**17.60**	**JQ**	**1.22**	**JQ**
PCB-189	39635-31-9	pg/L	**19.80**	**JQ**	**27.90**		**0.81**	**JQ**
PCB-190	41411-64-7	pg/L	**28.30**		**57.20**		**2.04**	**JQ**
PCB-191	74472-50-7	pg/L	**5.60**	**JQ**	**10.80**	**JQ**	**0.63**	**JQ**
PCB-192	74472-51-8	pg/L	0.58	U	0.55	U	0.55	U
PCB-194	35694-08-7	pg/L	**2170**		**4280**		**114**	
PCB-195	52663-78-2	pg/L	**388**		**542**		**18.30**	**JQ**
PCB-196	42740-50-1	pg/L	**1090**		**2090**		**67.50**	
PCB-197 + 200	33091-17-7 52663-73-7	pg/L	**306**		561	U	**23.40**	
PCB-198 + 199	68194-17-2 52663-75-9	pg/L	**3860**		**7360**		**305**	
PCB-201	40186-71-8	pg/L	**302**		**597**		**23.70**	
PCB-202	2136-99-4	pg/L	**642**		**1370**		**67.90**	
PCB-203	52663-76-0	pg/L	**2470**		**5130**		**186**	
PCB-204	74472-52-9	pg/L	**2.69**	**JQ**	**5.16**	**JQ**	0.55	U
PCB-205	74472-53-0	pg/L	**39.20**		**68.60**		**2.36**	**JQ**
PCB-206	40186-72-9	pg/L	**3400**		**8180**		**222**	
PCB-207	52663-79-3	pg/L	**360**		**837**		**23.70**	
PCB-208	52663-77-1	pg/L	**816**		**2070**		**63.40**	
PCB-209	2051-24-3	pg/L	**234**		**714**		**19.70**	**JQ**

Table 4-8
Low-Level PCB (1668) Water Sample Results
Former Kaiser Smelter Plant
Mead, Washington

Notes:

Detected results are bolded.

-- = Not Applicable

CAS = Chemical Abstracts Service

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K = The bias of the sample is not known.

L = The sample result is biased low.

pg/l = picograms per liter

PCBs = Polychlorinated Biphenyls (PCBs), EPA Method 8082A by GC/ECD

Q = Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

Qual = Qualifier

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

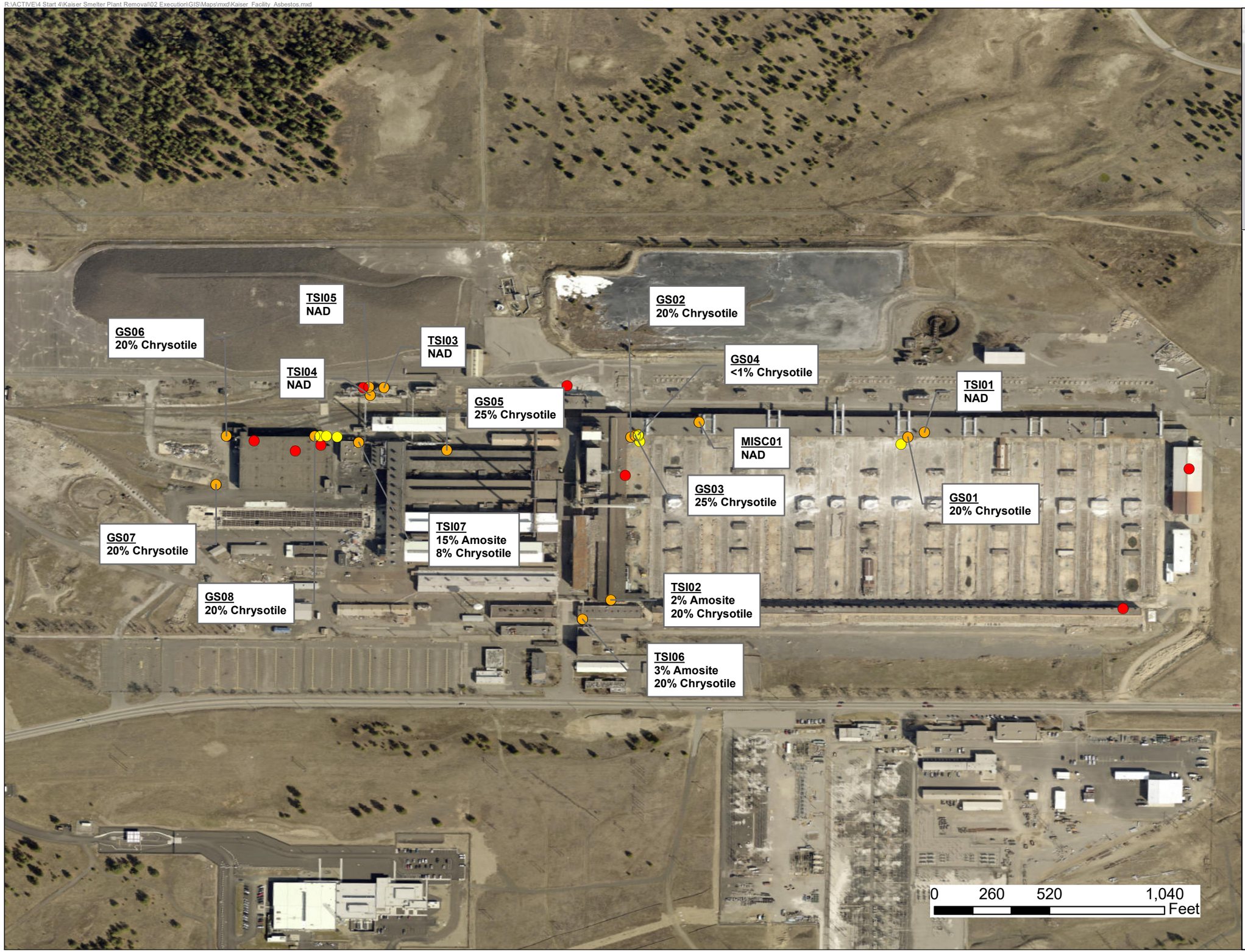

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FIGURE 4-1
ASBESTOS RESULTS AT FACILITY
FORMER KAISER SMELTER PLANT
Mead, Washington

Legend

- Sediment/Soil
- Surface Water
- Suspect ACM Bulk Material
- Waste Material/Product

Notes:
NAD = No Asbestos Detected
% = percent

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FIGURE 4-2
PCB RESULTS AT FACILITY
FORMER KAISER SMELTER PLANT
Mead, Washington

Legend

- Sediment/Soil
- Surface Water
- Suspect ACM Bulk Material
- Waste Material/Product

Notes:
ND = Non-detect
PCB results in microgram/kilogram (ug/kg)
H = The sample result is biased high.
J = The result is an estimated quantity. The associated numerical value is the approximate.
K = The bias of the sample is not known.
Q = Detected concentration is below the method reporting limit/Contract Required.

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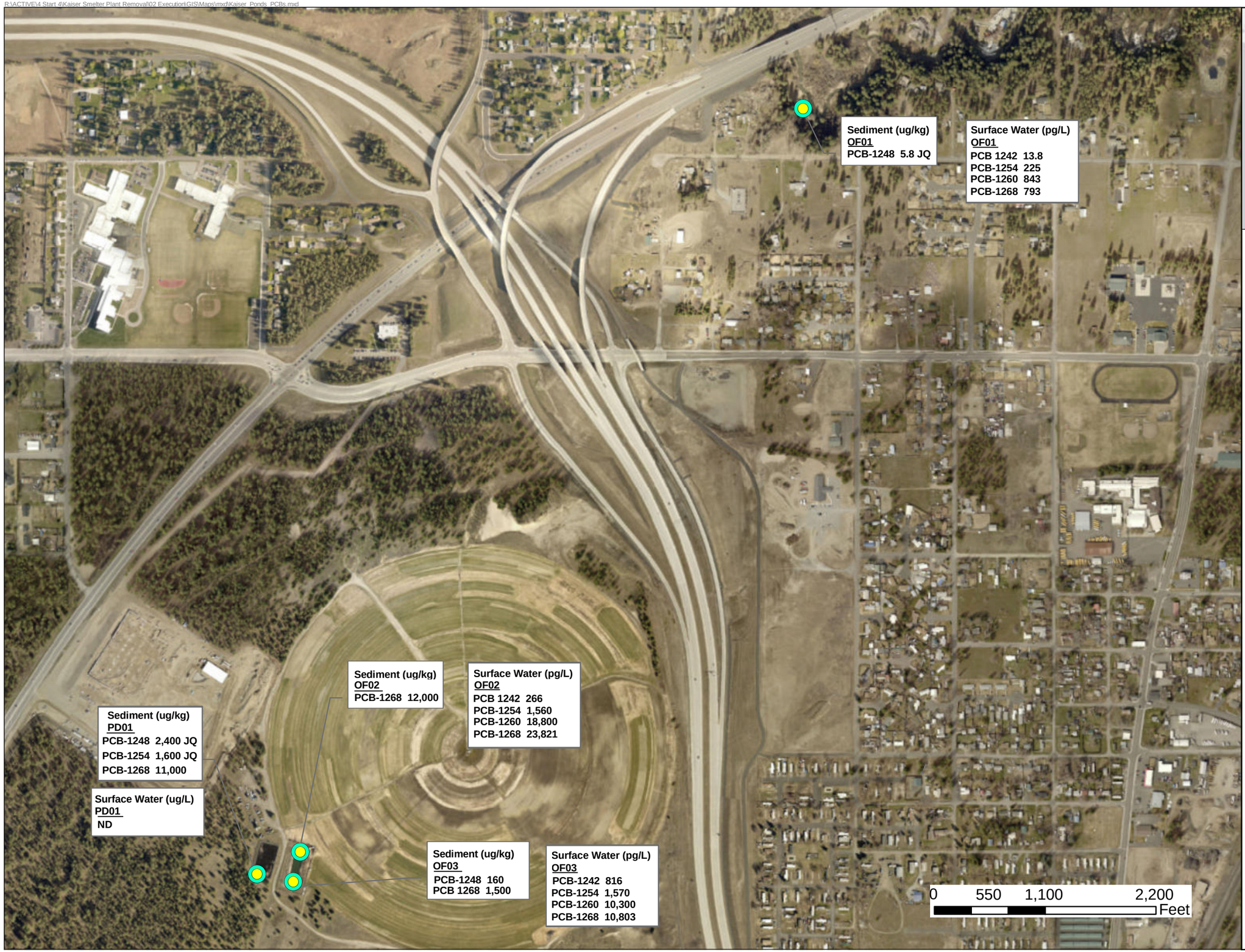

FIGURE 4-3
PCB RESULTS AT OUTFALL AND PONDS
FORMER KAISER SMELTER PLANT
Mead, Washington

Legend

- Sediment/Soil
- Surface Water
- Suspect ACM Bulk Material
- Waste Material/Product

Notes:
ND = Non-detect
H = The sample result is biased high.
J = The result is an estimated quantity. The associated numerical value is the approximate.
K = The bias of the sample is not known.
Q = Detected concentration is below the method reporting limit/Contract Required.

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5 Quality Assurance/Quality Control

QA/QC data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of sampling equipment, glassware and reagents. Specific QC requirements for laboratory analyses are incorporated in the *USEPA Contract Laboratory Program Statement of Work for Inorganic Superfund Methods Multi-Media Multi-Concentration ISM02.4* (EPA 2016a), the *USEPA Contract Laboratory Program Statement of Work for Organic Superfund Methods Multi-Media Multi-Concentration SOM02.4* (EPA 2016b), and *EPA Contract Laboratory Program Statement of Work for High Resolution Superfund Methods (Multi-Media, Multi-Concentration) HRSM01.2* (EPA 2014). These QC requirements or equivalent requirements found in the analytical methods were followed for analytical work on the project. This section describes the QA/QC measures taken for the project and provides an evaluation of the usability of data presented in this report.

Data from the START-subcontracted laboratories were reviewed by a START chemist. Data qualifiers and labels were applied as necessary according to the following guidance:

- EPA (2017a) *National Functional Guidelines for Inorganic Superfund Methods Data Review*.
- EPA (2017b) *National Functional Guidelines for Organic Superfund Methods Data Review*.
- EPA (2016c) *National Functional Guidelines for High Resolution Superfund Methods Data Review*.
- EPA (2009) *Guidance for Labeling Externally Validated Laboratory Data for Superfund Use.*

In the absence of other QC guidance, method- and/or SOP-specific QC limits were also utilized to apply qualifiers to the data.

5.1 Satisfaction of Data Quality Objectives

The following EPA (EPA 2000) guidance document was used to establish data quality objectives (DQOs) for this project:

- *Guidance for the Data Quality Objectives Process* (EPA QA/G-4), EPA/600/R-96/055.

EPA determined that definitive data without error and bias determination would be used for the sampling and analyses conducted during the field activities. The data quality achieved during the field work produced sufficient data that met the DQOs stated in the SSSP (E & E 2019a). A detailed discussion of accomplished project objectives is presented in the following sections.

5.2 QA/QC Samples

Trip blank QA samples were collected at a rate of one per cooler for volatile organic compound and gasoline-range organics analysis. Rinsate blank QA samples were not required as all samples were collected using dedicated sampling equipment. QC samples included matrix spike/matrix spike duplicate (MS/MSD) and/or blank spike (BS) samples at a rate of one MS/MSD and/or BS per 20 samples per matrix.

5.3 Project-Specific Data Quality Objectives

The laboratory data were reviewed to ensure that DQOs for the project were met. The following describes the laboratories' and/or field team's abilities to meet project DQOs for precision, accuracy and completeness and the field team's ability to meet project DQOs for representativeness and comparability. The laboratories and the field team were able to meet DQOs for the project.

5.3.1 Precision

Precision measures the reproducibility of the sampling and analytical methodology. Laboratory and field precision are defined as the relative percent difference (RPD) between duplicate sample analyses. The laboratory and field duplicate samples or MS/MSD samples measure the overall precision. The RPD values were reviewed for all commercial laboratory samples. A total of 179 sample results (approximately 4.2% of the data) were qualified as estimated quantities based on precision outliers; therefore, the project DQO for precision was met.

5.3.2 Accuracy

Accuracy indicates the conformity of the measurements to fact. Laboratory accuracy is defined as the surrogate spike percent recovery (%R) or the MS/MSD/BS %Rs for all laboratory analyses. The surrogate and MS/MSD/BS/BSD %R values were reviewed for all appropriate sample analyses. A total of 339 sample results (approximately 8.7 % of the data) were qualified as estimated quantities (J) based on accuracy outliers; therefore, the project DQO for accuracy was met.

5.3.3 Completeness

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). All laboratory data were reviewed for data validation and usability. Three sample results (approximately 0.07% of the data) were rejected (R); therefore, the project DQO for completeness of 90% was met.

5.3.4 Representativeness

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point or environmental condition. The number and selection of samples were determined in the field to account accurately for site variations and sample matrices. The DQO for representativeness was met.

5.3.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Data produced for this site followed applicable field sampling techniques and specific analytical methodology. The DQO for comparability was met.

5.4 Laboratory QA/QC Parameters

The laboratory data also were reviewed for holding times/temperatures/sample containers, laboratory blank samples, serial dilution analyses, and trip blanks. These QA/QC parameters are summarized below.

5.4.1 Holding Times/Temperatures/Sample Containers

All holding times, sample temperatures, and containers were acceptable.

5.4.2 Laboratory Blanks

All laboratory blanks met the frequency criteria. The following potential contaminants of concern were detected in the laboratory blanks:

- Inorganics: arsenic, chromium, cobalt, potassium, nickel, thallium, and vanadium.

See the data validation memoranda for results qualified based on blank contamination.

5.4.3 Serial Dilution Analyses

Serial dilution analyses met the frequency criteria. No sample results A total of 40 sample results (approximately 0.9 % of the data) were qualified based on serial dilution outliers.

5.4.4 Trip Blanks

Trip blank analyses were performed at a frequency of one per sample cooler collected for VOCs and gasoline-range organics analyses. Toluene and carbon disulfide were detected in one trip blank at less than the quantitation limit and acetone and 2-butanone were detected in one trip blank at greater than the quantitation limit. Associated positive acetone and 2-butanone sample results less than five times the trip blank results were qualified as not detected (U) at the sample result/quantitation limit. Associated positive toluene and carbon disulfide results less than the reporting limit were qualified as not detected (U) at the quantitation limit.

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6 Summary and Conclusions

EPA and START completed an RSE at the Former Kaiser Smelter Facility in Mead, WA. The facility is a former aluminum smelter that began operations in 1942 during World War II and closed in 2000. The specific goals and objectives for the RSE were to assess the presence, concentrations, and migration pathways of hazardous substances at the site.

During the May 2019 field sampling event, START collected samples from building materials (including Robertson siding), waste materials and product, solids/soil, sediment, and surface water. START collected a total of 42 samples, and the analyses included asbestos, PCBs, SVOCs, TAL metals, VOCs, NWTPH-Gx, and NWTPH-Dx. Additionally, two Robertson siding samples and three surface water samples were analyzed for low-level PCBs using EPA Method 1668.

START observed at least 13 facility buildings that appeared to have walls constructed with Robertson siding, which is a building material composed of PCBs and asbestos. The Robertson siding panels appeared to be weathered and damaged, with multiple pieces observed to be on the ground around the buildings. Chrysotile asbestos was detected in most of the Robertson siding samples at concentrations of 20%. Additionally, the analytical results confirmed the presence of high concentrations of Aroclor 1268 µg/kg in the Robert siding samples.

The former facility has a system of catch basins and storm sewers to collect and divert stormwater through an aqueduct flowing north from the facility to a pair of settling ponds. The water flows into the southern end of the lower settling pond. At the northern end of the lower pond, a pipe transfers the water through a second aqueduct to the effluent outfall and discharges into Deadman Creek. The RSE sampling effort focused on the potential migration pathway from the facility buildings with Robertson siding through the catch basins and settling ponds to the outfall at Deadman Creek. Several PCB congeners were detected in various sampling locations during this effort. The PCB Aroclor 1268 was detected in samples collected from each of these sampling areas:

- Robertson siding: Aroclor 1268 concentrations ranged from 70,000 JQ to 39,000,000 µg/kg in the samples analyzed by EPA Method 8082.

- Solids/soil on ground near exterior walls with Robertson siding: Aroclor 1268 concentrations ranged from 920 to 170,000 µg/kg.
- Sediment in facility catch basins: Aroclor 1268 concentrations ranged from 3,500 to 220,000 µg/kg.
- Stormwater settling ponds:
    - In sediment samples, Aroclor 1268 concentrations ranged from 1,500 to 12,000 µg/kg. Total PCB concentrations exceeded Washington State sediment cleanup goals in all three samples.
    - In surface water samples, the low-level PCB analysis (EPA Method 1668) indicated multiple Aroclors including Aroclor 1268 (10,803 to 23,821 pg/L). Total PCB concentrations ranged from 23,489 to 44,447 pg/L, which exceeded both the Washington State (7 pg/L) and Spokane Tribe (1.3 pg/L) human health screening levels for the Spokane River.
- Stormwater discharge at Deadman Creek:
    - In sediment samples, Aroclor 1268 was not detected, but the Aroclor 1248 was detected at trace concentrations below Washington State sediment cleanup goals.
    - In surface water, the effluent sample analyzed by the low-level PCB method (EPA Method 1668) indicated multiple Aroclors including Aroclor 1268 (793 pg/L). The total PCB concentration for this sample was 1,875 pg/L, which exceeded both the Washington State (7 pg/L) and Spokane Tribe (1.3 pg/L) human health screening levels for the Spokane River.

These results indicate a pathway for migration of PCBs from the facility buildings with Robertson Siding through the catch basins and stormwater system to the settling ponds and then to Deadman Creek. Additionally, total PCB concentrations in several of these samples, including Robertson siding, soil/solids on the ground, and catch basin sediment, exceeded the RML for industrial soil.

In addition to the PCBs, samples from the sediment samples from the catch basins and settling ponds also contained elevated concentrations of other compounds, including PAHs, metals, and petroleum hydrocarbons (diesel- and heavy oil-range organics), indicating that these contaminants are also migrating off site in a manner similar to PCBs.

START estimated the quantity of Robertson siding at the facility using online mapping resources and the estimated heights of the buildings. There is approximately 300,000 square feet of Robertson siding on the 13 buildings. The roofs of these buildings were not accessible during the field sampling event, but if

they are also composed of Robertson siding, then there is approximately 650,000 square feet of the material at the facility.

In the rafters of the Baghouse Building and exterior piping throughout the facility, TSI material was visibly deteriorating from the pipelines and had fallen onto the ground. The results of the asbestos sampling indicated some of the TSI on the pipelines contained both amosite and chrysotile asbestos at total concentrations of approximately 20% and thus were ACM. Within the Baghouse Building and connected Building 32, there was approximately 5,500 linear feet of ACM TSI in the rafters. On observed exterior pipelines throughout the facility, there is approximately 750 linear feet of suspect ACM TSI.

EPA and START observed numerous piles of waste materials and former products. Many of these materials were uncontrolled and without secondary containment. They were either outside and exposed to the elements, or inside unsecured and open buildings. Within the Green Mill Building, there was approximately 4,500 cubic yards of a material labeled “Green Coke” in numerous piles and containers. Samples collected from the green coke contained elevated concentrations of PAHs and metals.

In and near the Baghouse Building there were several large piles of baghouse dust. One large pile (approximately 1,000 cubic yards) was located inside a large open and unsecured building (Building 35), and another large pile (approximately 220 cubic yards) was located outside to the north of the Baghouse Building. Samples from the baghouse dust contained elevated concentrations of PCBs (including Aroclor 1268), PAHs, and metals.

Other uncontrolled and exposed waste materials/products included large piles of alumina in the potline area. One sample analyzed for metals indicated an aluminum concentration of 192,000 mg/kg.

There were three coal tar ASTs at the coal tar tank farm, and approximately 370 cubic yards of coal tar was spilling out of one open AST. The coal tar sample contained elevated concentrations of PAHs, including multiple PAH compounds with concentrations greater than 1,000,000 µg/kg. The maximum capacity of each tank is 2,300 cubic yards or 100,000 gallons.

During the field sampling event, EPA and START observed evidence of uncontrolled access to the facility. Although there is a front gate that was sometimes staffed by security, START observed multiple visitors entering and driving throughout the property. START also observed graffiti and several mattresses, and online videos show online videos show members of the public readily driving and/or walking throughout the former facility.

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7 References

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Washington Department of Ecology (Ecology), May 2002, *Cleanup Action Plan, Kaiser Aluminum National Priorities List Site in Mead, Washington.* https://semspub.epa.gov/work/10/100042759.pdf

A Photographs

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Facility: Former Kaiser Smelter Site
Location: Mead, WA

Photo: 1 Date: 5/23/2019 Time: 14:02

Former Kaiser Aluminum sign.

Photo: 2 Date: 5/23/2019 Time: 14:02

Entrance to former Kaiser Smelter Plant facility.

Photo: 3 Date: 5/22/2019 Time: 16:32

Green Mill Building.

Photo: 4 Date: 5/21/2019 Time: 08:23

Baghouse Building.

Facility: Former Kaiser Smelter Site
Location: Mead, WA

Photo: 5 Date: 5/22/2019 Time: 12:42

START sampling suspect ACM TSI.

Photo: 6 Date: 5/22/2019 Time: 11:52

START sampling the Robertson Protective Metal siding on the Baghouse Building.

Photo: 7 Date: 5/21/2019 Time: 14:35

START sampling green coke in the Green Mill Building.

Photo: 8 Date: 5/21/2019 Time: 14:12

55-gallon drums containing green coke in the Green Mill Building.

Facility: Former Kaiser Smelter Site
Location: Mead, WA

Photo: 9 Date: 5/22/2019 Time: 08:18

Large pile of baghouse dust in Building 35, connected the the Baghouse Building.

Photo: 10 Date: 5/23/2019 Time: 14:16

Large pile of baghouse dust located directly north of Bagehouse Building.

Photo: 11 Date: 5/23/2019 Time: 10:58

Several piles of alumina located in the potline area to the south of the Baghouse Building.

Photo: 12 Date: 5/23/2019 Time: 10:57

Several piles of alumina located in the potline area to the south of the Baghouse Building.

Facility: Former Kaiser Smelter Site
Location: Mead, WA

Photo: 13 Date: 5/24/2019 Time: 08:18

One of three coal tar ASTs.

Photo: 14 Date: 5/24/2019 Time: 08:18

START sampling visible coal tar.

Photo: 15 Date: 5/21/2019 Time: 09:03

Loose coal tar outside of secondary containment.

Photo: 16 Date: 5/22/2019 Time: 16:02

One of four transformers containing dielectric fluid.

Facility: Former Kaiser Smelter Plant
Location: Mead, WA

Photo: 17 Date: 5/21/2019 Time: 12:31

START collecting debris sample near Robertson Protective Metal siding by the Baghouse Building, Bay 3.

Photo: 18 Date: 5/21/2019 Time: 13:43

START collecting soil sample near Robertson Protective Metal siding by the Green Mill Building.

Photo: 19 Date: 5/21/2019 Time: 11:50

START collecting soil/solids on the ground in catchbasin near Robertson Protective Metal siding by the Baghouse Building, Bay 19.

Photo: 20 Date: 5/21/2019 Time: 11:47

Location of catchbasin near Robertson Protective Metal siding by the Baghouse Building, Bay 19.

Facility: Former Kaiser Smelter Plant
Location: Mead, WA

Photo: 21 Date: 5/20/2019 Time: 08:39

Overview of effluent outfall.

Photo: 22 Date: 5/20/2019 Time: 08:39

Overview of Deadman Creek, next to the effluent outfall.

Photo: 23 Date: 5/20/2019 Time: 09:30

START collecting sediment sample at the base of the outfall.

Photo: 24 Date: 5/20/2019 Time: 09:03

START collecting surface water sampling within the outfall.

Facility: Former Kaiser Smelter Plant
Location: Mead, WA

Photo: 25 Date: 5/20/2019 Time: 11:58

Overview of lower settling pond.

Photo: 26 Date: 5/20/2019 Time: 11:34

Overview of upper settling pond.

Photo: 27 Date: 5/20/2019 Time: 11:55

EPA and START collecting surface water sample at the southern baffle in the lower settling pond.

Photo: 28 Date: 5/20/2019 Time: 10:40

START collecting surface water sample at the edge of the upper settling pond.

Facility: Former Kaiser Smelter Plant
Location: Mead, WA

Photo: 29 Date: 5/22/2019 Time: 15:55

Spray-painted graffiti located in structurally damaged building.

Photo: 30 Date: 5/22/2019 Time: 16:31

Open pits within footprints of former building.

Photo: 31 Date: 5/23/2019 Time: 15:31

Exterior ACM pipeline TSI deteriorating on the elbow. Visible ACM TSI observed on the groud near the fence.

Photo: 32 Date: 5/22/2019 Time: 16:01

Building siding partially torn down.

B Analytical Data

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ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: June 11, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, WA MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of 16 solid (building material and dust) samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Polarized light microscopy (PLM) asbestos analyses were performed by EMSL Analytical, Inc., Cinnaminson, New Jersey. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered:

19050001	19050002	19050003	19050004	19050005
19050006	19050007	19050008	19050101	19050102
19050103	19050104	19050105	19050106	19050107
19050108				

Data Qualifications:

The samples were collected on May 22 and 23, 2019, and were analyzed by June 10, 2019. No discrepancies were noted in the laboratory case narrative.

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

A total of 16 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and the analytical method(s). Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order:	041914073
Customer ID:	ECOL44
Customer PO:	B07-000136
Project ID:	TO-68HE0719F0066

Attention: Mark Woodke
Ecology & Environment, Inc.
720 3rd Ave
Suite 1700
Seattle, WA 98104
Project: Project No: 1004530.F066.001.01/Site #: 10ZZ (TO-68HE0719F0066)

Phone:	(206) 624-9537
Fax:	(206) 621-9832
Received Date:	05/24/2019 9:25 AM
Analysis Date:	06/10/2019
Collected Date:	05/22/2019

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
19050001 *041914073-0001*	TSI01 - Building Material	Tan Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
19050002 *041914073-0002*	MISC01 - Building Material	White Fibrous Homogeneous	20% Cellulose 5% Wollastonite	75% Non-fibrous (Other)	None Detected
19050003 *041914073-0003*	TSI02 - Building Material	White Fibrous Homogeneous		78% Non-fibrous (Other)	2% Amosite 20% Chrysotile
19050004 *041914073-0004* *Sample is dust.*	TSI03 - Dust	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
19050005 *041914073-0005* *Sample is dust.*	TSI04 - Dust	Tan Fibrous Homogeneous	15% Cellulose	85% Non-fibrous (Other)	None Detected
19050006 *041914073-0006* *Sample is dust.*	TSI05 - Dust	Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
19050007 *041914073-0007* *Sample is dust.*	TSI06 - Dust	Brown/Gray Fibrous Homogeneous		77% Non-fibrous (Other)	3% Amosite 20% Chrysotile
19050008 *041914073-0008* *Sample is dust.*	TSI07 - Dust	Gray Fibrous Homogeneous		77% Non-fibrous (Other)	15% Amosite 8% Chrysotile
19050101 *041914073-0009*	GS01 - Building Material	Black Fibrous Homogeneous	15% Cellulose	65% Non-fibrous (Other)	20% Chrysotile
19050102 *041914073-0010*	GS02 - Building Material	Black Fibrous Homogeneous	15% Cellulose	65% Non-fibrous (Other)	20% Chrysotile
19050103 *041914073-0011*	GS03 - Building Material	Black Fibrous Homogeneous	10% Cellulose	65% Non-fibrous (Other)	25% Chrysotile
19050104 *041914073-0012*	GS04 - Building Material	Black Fibrous Homogeneous	2% Cellulose	98% Non-fibrous (Other)	<1% Chrysotile
19050105 *041914073-0013*	GS05 - Dust	Black Fibrous Homogeneous	10% Cellulose	65% Non-fibrous (Other)	25% Chrysotile
19050106 *041914073-0014*	GS06 - Building Material	Black Fibrous Homogeneous	10% Cellulose 2% Synthetic	68% Non-fibrous (Other)	20% Chrysotile

Initial report from: 06/10/2019 11:20:21

MW 6-11-19

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order:	041914073
Customer ID:	ECOL44
Customer PO:	B07-000136
Project ID:	TO-68HE0719F0066

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
19050107 *041914073-0015*	GS07 - Building Material	Black Fibrous Homogeneous	10% Cellulose 2% Synthetic	68% Non-fibrous (Other)	20% Chrysotile
19050108 *041914073-0016*	GS08 - Building Material	Black Fibrous Homogeneous	10% Cellulose 5% Synthetic	55% Non-fibrous (Other)	20% Chrysotile

Analyst(s)
Chelsey Donnelly (16)

Samantha Ringstrom
Benjamin Ellis, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method"), but augmented with procedures outlined in the 1993 ("final") version of the method. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. All samples received in acceptable condition unless otherwise noted. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. EMSL recommends gravimetric reduction for all non-friable organically bound materials prior to analysis. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036, PA ID# 68-00367, LA #04127

Initial report from: 06/10/2019 11:20:21

MN 6-11-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analyses for Polychlorinated Biphenyls (PCBs - EPA Method 8082) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050601

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained at 0°C to 6°C. The sample was collected on May 20, 2019, extracted on May 24, 2019, and were analyzed by May 28, 2019. There are no holding time limits for Method 8082 PCB analyses.

2. **Instrument Performance: Acceptable.**

The surrogate retention time percent difference between the initial calibration standards and the remaining standards and samples was within QC limits.

3. **Initial and Continuing Calibration: Acceptable.**

All initial calibration relative standard deviations (RSDs) were within QC limits. All continuing calibration % differences (% D) were within QC limits.

4. **Blanks: Acceptable.**

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each analytical system. No target analytes were detected in the laboratory blanks.

5. **System Monitoring Compounds (SMCs): Acceptable.**

All recoveries of the SMCs were within the established control limits.

6. Blank Spike (BS) Analyses: Acceptable.

BS recoveries were within QC limits.

7. Compound Identification: Acceptable.

All positive results were dual-column confirmed with differences between the columns < 40%.

8. Target Compound Quantitation and Quantitation Limits: Acceptable.

Sample results and quantitation limits were correctly calculated.

9. Laboratory Contact

No laboratory contact was required.

10. Overall Assessment

A total of nine results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050601 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064105
ELLE Group #: 2045307
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:02
SDG#: EUR57-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	2	5	1
10461	Fluoranthene	206-44-0	N.D.	0.1	0.5	1
10461	Fluorene	86-73-7	N.D.	0.1	0.5	1
10461	Hexachlorobenzene	118-74-1	N.D.	0.1	0.5	1
10461	Hexachlorobutadiene	87-68-3	N.D.	0.6	2	1
10461	Hexachlorocyclopentadiene	77-47-4	N.D.	5	16	1
10461	Hexachloroethane	67-72-1	N.D.	1	5	1
10461	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.5	1
10461	Isophorone	78-59-1	N.D.	0.5	2	1
10461	2-Methylnaphthalene	91-57-6	N.D.	0.1	0.5	1
10461	2-Methylphenol	95-48-7	N.D.	0.7	2	1
10461	4-Methylphenol	106-44-5	N.D.	0.5	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10461	Naphthalene	91-20-3	N.D.	0.1	0.5	1
10461	2-Nitroaniline	88-74-4	N.D.	0.7	2	1
10461	3-Nitroaniline	99-09-2	N.D.	0.5	2	1
10461	4-Nitroaniline	100-01-6	N.D.	0.6	2	1
10461	Nitrobenzene	98-95-3	N.D.	0.8	2	1
10461	2-Nitrophenol	88-75-5	N.D.	0.7	2	1
10461	4-Nitrophenol	100-02-7	N.D.	11	32	1
10461	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.5	2	1
10461	N-Nitrosodiphenylamine	86-30-6	N.D.	0.5	2	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10461	Di-n-octylphthalate	117-84-0	N.D.	2	5	1
10461	Pentachlorophenol	87-86-5	N.D.	1	5	1
10461	Phenanthrene	85-01-8	N.D.	0.1	0.5	1
10461	Phenol	108-95-2	N.D.	0.5	2	1
10461	Pyrene	129-00-0	N.D.	0.1	0.5	1
10461	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	0.6	2	1
10461	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	0.7	2	1
10461	2,4,5-Trichlorophenol	95-95-4	N.D.	0.7	2	1
10461	2,4,6-Trichlorophenol	88-06-2	N.D.	0.6	2	1
PCBs	**SW-846 8082A**		ug/l	ug/l	ug/l	
14184	PCB-1016	12674-11-2	N.D. D1	0.12	0.59	1
14184	PCB-1221	11104-28-2	N.D. D1	0.12	0.59	1
14184	PCB-1232	11141-16-5	N.D. D1	0.12	0.59	1
14184	PCB-1242	53469-21-9	N.D. D1	0.12	0.59	1

*=This limit was used in the evaluation of the final result

MW 7-8-19

eurofins | Lancaster Laboratories Environmental

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Analysis Report

Sample Description: 19050601 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064105
ELLE Group #: 2045307
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:02
SDG#: EUR57-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A**	ug/l	ug/l	ug/l	
14184	PCB-1248	12672-29-6	N.D. D1	0.12	0.59	1
14184	PCB-1254	11097-69-1	N.D. D1	0.12	0.59	1
14184	PCB-1260	11096-82-5	N.D. D1	0.12	0.59	1
14184	PCB-1262	37324-23-5	N.D. D1	0.12	0.59	1
14184	PCB-1268	11100-14-4	N.D. D1	0.12	0.59	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10461	SVOAs by 8270D in Water	SW-846 8270D	1	19143WAP026	05/25/2019 02:09	Brandon K Cordova	1
11010	8270D BNA Extraction	SW-846 3510C	1	19143WAP026	05/24/2019 10:45	David S Schrum	1
14184	PCBs (8082A/3510C) 1000 ml	SW-846 8082A	1	191440008A	05/28/2019 10:04	Covenant Mutuku	1
11121	PCB Waters Update IV Ext	SW-846 3510C	1	191440008A	05/24/2019 17:36	Christine E Gleim	1

*=This limit was used in the evaluation of the final result

7-8-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Semivolatile Organic Compound (SVOC) analysis (EPA Method 8270) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050601

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained and received within the QC limits of 0°C to 6°C. The sample was collected on May 20, 2019, was extracted and analyzed by May 24, 2019, therefore meeting holding time criteria of less than 7 days between collection and extraction and less than 40 days between extraction and analysis.

2. **Tuning: Acceptable.**

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. **Initial Calibration: Acceptable.**

All average Relative Response Factors (RRFs) were within the QC limits. All Relative Standard Deviations (RSDs) were within the QC limits.

4. **Continuing Calibration: Acceptable.**

All RRFs were within the QC limits. All % differences were within the QC limits.

5. **Blanks: Acceptable.**

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS)/BS Duplicate (BSD) Analysis: Acceptable.

BS and BSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. Duplicate Analysis: Acceptable.

Spike duplicate analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All spike duplicate results were within QC limits.

9. Internal Standards: Acceptable.

All internal standards (IS) were within $\pm$ 30 seconds of the continuing calibration IS retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts.

10. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

A total of 68 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050601 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064105
ELLE Group #: 2045307
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:02
SDG#: EUR57-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	Acenaphthene	83-32-9	N.D.	0.1	0.5	1
10461	Acenaphthylene	208-96-8	N.D.	0.1	0.5	1
10461	Acetophenone	98-86-2	N.D.	0.5	2	1
10461	Anthracene	120-12-7	N.D.	0.1	0.5	1
10461	Atrazine	1912-24-9	N.D.	2	5	1
10461	Benzaldehyde	100-52-7	N.D.	1	5	1
10461	Benzo(a)anthracene	56-55-3	N.D.	0.1	0.5	1
10461	Benzo(a)pyrene	50-32-8	N.D.	0.1	0.5	1
10461	Benzo(b)fluoranthene	205-99-2	N.D.	0.1	0.5	1
10461	Benzo(g,h,i)perylene	191-24-2	N.D.	0.2	0.5	1
10461	Benzo(k)fluoranthene	207-08-9	N.D.	0.1	0.5	1
10461	1,1'-Biphenyl	92-52-4	N.D.	0.5	2	1
10461	4-Bromophenyl-phenylether	101-55-3	N.D.	0.5	2	1
10461	Butylbenzylphthalate	85-68-7	N.D.	2	5	1
10461	Di-n-butylphthalate	84-74-2	N.D.	2	5	1
10461	Caprolactam	105-60-2	N.D.	5	16	1
10461	Carbazole	86-74-8	N.D.	0.5	2	1
10461	4-Chloro-3-methylphenol	59-50-7	N.D.	0.5	2	1
10461	4-Chloroaniline	106-47-8	N.D.	2	5	1
10461	bis(2-Chloroethoxy)methane	111-91-1	N.D.	0.5	2	1
10461	bis(2-Chloroethyl)ether	111-44-4	N.D.	0.5	2	1
10461	2-Chloronaphthalene	91-58-7	N.D.	0.4	1	1
10461	2-Chlorophenol	95-57-8	N.D.	0.5	2	1
10461	4-Chlorophenyl-phenylether	7005-72-3	N.D.	0.5	2	1
10461	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	0.5	2	1
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10461	Chrysene	218-01-9	N.D.	0.1	0.5	1
10461	Dibenz(a,h)anthracene	53-70-3	N.D.	0.1	0.5	1
10461	Dibenzofuran	132-64-9	N.D.	0.5	2	1
10461	3,3'-Dichlorobenzidine	91-94-1	N.D.	2	5	1
10461	2,4-Dichlorophenol	120-83-2	N.D.	0.5	2	1
10461	Diethylphthalate	84-66-2	N.D.	2	5	1
10461	2,4-Dimethylphenol	105-67-9	N.D.	0.5	2	1
10461	Dimethylphthalate	131-11-3	N.D.	2	5	1
10461	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	5	16	1
10461	2,4-Dinitrophenol	51-28-5	N.D.	11	32	1
10461	2,4-Dinitrotoluene	121-14-2	N.D.	1	5	1
10461	2,6-Dinitrotoluene	606-20-2	N.D.	0.7	2	1
10461	1,4-Dioxane	123-91-1	N.D.	1	5	1

*=This limit was used in the evaluation of the final result

WW 7-8-19

Sample Description: 19050601 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064105
ELLE Group #: 2045307
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:02
SDG#: EUR57-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	2	5	1
10461	Fluoranthene	206-44-0	N.D.	0.1	0.5	1
10461	Fluorene	86-73-7	N.D.	0.1	0.5	1
10461	Hexachlorobenzene	118-74-1	N.D.	0.1	0.5	1
10461	Hexachlorobutadiene	87-68-3	N.D.	0.6	2	1
10461	Hexachlorocyclopentadiene	77-47-4	N.D.	5	16	1
10461	Hexachloroethane	67-72-1	N.D.	1	5	1
10461	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.5	1
10461	Isophorone	78-59-1	N.D.	0.5	2	1
10461	2-Methylnaphthalene	91-57-6	N.D.	0.1	0.5	1
10461	2-Methylphenol	95-48-7	N.D.	0.7	2	1
10461	4-Methylphenol	106-44-5	N.D.	0.5	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10461	Naphthalene	91-20-3	N.D.	0.1	0.5	1
10461	2-Nitroaniline	88-74-4	N.D.	0.7	2	1
10461	3-Nitroaniline	99-09-2	N.D.	0.5	2	1
10461	4-Nitroaniline	100-01-6	N.D.	0.6	2	1
10461	Nitrobenzene	98-95-3	N.D.	0.8	2	1
10461	2-Nitrophenol	88-75-5	N.D.	0.7	2	1
10461	4-Nitrophenol	100-02-7	N.D.	11	32	1
10461	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.5	2	1
10461	N-Nitrosodiphenylamine	86-30-6	N.D.	0.5	2	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10461	Di-n-octylphthalate	117-84-0	N.D.	2	5	1
10461	Pentachlorophenol	87-86-5	N.D.	1	5	1
10461	Phenanthrene	85-01-8	N.D.	0.1	0.5	1
10461	Phenol	108-95-2	N.D.	0.5	2	1
10461	Pyrene	129-00-0	N.D.	0.1	0.5	1
10461	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	0.6	2	1
10461	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	0.7	2	1
10461	2,4,5-Trichlorophenol	95-95-4	N.D.	0.7	2	1
10461	2,4,6-Trichlorophenol	88-06-2	N.D.	0.6	2	1
PCBs	**SW-846 8082A**		ug/l	ug/l	ug/l	
14184	PCB-1016	12674-11-2	N.D. D1	0.12	0.59	1
14184	PCB-1221	11104-28-2	N.D. D1	0.12	0.59	1
14184	PCB-1232	11141-16-5	N.D. D1	0.12	0.59	1
14184	PCB-1242	53469-21-9	N.D. D1	0.12	0.59	1

*=This limit was used in the evaluation of the final result

MW 7-8-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1904539.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050602

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained at 4°C ± 2°C. The sample was collected on May 20, 2019, extracted on May 24, 2019, and analyzed by May 28, 2019, therefore meeting QC criteria of less than 14 days between collection and extraction for soil and preserved water samples and less than 40 days between extraction and analysis.

2. **Initial Calibration: Acceptable.**

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. **Continuing Calibration: Acceptable.**

Calculations were verified as correct. All percent differences (%Ds) were within the laboratory control limits.

4. **Blanks: Acceptable.**

A method blank was analyzed for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in the method blank.

5. **System Monitoring Compounds (SMC): Satisfactory.**

All recoveries of the SMCs were greater than 10% and within QC limits except in the method blank with a 40% recovery (QC limits 50% - 150%); no actions were taken based on this outlier as all other SMCs were within QC limits.

6. Blank Spike (BS) and BS Duplicate (BSD): Acceptable.

BS and BSD recoveries were within QC limits.

7. Duplicates: Acceptable.

All spike duplicate results were within QC limits.

8. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

9. Laboratory Contact: Not Required.

No laboratory contact was required.

10. Overall Assessment of Data for Use

A total of two results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Sample Description: 19050602 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064106
ELLE Group #: 2045307
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:48
SDG#: EUR57-02

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		ug/l	ug/l	ug/l	
08271	Diesel Range Organics C12-C24	n.a.	81 J Q	33	110	1
08271	Heavy Range Organics C24-C40	n.a.	~~N.D.~~	75 U	270	1

The recovery for the method blank surrogate(s) is outside the QC acceptance limits as noted on the QC Summary. The following action was taken:
The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08271	NWTPH-Dx water	ECY 97-602 NWTPH-Dx modified	1	191430037A	05/28/2019 20:21	Nicholas R Rossi	1
11197	WA DRO NW DX Ext (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	191430037A	05/24/2019 10:45	David S Schrum	1

*=This limit was used in the evaluation of the final result

MW 7-8-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: June 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Semivolatile Organic Compound (SVOC) analysis (EPA Method 8270) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050602

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained and received within the QC limits of 0°C to 6°C. The sample was collected on May 20, 2019, was extracted and analyzed by May 25, 2019, therefore meeting holding time criteria of less than 7 days between collection and extraction and less than 40 days between extraction and analysis.

2. **Tuning: Acceptable.**

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. **Initial Calibration: Acceptable.**

All average Relative Response Factors (RRFs) were within the QC limits. All Relative Standard Deviations (RSDs) were within the QC limits.

4. **Continuing Calibration: Acceptable.**

All RRFs were within the QC limits. All % differences were within the QC limits.

5. **Blanks: Acceptable.**

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Matrix Spike (MS)/MS Duplicate (MSD) Analysis: Satisfactory.

MS and MSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits except hexachlorocyclopentadiene with two high recoveries; no qualifiers were applied as it was not detected in the native sample.

8. Blank Spike (BS) Analysis: Acceptable.

BS analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

9. Duplicate Analysis: Satisfactory.

Duplicate and spike duplicate analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate and spike duplicate results were within QC limits except dibenz(a,h)anthracene; this analyte was qualified as an estimated quantity with an unknown bias in the native sample (UJK).

10. Internal Standards: Acceptable.

All internal standards (IS) were within $\pm$ 30 seconds of the continuing calibration IS retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

A total of 68 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R). A total of one sample result (approximately 1.5 percent of the data) was qualified as an estimated quantity based on duplicate precision outliers.

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Sample Description: 19050602 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064107
ELLE Group #: 2045308
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:48
SDG#: EUR58-01BKG

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	Acenaphthene	83-32-9	N.D.	0.1	0.5	1
10461	Acenaphthylene	208-96-8	N.D.	0.1	0.5	1
10461	Acetophenone	98-86-2	N.D.	0.5	2	1
10461	Anthracene	120-12-7	N.D.	0.1	0.5	1
10461	Atrazine	1912-24-9	N.D.	2	5	1
10461	Benzaldehyde	100-52-7	N.D.	1	5	1
10461	Benzo(a)anthracene	56-55-3	N.D.	0.1	0.5	1
10461	Benzo(a)pyrene	50-32-8	N.D.	0.1	0.5	1
10461	Benzo(b)fluoranthene	205-99-2	N.D.	0.1	0.5	1
10461	Benzo(g,h,i)perylene	191-24-2	N.D.	0.2	0.5	1
10461	Benzo(k)fluoranthene	207-08-9	N.D.	0.1	0.5	1
10461	1,1'-Biphenyl	92-52-4	N.D.	0.5	2	1
10461	4-Bromophenyl-phenylether	101-55-3	N.D.	0.5	2	1
10461	Butylbenzylphthalate	85-68-7	N.D.	2	5	1
10461	Di-n-butylphthalate	84-74-2	N.D.	2	5	1
10461	Caprolactam	105-60-2	N.D.	5	15	1
10461	Carbazole	86-74-8	N.D.	0.5	2	1
10461	4-Chloro-3-methylphenol	59-50-7	N.D.	0.5	2	1
10461	4-Chloroaniline	106-47-8	N.D.	2	5	1
10461	bis(2-Chloroethoxy)methane	111-91-1	N.D.	0.5	2	1
10461	bis(2-Chloroethyl)ether	111-44-4	N.D.	0.5	2	1
10461	2-Chloronaphthalene	91-58-7	N.D.	0.4	1	1
10461	2-Chlorophenol	95-57-8	N.D.	0.5	2	1
10461	4-Chlorophenyl-phenylether	7005-72-3	N.D.	0.5	2	1
10461	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	0.5	2	1
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10461	Chrysene	218-01-9	N.D.	0.1	0.5	1
10461	Dibenz(a,h)anthracene	53-70-3	N.D.	0.1	0.5	1
10461	Dibenzofuran	132-64-9	N.D.	0.5	2	1
10461	3,3'-Dichlorobenzidine	91-94-1	N.D.	2	5	1
10461	2,4-Dichlorophenol	120-83-2	N.D.	0.5	2	1
10461	Diethylphthalate	84-66-2	N.D.	2	5	1
10461	2,4-Dimethylphenol	105-67-9	N.D.	0.5	2	1
10461	Dimethylphthalate	131-11-3	N.D.	2	5	1
10461	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	5	15	1
10461	2,4-Dinitrophenol	51-28-5	N.D.	10	31	1
10461	2,4-Dinitrotoluene	121-14-2	N.D.	1	5	1
10461	2,6-Dinitrotoluene	606-20-2	N.D.	0.7	2	1
10461	1,4-Dioxane	123-91-1	N.D.	1	5	1

*=This limit was used in the evaluation of the final result

MW 62619

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Analysis Report

Sample Description: 19050602 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064107
ELLE Group #: 2045308
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:48
SDG#: EUR58-01BKG

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	2	5	1
10461	Fluoranthene	206-44-0	N.D.	0.1	0.5	1
10461	Fluorene	86-73-7	N.D.	0.1	0.5	1
10461	Hexachlorobenzene	118-74-1	N.D.	0.1	0.5	1
10461	Hexachlorobutadiene	87-68-3	N.D.	0.6	2	1
10461	Hexachlorocyclopentadiene	77-47-4	N.D.	5	15	1
10461	Hexachloroethane	67-72-1	N.D.	1	5	1
10461	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.5	1
10461	Isophorone	78-59-1	N.D.	0.5	2	1
10461	2-Methylnaphthalene	91-57-6	N.D.	0.1	0.5	1
10461	2-Methylphenol	95-48-7	N.D.	0.7	2	1
10461	4-Methylphenol	106-44-5	N.D.	0.5	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10461	Naphthalene	91-20-3	N.D.	0.1	0.5	1
10461	2-Nitroaniline	88-74-4	N.D.	0.7	2	1
10461	3-Nitroaniline	99-09-2	N.D.	0.5	2	1
10461	4-Nitroaniline	100-01-6	N.D.	0.6	2	1
10461	Nitrobenzene	98-95-3	N.D.	0.8	2	1
10461	2-Nitrophenol	88-75-5	N.D.	0.7	2	1
10461	4-Nitrophenol	100-02-7	N.D.	10	31	1
10461	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.5	2	1
10461	N-Nitrosodiphenylamine	86-30-6	N.D.	0.5	2	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10461	Di-n-octylphthalate	117-84-0	N.D.	2	5	1
10461	Pentachlorophenol	87-86-5	N.D.	1	5	1
10461	Phenanthrene	85-01-8	N.D.	0.1	0.5	1
10461	Phenol	108-95-2	N.D.	0.5	2	1
10461	Pyrene	129-00-0	N.D.	0.1	0.5	1
10461	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	0.6	2	1
10461	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	0.7	2	1
10461	2,4,5-Trichlorophenol	95-95-4	N.D.	0.7	2	1
10461	2,4,6-Trichlorophenol	88-06-2	N.D.	0.6	2	1

Sample Comments

State of Washington Lab Certification No. C457

*=This limit was used in the evaluation of the final result

MW 6/26/19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Semivolatile Organic Compound (SVOC) analysis (EPA Method 8270) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050603

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained and received within the QC limits of 0°C to 6°C. The sample was collected on May 20, 2019, was extracted and analyzed by May 25, 2019, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

2. **Tuning: Acceptable.**

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. **Initial Calibration: Acceptable.**

All average Relative Response Factors (RRFs) were within the QC limits. All Relative Standard Deviations (RSDs) were within the QC limits.

4. **Continuing Calibration: Acceptable.**

All RRFs were within the QC limits. All % differences were within the QC limits.

5. **Blanks: Acceptable.**

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank.

6. **System Monitoring Compounds (SMCs): Acceptable.**

All SMC recoveries were within QC limits.

7. Blank Spike (BS) Analysis: Acceptable.

BS analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. Internal Standards: Acceptable.

All internal standards (IS) were within ± 30 seconds of the continuing calibration IS retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts.

9. Overall Assessment of Data for Use

A total of 68 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050603 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064111
ELLE Group #: 2045310
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 11:54
SDG#: EUR59-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	Acenaphthene	83-32-9	N.D.	0.1	0.6	1
10461	Acenaphthylene	208-96-8	N.D.	0.1	0.6	1
10461	Acetophenone	98-86-2	N.D.	0.6	2	1
10461	Anthracene	120-12-7	N.D.	0.1	0.6	1
10461	Atrazine	1912-24-9	N.D.	2	6	1
10461	Benzaldehyde	100-52-7	N.D.	1	6	1
10461	Benzo(a)anthracene	56-55-3	N.D.	0.1	0.6	1
10461	Benzo(a)pyrene	50-32-8	N.D.	0.1	0.6	1
10461	Benzo(b)fluoranthene	205-99-2	N.D.	0.1	0.6	1
10461	Benzo(g,h,i)perylene	191-24-2	N.D.	0.2	0.6	1
10461	Benzo(k)fluoranthene	207-08-9	N.D.	0.1	0.6	1
10461	1,1'-Biphenyl	92-52-4	N.D.	0.6	2	1
10461	4-Bromophenyl-phenylether	101-55-3	N.D.	0.6	2	1
10461	Butylbenzylphthalate	85-68-7	N.D.	2	6	1
10461	Di-n-butylphthalate	84-74-2	N.D.	2	6	1
10461	Caprolactam	105-60-2	N.D.	6	17	1
10461	Carbazole	86-74-8	N.D.	0.6	2	1
10461	4-Chloro-3-methylphenol	59-50-7	N.D.	0.6	2	1
10461	4-Chloroaniline	106-47-8	N.D.	2	6	1
10461	bis(2-Chloroethoxy)methane	111-91-1	N.D.	0.6	2	1
10461	bis(2-Chloroethyl)ether	111-44-4	N.D.	0.6	2	1
10461	2-Chloronaphthalene	91-58-7	N.D.	0.5	1	1
10461	2-Chlorophenol	95-57-8	N.D.	0.6	2	1
10461	4-Chlorophenyl-phenylether	7005-72-3	N.D.	0.6	2	1
10461	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	0.6	2	1
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10461	Chrysene	218-01-9	N.D.	0.1	0.6	1
10461	Dibenz(a,h)anthracene	53-70-3	N.D.	0.1	0.6	1
10461	Dibenzofuran	132-64-9	N.D.	0.6	2	1
10461	3,3'-Dichlorobenzidine	91-94-1	N.D.	2	6	1
10461	2,4-Dichlorophenol	120-83-2	N.D.	0.6	2	1
10461	Diethylphthalate	84-66-2	N.D.	2	6	1
10461	2,4-Dimethylphenol	105-67-9	N.D.	0.6	2	1
10461	Dimethylphthalate	131-11-3	N.D.	2	6	1
10461	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	6	17	1
10461	2,4-Dinitrophenol	51-28-5	N.D.	12	35	1
10461	2,4-Dinitrotoluene	121-14-2	N.D.	1	6	1
10461	2,6-Dinitrotoluene	606-20-2	N.D.	0.8	2	1
10461	1,4-Dioxane	123-91-1	N.D.	1	6	1

*=This limit was used in the evaluation of the final result

MW 7-8-19

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Sample Description: 19050603 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064111
ELLE Group #: 2045310
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 11:54
SDG#: EUR59-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	2	6	1
10461	Fluoranthene	206-44-0	N.D.	0.1	0.6	1
10461	Fluorene	86-73-7	N.D.	0.1	0.6	1
10461	Hexachlorobenzene	118-74-1	N.D.	0.1	0.6	1
10461	Hexachlorobutadiene	87-68-3	N.D.	0.7	2	1
10461	Hexachlorocyclopentadiene	77-47-4	N.D.	6	17	1
10461	Hexachloroethane	67-72-1	N.D.	1	6	1
10461	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.6	1
10461	Isophorone	78-59-1	N.D.	0.6	2	1
10461	2-Methylnaphthalene	91-57-6	N.D.	0.1	0.6	1
10461	2-Methylphenol	95-48-7	N.D.	0.8	2	1
10461	4-Methylphenol	106-44-5	N.D.	0.6	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10461	Naphthalene	91-20-3	N.D.	0.1	0.6	1
10461	2-Nitroaniline	88-74-4	N.D.	0.8	2	1
10461	3-Nitroaniline	99-09-2	N.D.	0.6	2	1
10461	4-Nitroaniline	100-01-6	N.D.	0.7	2	1
10461	Nitrobenzene	98-95-3	N.D.	0.9	2	1
10461	2-Nitrophenol	88-75-5	N.D.	0.8	2	1
10461	4-Nitrophenol	100-02-7	N.D.	12	35	1
10461	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.6	2	1
10461	N-Nitrosodiphenylamine	86-30-6	N.D.	0.6	2	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10461	Di-n-octylphthalate	117-84-0	N.D.	2	6	1
10461	Pentachlorophenol	87-86-5	N.D.	1	6	1
10461	Phenanthrene	85-01-8	N.D.	0.1	0.6	1
10461	Phenol	108-95-2	N.D.	0.6	2	1
10461	Pyrene	129-00-0	N.D.	0.1	0.6	1
10461	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	0.7	2	1
10461	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	0.8	2	1
10461	2,4,5-Trichlorophenol	95-95-4	N.D.	0.8	2	1
10461	2,4,6-Trichlorophenol	88-06-2	N.D.	0.7	2	1
PCBs	**SW-846 8082A**		ug/l	ug/l	ug/l	
14184	PCB-1016	12674-11-2	N.D. D1	0.12	0.59	1
14184	PCB-1221	11104-28-2	N.D. D1	0.12	0.59	1
14184	PCB-1232	11141-16-5	N.D. D1	0.12	0.59	1
14184	PCB-1242	53469-21-9	N.D. D1	0.12	0.59	1

*=This limit was used in the evaluation of the final result

7-8-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530 F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analyses for Polychlorinated Biphenyls (PCBs - EPA Method 8082) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050603

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained at 0°C to 6°C. The sample was collected on May 20, 2019, extracted on May 24, 2019, and was analyzed by May 28, 2019. There are no holding time limits for Method 8082 PCB analyses.

2. **Instrument Performance: Acceptable.**

The surrogate retention time percent difference between the initial calibration standards and the remaining standards and samples was within QC limits.

3. **Initial and Continuing Calibration: Acceptable.**

All initial calibration relative standard deviations (RSDs) were within QC limits. All continuing calibration % differences (% D) were within QC limits.

4. **Blanks: Acceptable.**

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each analytical system. No target analytes were detected in the laboratory blanks.

5. **System Monitoring Compounds (SMCs): Acceptable.**

All recoveries of the SMCs were within the established control limits.

6. **Blank Spike (BS) Analyses: Acceptable.**

BS recoveries were within QC limits.

7. **Compound Identification: Acceptable.**

All positive results were dual-column confirmed with differences between the columns < 40%.

8. **Target Compound Quantitation and Quantitation Limits: Acceptable.**

Sample results and quantitation limits were correctly calculated.

9. **Laboratory Contact**

No laboratory contact was required.

10. **Overall Assessment**

A total of nine results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050603 Grab Surface Water

Project Name: Ecology & Environment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 11:54
SDG#: EUR59-01

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064111
ELLE Group #: 2045310
Matrix: Surface Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	2	6	1
10461	Fluoranthene	206-44-0	N.D.	0.1	0.6	1
10461	Fluorene	86-73-7	N.D.	0.1	0.6	1
10461	Hexachlorobenzene	118-74-1	N.D.	0.1	0.6	1
10461	Hexachlorobutadiene	87-68-3	N.D.	0.7	2	1
10461	Hexachlorocyclopentadiene	77-47-4	N.D.	6	17	1
10461	Hexachloroethane	67-72-1	N.D.	1	6	1
10461	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.6	1
10461	Isophorone	78-59-1	N.D.	0.6	2	1
10461	2-Methylnaphthalene	91-57-6	N.D.	0.1	0.6	1
10461	2-Methylphenol	95-48-7	N.D.	0.8	2	1
10461	4-Methylphenol	106-44-5	N.D.	0.6	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10461	Naphthalene	91-20-3	N.D.	0.1	0.6	1
10461	2-Nitroaniline	88-74-4	N.D.	0.8	2	1
10461	3-Nitroaniline	99-09-2	N.D.	0.6	2	1
10461	4-Nitroaniline	100-01-6	N.D.	0.7	2	1
10461	Nitrobenzene	98-95-3	N.D.	0.9	2	1
10461	2-Nitrophenol	88-75-5	N.D.	0.8	2	1
10461	4-Nitrophenol	100-02-7	N.D.	12	35	1
10461	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.6	2	1
10461	N-Nitrosodiphenylamine	86-30-6	N.D.	0.6	2	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10461	Di-n-octylphthalate	117-84-0	N.D.	2	6	1
10461	Pentachlorophenol	87-86-5	N.D.	1	6	1
10461	Phenanthrene	85-01-8	N.D.	0.1	0.6	1
10461	Phenol	108-95-2	N.D.	0.6	2	1
10461	Pyrene	129-00-0	N.D.	0.1	0.6	1
10461	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	0.7	2	1
10461	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	0.8	2	1
10461	2,4,5-Trichlorophenol	95-95-4	N.D.	0.8	2	1
10461	2,4,6-Trichlorophenol	88-06-2	N.D.	0.7	2	1
PCBs	**SW-846 8082A**		ug/l	ug/l	ug/l	
14184	PCB-1016	12674-11-2	N.D. D1	0.12	0.59	1
14184	PCB-1221	11104-28-2	N.D. D1	0.12	0.59	1
14184	PCB-1232	11141-16-5	N.D. D1	0.12	0.59	1
14184	PCB-1242	53469-21-9	N.D. D1	0.12	0.59	1

*=This limit was used in the evaluation of the final result

7-8-19

eurofins | Lancaster Laboratories Environmental

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Analysis Report

Sample Description: 19050603 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064111
ELLE Group #: 2045310
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 11:54
SDG#: EUR59-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A**	ug/l	ug/l	ug/l	
14184	PCB-1248	12672-29-6	N.D. D1	0.12 U	0.59	1
14184	PCB-1254	11097-69-1	N.D. D1	0.12	0.59	1
14184	PCB-1260	11096-82-5	N.D. D1	0.12	0.59	1
14184	PCB-1262	37324-23-5	N.D. D1	0.12	0.59	1
14184	PCB-1268	11100-14-4	N.D. D1	0.12	0.59	1
GC Petroleum Hydrocarbons		**ECY 97-602 NWTPH-Dx modified**	ug/l	ug/l	ug/l	
08271	Diesel Range Organics C12-C24	n.a.	60 J Q	36	120	1
08271	Heavy Range Organics C24-C40	n.a.	N.D.	81 U	290	1

The recovery for the method blank surrogate(s) is outside the QC acceptance limits as noted on the QC Summary. The following action was taken: The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10461	SVOAs by 8270D in Water	SW-846 8270D	1	19143WAP026	05/25/2019 03:48	Brandon K Cordova	1
11010	8270D BNA Extraction	SW-846 3510C	1	19143WAP026	05/24/2019 10:45	David S Schrum	1
14184	PCBs (8082A/3510C) 1000 ml	SW-846 8082A	1	191440008A	05/28/2019 10:14	Covenant Mutuku	1
11121	PCB Waters Update IV Ext	SW-846 3510C	1	191440008A	05/24/2019 17:36	Christine E Gleim	1
08271	NWTPH-Dx water	ECY 97-602 NWTPH-Dx modified	1	191430037A	05/28/2019 19:15	Nicholas R Rossi	1
11197	WA DRO NW DX Ext (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	191430037A	05/24/2019 10:45	David S Schrum	1

*=This limit was used in the evaluation of the final result

7-8-19

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Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050603

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained at 4°C ± 2°C. The sample was collected on May 20, 2019, extracted on May 24, 2019, and analyzed by May 28, 2019, therefore meeting QC criteria of less than 14 days between collection and extraction for soil and preserved water samples and less than 40 days between extraction and analysis.

2. **Initial Calibration: Acceptable.**

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. **Continuing Calibration: Acceptable.**

Calculations were verified as correct. All percent differences (%Ds) were within the laboratory control limits.

4. **Blanks: Acceptable.**

A method blank was analyzed for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in the method blank.

5. **System Monitoring Compounds (SMC): Satisfactory.**

All recoveries of the SMCs were greater than 10% and within QC limits except in the method blank with a 40% recovery (QC limits of 50% - 150%). No actions were taken based on this outlier as all other SMCs were within QC limits.

6. Blank Spike (BS) and BS Duplicate (BSD): Acceptable.

BS and BSD recoveries were within QC limits.

7. Duplicates: Acceptable.

All spike duplicate results were within QC limits.

8. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

9. Laboratory Contact: Not Required.

No laboratory contact was required.

10. Overall Assessment of Data for Use

A total of two results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Analysis Report

Sample Description: 19050603 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064111
ELLE Group #: 2045310
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 11:54
SDG#: EUR59-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A**		ug/l	ug/l	ug/l	
14184	PCB-1248	12672-29-6	N.D. D1	0.12 U	0.59	1
14184	PCB-1254	11097-69-1	N.D. D1	0.12	0.59	1
14184	PCB-1260	11096-82-5	N.D. D1	0.12	0.59	1
14184	PCB-1262	37324-23-5	N.D. D1	0.12	0.59	1
14184	PCB-1268	11100-14-4	N.D. D1	0.12	0.59	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		ug/l	ug/l	ug/l	
08271	Diesel Range Organics C12-C24	n.a.	60 J Q	36	120	1
08271	Heavy Range Organics C24-C40	n.a.	N.D.	81 U	290	1

The recovery for the method blank surrogate(s) is outside the QC acceptance limits as noted on the QC Summary. The following action was taken: The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10461	SVOAs by 8270D in Water	SW-846 8270D	1	19143WAP026	05/25/2019 03:48	Brandon K Cordova	1
11010	8270D BNA Extraction	SW-846 3510C	1	19143WAP026	05/24/2019 10:45	David S Schrum	1
14184	PCBs (8082A/3510C) 1000 ml	SW-846 8082A	1	191440008A	05/28/2019 10:14	Covenant Mutuku	1
11121	PCB Waters Update IV Ext	SW-846 3510C	1	191440008A	05/24/2019 17:36	Christine E Gleim	1
08271	NWTPH-Dx water	ECY 97-602 NWTPH-Dx modified	1	191430037A	05/28/2019 19:15	Nicholas R Rossi	1
11197	WA DRO NW DX Ext (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	191430037A	05/24/2019 10:45	David S Schrum	1

*=This limit was used in the evaluation of the final result

7-8-19

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Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Semivolatile Organic Compound (SVOC) analysis (EPA Method 8270) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050604

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained and received within the QC limits of 0°C to 6°C. The sample was collected on May 20, 2019, was extracted and analyzed by May 25, 2019, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

2. **Tuning: Acceptable.**

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. **Initial Calibration: Acceptable.**

All average Relative Response Factors (RRFs) were within the QC limits. All Relative Standard Deviations (RSDs) were within the QC limits.

4. **Continuing Calibration: Acceptable.**

All RRFs were within the QC limits. All % differences were within the QC limits.

5. **Blanks: Acceptable.**

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank.

6. **System Monitoring Compounds (SMCs): Acceptable.**

All SMC recoveries were within QC limits.

7. Blank Spike (BS) Analysis: Acceptable.

BS analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. Internal Standards: Acceptable.

All internal standards (IS) were within ± 30 seconds of the continuing calibration IS retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts.

9. Overall Assessment of Data for Use

A total of 68 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050604 Grab Surface Water

Project Name: Ecology & Environment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:19
SDG#: EUR60-01

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064114
ELLE Group #: 2045312
Matrix: Surface Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	Acenaphthene	83-32-9	N.D.	0.1	0.5	1
10461	Acenaphthylene	208-96-8	N.D.	0.1	0.5	1
10461	Acetophenone	98-86-2	N.D.	0.5	2	1
10461	Anthracene	120-12-7	N.D.	0.1	0.5	1
10461	Atrazine	1912-24-9	N.D.	2	5	1
10461	Benzaldehyde	100-52-7	N.D.	1	5	1
10461	Benzo(a)anthracene	56-55-3	N.D.	0.1	0.5	1
10461	Benzo(a)pyrene	50-32-8	N.D.	0.1	0.5	1
10461	Benzo(b)fluoranthene	205-99-2	N.D.	0.1	0.5	1
10461	Benzo(g,h,i)perylene	191-24-2	N.D.	0.2	0.5	1
10461	Benzo(k)fluoranthene	207-08-9	N.D.	0.1	0.5	1
10461	1,1'-Biphenyl	92-52-4	N.D.	0.5	2	1
10461	4-Bromophenyl-phenylether	101-55-3	N.D.	0.5	2	1
10461	Butylbenzylphthalate	85-68-7	N.D.	2	5	1
10461	Di-n-butylphthalate	84-74-2	N.D.	2	5	1
10461	Caprolactam	105-60-2	N.D.	5	16	1
10461	Carbazole	86-74-8	N.D.	0.5	2	1
10461	4-Chloro-3-methylphenol	59-50-7	N.D.	0.5	2	1
10461	4-Chloroaniline	106-47-8	N.D.	2	5	1
10461	bis(2-Chloroethoxy)methane	111-91-1	N.D.	0.5	2	1
10461	bis(2-Chloroethyl)ether	111-44-4	N.D.	0.5	2	1
10461	2-Chloronaphthalene	91-58-7	N.D.	0.4	1	1
10461	2-Chlorophenol	95-57-8	N.D.	0.5	2	1
10461	4-Chlorophenyl-phenylether	7005-72-3	N.D.	0.5	2	1
10461	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	0.5	2	1
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10461	Chrysene	218-01-9	N.D.	0.1	0.5	1
10461	Dibenz(a,h)anthracene	53-70-3	N.D.	0.1	0.5	1
10461	Dibenzofuran	132-64-9	N.D.	0.5	2	1
10461	3,3'-Dichlorobenzidine	91-94-1	N.D.	2	5	1
10461	2,4-Dichlorophenol	120-83-2	N.D.	0.5	2	1
10461	Diethylphthalate	84-66-2	N.D.	2	5	1
10461	2,4-Dimethylphenol	105-67-9	N.D.	0.5	2	1
10461	Dimethylphthalate	131-11-3	N.D.	2	5	1
10461	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	5	16	1
10461	2,4-Dinitrophenol	51-28-5	N.D.	11	32	1
10461	2,4-Dinitrotoluene	121-14-2	N.D.	1	5	1
10461	2,6-Dinitrotoluene	606-20-2	N.D.	0.7	2	1
10461	1,4-Dioxane	123-91-1	N.D.	1	5	1

*=This limit was used in the evaluation of the final result

7-8-19

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Analysis Report

Sample Description: 19050604 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064114
ELLE Group #: 2045312
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:19
SDG#: EUR60-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	2	5	1
10461	Fluoranthene	206-44-0	N.D.	0.1	0.5	1
10461	Fluorene	86-73-7	N.D.	0.1	0.5	1
10461	Hexachlorobenzene	118-74-1	N.D.	0.1	0.5	1
10461	Hexachlorobutadiene	87-68-3	N.D.	0.6	2	1
10461	Hexachlorocyclopentadiene	77-47-4	N.D.	5	16	1
10461	Hexachloroethane	67-72-1	N.D.	1	5	1
10461	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.5	1
10461	Isophorone	78-59-1	N.D.	0.5	2	1
10461	2-Methylnaphthalene	91-57-6	N.D.	0.1	0.5	1
10461	2-Methylphenol	95-48-7	N.D.	0.7	2	1
10461	4-Methylphenol	106-44-5	N.D.	0.5	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10461	Naphthalene	91-20-3	N.D.	0.1	0.5	1
10461	2-Nitroaniline	88-74-4	N.D.	0.7	2	1
10461	3-Nitroaniline	99-09-2	N.D.	0.5	2	1
10461	4-Nitroaniline	100-01-6	N.D.	0.6	2	1
10461	Nitrobenzene	98-95-3	N.D.	0.8	2	1
10461	2-Nitrophenol	88-75-5	N.D.	0.7	2	1
10461	4-Nitrophenol	100-02-7	N.D.	11	32	1
10461	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.5	2	1
10461	N-Nitrosodiphenylamine	86-30-6	N.D.	0.5	2	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10461	Di-n-octylphthalate	117-84-0	N.D.	2	5	1
10461	Pentachlorophenol	87-86-5	N.D.	1	5	1
10461	Phenanthrene	85-01-8	N.D.	0.1	0.5	1
10461	Phenol	108-95-2	N.D.	0.5	2	1
10461	Pyrene	129-00-0	N.D.	0.1	0.5	1
10461	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	0.6	2	1
10461	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	0.7	2	1
10461	2,4,5-Trichlorophenol	95-95-4	N.D.	0.7	2	1
10461	2,4,6-Trichlorophenol	88-06-2	N.D.	0.6	2	1
PCBs	**SW-846 8082A**		ug/l	ug/l	ug/l	
14184	PCB-1016	12674-11-2	N.D. D1	0.11	0.55	1
14184	PCB-1221	11104-28-2	N.D. D1	0.11	0.55	1
14184	PCB-1232	11141-16-5	N.D. D1	0.11	0.55	1
14184	PCB-1242	53469-21-9	N.D. D1	0.11	0.55	1

*=This limit was used in the evaluation of the final result

7/8/19

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720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analyses for Polychlorinated Biphenyls (PCBs - EPA Method 8082) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050604

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained at 0°C to 6°C. The sample was collected on May 20, 2019, extracted on May 24, 2019, and was analyzed by May 28, 2019. There are no holding time limits for Method 8082 PCB analyses.

2. **Instrument Performance: Acceptable.**

The surrogate retention time percent difference between the initial calibration standards and the remaining standards and samples was within QC limits.

3. **Initial and Continuing Calibration: Acceptable.**

All initial calibration relative standard deviations (RSDs) were within QC limits. All continuing calibration % differences (% D) were within QC limits.

4. **Blanks: Acceptable.**

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each analytical system. No target analytes were detected in the laboratory blanks.

5. **System Monitoring Compounds (SMCs): Acceptable.**

All recoveries of the SMCs were within the established control limits.

6. Blank Spike (BS) Analyses: Acceptable.

BS recoveries were within QC limits.

7. Compound Identification: Acceptable.

All positive results were dual-column confirmed with differences between the columns < 40%.

8. Target Compound Quantitation and Quantitation Limits: Acceptable.

Sample results and quantitation limits were correctly calculated.

9. Laboratory Contact

No laboratory contact was required.

10. Overall Assessment

A total of nine results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Analysis Report

Sample Description: 19050604 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064114
ELLE Group #: 2045312
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:19
SDG#: EUR60-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	2	5	1
10461	Fluoranthene	206-44-0	N.D.	0.1	0.5	1
10461	Fluorene	86-73-7	N.D.	0.1	0.5	1
10461	Hexachlorobenzene	118-74-1	N.D.	0.1	0.5	1
10461	Hexachlorobutadiene	87-68-3	N.D.	0.6	2	1
10461	Hexachlorocyclopentadiene	77-47-4	N.D.	5	16	1
10461	Hexachloroethane	67-72-1	N.D.	1	5	1
10461	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.5	1
10461	Isophorone	78-59-1	N.D.	0.5	2	1
10461	2-Methylnaphthalene	91-57-6	N.D.	0.1	0.5	1
10461	2-Methylphenol	95-48-7	N.D.	0.7	2	1
10461	4-Methylphenol	106-44-5	N.D.	0.5	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10461	Naphthalene	91-20-3	N.D.	0.1	0.5	1
10461	2-Nitroaniline	88-74-4	N.D.	0.7	2	1
10461	3-Nitroaniline	99-09-2	N.D.	0.5	2	1
10461	4-Nitroaniline	100-01-6	N.D.	0.6	2	1
10461	Nitrobenzene	98-95-3	N.D.	0.8	2	1
10461	2-Nitrophenol	88-75-5	N.D.	0.7	2	1
10461	4-Nitrophenol	100-02-7	N.D.	11	32	1
10461	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.5	2	1
10461	N-Nitrosodiphenylamine	86-30-6	N.D.	0.5	2	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10461	Di-n-octylphthalate	117-84-0	N.D.	2	5	1
10461	Pentachlorophenol	87-86-5	N.D.	1	5	1
10461	Phenanthrene	85-01-8	N.D.	0.1	0.5	1
10461	Phenol	108-95-2	N.D.	0.5	2	1
10461	Pyrene	129-00-0	N.D.	0.1	0.5	1
10461	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	0.6	2	1
10461	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	0.7	2	1
10461	2,4,5-Trichlorophenol	95-95-4	N.D.	0.7	2	1
10461	2,4,6-Trichlorophenol	88-06-2	N.D.	0.6	2	1
PCBs	**SW-846 8082A**		ug/l	ug/l	ug/l	
14184	PCB-1016	12674-11-2	N.D. D1	0.11	0.55	1
14184	PCB-1221	11104-28-2	N.D. D1	0.11	0.55	1
14184	PCB-1232	11141-16-5	N.D. D1	0.11	0.55	1
14184	PCB-1242	53469-21-9	N.D. D1	0.11	0.55	1

*=This limit was used in the evaluation of the final result

7/8/19

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Analysis Report

Sample Description: 19050604 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064114
ELLE Group #: 2045312
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:19
SDG#: EUR60-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A**	ug/l	ug/l	ug/l	
14184	PCB-1248	12672-29-6	N.D. D1	0.11	0.55	1
14184	PCB-1254	11097-69-1	N.D. D1	0.11	0.55	1
14184	PCB-1260	11096-82-5	N.D. D1	0.11	0.55	1
14184	PCB-1262	37324-23-5	N.D. D1	0.11	0.55	1
14184	PCB-1268	11100-14-4	N.D. D1	0.11	0.55	1
GC Petroleum Hydrocarbons		**ECY 97-602 NWTPH-Dx modified**	ug/l	ug/l	ug/l	
08271	Diesel Range Organics C12-C24	n.a.	90 J	35	110	1
08271	Heavy Range Organics C24-C40	n.a.	180 J	79	280	1

The recovery for the method blank surrogate(s) is outside the QC acceptance limits as noted on the QC Summary. The following action was taken:
The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10461	SVOAs by 8270D in Water	SW-846 8270D	1	19143WAP026	05/25/2019 04:13	Brandon K Cordova	1
11010	8270D BNA Extraction	SW-846 3510C	1	19143WAP026	05/24/2019 10:45	David S Schrum	1
14184	PCBs (8082A/3510C) 1000 ml	SW-846 8082A	1	191440008A	05/28/2019 10:24	Covenant Mutuku	1
11121	PCB Waters Update IV Ext	SW-846 3510C	1	191440008A	05/24/2019 17:36	Christine E Gleim	1
08271	NWTPH-Dx water	ECY 97-602 NWTPH-Dx modified	1	191430037A	05/28/2019 19:59	Nicholas R Rossi	1
11197	WA DRO NW DX Ext (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	191430037A	05/24/2019 10:45	David S Schrum	1

*=This limit was used in the evaluation of the final result

7/8/19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO. TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050604

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained at 4°C ± 2°C. The sample was collected on May 20, 2019, extracted on May 24, 2019, and analyzed by June May 28, 2019, therefore meeting QC criteria of less than 14 days between collection and extraction for soil and preserved water samples and less than 40 days between extraction and analysis.

2. **Initial Calibration: Acceptable.**

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. **Continuing Calibration: Acceptable.**

Calculations were verified as correct. All percent differences (%Ds) were within the laboratory control limits.

4. **Blanks: Acceptable.**

A method blank was analyzed for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in the method blank.

5. **System Monitoring Compounds (SMC): Satisfactory.**

All recoveries of the SMCs were greater than 10% and within QC limits except a low recovery in the method blank of 40% (QC limits of 50% - 150%); no actions were taken based on this outlier as all other SMC results were within QC limits.

6. Blank Spike (BS) and BS Duplicate (BSD): Acceptable.

BS and BSD recoveries were within QC limits.

7. Duplicates: Acceptable.

All spike duplicate results were within QC limits.

8. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

9. Laboratory Contact: Not Required.

No laboratory contact was required.

10. Overall Assessment of Data for Use

A total of two results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Analysis Report

Sample Description: 19050604 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064114
ELLE Group #: 2045312
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:19
SDG#: EUR60-01

CAT No.	Analysis Name	CAS Number	Result		Method Detection Limit*	Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A**		ug/l		ug/l	ug/l	
14184	PCB-1248	12672-29-6	N.D.	D1	0.11	0.55	1
14184	PCB-1254	11097-69-1	N.D.	D1	0.11	0.55	1
14184	PCB-1260	11096-82-5	N.D.	D1	0.11	0.55	1
14184	PCB-1262	37324-23-5	N.D.	D1	0.11	0.55	1
14184	PCB-1268	11100-14-4	N.D.	D1	0.11	0.55	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		ug/l		ug/l	ug/l	
08271	Diesel Range Organics C12-C24	n.a.	90	J	35	110	1
08271	Heavy Range Organics C24-C40	n.a.	180	J	79	280	1

The recovery for the method blank surrogate(s) is outside the QC acceptance limits as noted on the QC Summary. The following action was taken:
The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10461	SVOAs by 8270D in Water	SW-846 8270D	1	19143WAP026	05/25/2019 04:13	Brandon K Cordova	1
11010	8270D BNA Extraction	SW-846 3510C	1	19143WAP026	05/24/2019 10:45	David S Schrum	1
14184	PCBs (8082A/3510C) 1000 ml	SW-846 8082A	1	191440008A	05/28/2019 10:24	Covenant Mutuku	1
11121	PCB Waters Update IV Ext	SW-846 3510C	1	191440008A	05/24/2019 17:36	Christine E Gleim	1
08271	NWTPH-Dx water	ECY 97-602 NWTPH-Dx modified	1	191430037A	05/28/2019 19:59	Nicholas R Rossi	1
11197	WA DRO NW DX Ext (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	191430037A	05/24/2019 10:45	David S Schrum	1

*=This limit was used in the evaluation of the final result

MW 7/8/19

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Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Semivolatile Organic Compound (SVOC) analysis (EPA Method 8270) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050605

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained and received within the QC limits of 0°C to 6°C. The sample was collected on May 20, 2019, and was extracted and analyzed by May 25, 2019, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

2. **Tuning: Acceptable.**

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. **Initial Calibration: Acceptable.**

All average Relative Response Factors (RRFs) were within the QC limits. All Relative Standard Deviations (RSDs) were within the QC limits.

4. **Continuing Calibration: Acceptable.**

All RRFs were within the QC limits. All % differences were within the QC limits.

5. **Blanks: Acceptable.**

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in the method blank.

6. **System Monitoring Compounds (SMCs): Acceptable.**

All SMC recoveries were within QC limits.

7. **Blank Spike (BS) Analysis: Acceptable.**

BS analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. **Duplicate Analysis: Satisfactory.**

Spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All spike duplicate results were within QC limits.

9. **Internal Standards: Acceptable.**

All internal standards (IS) were within $\pm$ 30 seconds of the continuing calibration IS retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts.

10. **Overall Assessment of Data for Use**

A total of 68 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050605 Grab Surface Water

Project Name: Ecology & Environment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:39
SDG#: EUR61-01

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064115
ELLE Group #: 2045313
Matrix: Surface Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	Acenaphthene	83-32-9	N.D.	0.1 U	0.5	1
10461	Acenaphthylene	208-96-8	N.D.	0.1	0.5	1
10461	Acetophenone	98-86-2	N.D.	0.5	2	1
10461	Anthracene	120-12-7	N.D.	0.1	0.5	1
10461	Atrazine	1912-24-9	N.D.	2	5	1
10461	Benzaldehyde	100-52-7	N.D. mu	1	5	1
10461	Benzo(a)anthracene	56-55-3	0.1 J Q	0.1	0.5	1
10461	Benzo(a)pyrene	50-32-8	N.D.	0.1 U	0.5	1
10461	Benzo(b)fluoranthene	205-99-2	N.D.	0.1	0.5	1
10461	Benzo(g,h,i)perylene	191-24-2	N.D.	0.2	0.5	1
10461	Benzo(k)fluoranthene	207-08-9	N.D.	0.1	0.5	1
10461	1,1'-Biphenyl	92-52-4	N.D.	0.5	2	1
10461	4-Bromophenyl-phenylether	101-55-3	N.D.	0.5	2	1
10461	Butylbenzylphthalate	85-68-7	N.D.	2	5	1
10461	Di-n-butylphthalate	84-74-2	N.D.	2	5	1
10461	Caprolactam	105-60-2	N.D.	5	15	1
10461	Carbazole	86-74-8	N.D.	0.5	2	1
10461	4-Chloro-3-methylphenol	59-50-7	N.D.	0.5	2	1
10461	4-Chloroaniline	106-47-8	N.D.	2	5	1
10461	bis(2-Chloroethoxy)methane	111-91-1	N.D.	0.5	2	1
10461	bis(2-Chloroethyl)ether	111-44-4	N.D.	0.5	2	1
10461	2-Chloronaphthalene	91-58-7	N.D.	0.4	1	1
10461	2-Chlorophenol	95-57-8	N.D.	0.5	2	1
10461	4-Chlorophenyl-phenylether	7005-72-3	N.D.	0.5	2	1
10461	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D. mu	0.5	2	1
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10461	Chrysene	218-01-9	0.1 J Q	0.1	0.5	1
10461	Dibenz(a,h)anthracene	53-70-3	N.D.	0.1 U	0.5	1
10461	Dibenzofuran	132-64-9	N.D.	0.5	2	1
10461	3,3'-Dichlorobenzidine	91-94-1	N.D.	2	5	1
10461	2,4-Dichlorophenol	120-83-2	N.D.	0.5	2	1
10461	Diethylphthalate	84-66-2	N.D.	2	5	1
10461	2,4-Dimethylphenol	105-67-9	N.D.	0.5	2	1
10461	Dimethylphthalate	131-11-3	N.D.	2	5	1
10461	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	5	15	1
10461	2,4-Dinitrophenol	51-28-5	N.D.	10	30	1
10461	2,4-Dinitrotoluene	121-14-2	N.D.	1	5	1
10461	2,6-Dinitrotoluene	606-20-2	N.D.	0.7	2	1
10461	1,4-Dioxane	123-91-1	N.D. mu	1	5	1

*=This limit was used in the evaluation of the final result

MW 7-8-19

Sample Description: 19050605 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064115
ELLE Group #: 2045313
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:39
SDG#: EUR61-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	2	5	1
10461	Fluoranthene	206-44-0	0.2 J	0.1	0.5	1
10461	Fluorene	86-73-7	N.D.	0.1	0.5	1
10461	Hexachlorobenzene	118-74-1	N.D.	0.1	0.5	1
10461	Hexachlorobutadiene	87-68-3	N.D.	0.6	2	1
10461	Hexachlorocyclopentadiene	77-47-4	N.D.	5	15	1
10461	Hexachloroethane	67-72-1	N.D.	1	5	1
10461	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.5	1
10461	Isophorone	78-59-1	N.D.	0.5	2	1
10461	2-Methylnaphthalene	91-57-6	N.D.	0.1	0.5	1
10461	2-Methylphenol	95-48-7	N.D.	0.7	2	1
10461	4-Methylphenol	106-44-5	N.D.	0.5	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10461	Naphthalene	91-20-3	N.D.	0.1	0.5	1
10461	2-Nitroaniline	88-74-4	N.D.	0.7	2	1
10461	3-Nitroaniline	99-09-2	N.D.	0.5	2	1
10461	4-Nitroaniline	100-01-6	N.D.	0.6	2	1
10461	Nitrobenzene	98-95-3	N.D.	0.8	2	1
10461	2-Nitrophenol	88-75-5	N.D.	0.7	2	1
10461	4-Nitrophenol	100-02-7	N.D.	10	30	1
10461	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.5	2	1
10461	N-Nitrosodiphenylamine	86-30-6	N.D.	0.5	2	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10461	Di-n-octylphthalate	117-84-0	N.D.	2	5	1
10461	Pentachlorophenol	87-86-5	N.D.	1	5	1
10461	Phenanthrene	85-01-8	N.D.	0.1	0.5	1
10461	Phenol	108-95-2	N.D.	0.5	2	1
10461	Pyrene	129-00-0	N.D.	0.1	0.5	1
10461	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	0.6	2	1
10461	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	0.7	2	1
10461	2,4,5-Trichlorophenol	95-95-4	N.D.	0.7	2	1
10461	2,4,6-Trichlorophenol	88-06-2	N.D.	0.6	2	1
PCBs	**SW-846 8082A**		ug/l	ug/l	ug/l	
14184	PCB-1016	12674-11-2	N.D. D1	0.099	0.49	1
14184	PCB-1221	11104-28-2	N.D. D1	0.099	0.49	1
14184	PCB-1232	11141-16-5	N.D. D1	0.099	0.49	1
14184	PCB-1242	53469-21-9	N.D. D1	0.099	0.49	1

*=This limit was used in the evaluation of the final result

7-8-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analyses for Polychlorinated Biphenyls (PCBs - EPA Method 8082) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050605

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained at 0°C to 6°C. The sample was collected on May 20, 2019, extracted on May 24, 2019, and was analyzed by May 28, 2019. There are no holding time limits for Method 8082 PCB analyses.

2. **Instrument Performance: Acceptable.**

The surrogate retention time percent difference between the initial calibration standards and the remaining standards and samples was within QC limits.

3. **Initial and Continuing Calibration: Acceptable.**

All initial calibration relative standard deviations (RSDs) were within QC limits. All continuing calibration % differences (% D) were within QC limits.

4. **Blanks: Acceptable.**

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each analytical system. No target analytes were detected in the laboratory blanks.

5. **System Monitoring Compounds (SMCs): Acceptable.**

All recoveries of the SMCs were within the established control limits.

6. **Blank Spike (BS) Analysis: Acceptable.**

BS recoveries were within QC limits.

7. **Compound Identification: Acceptable.**

All positive results were dual-column confirmed with differences between the columns less than 40%.

8. **Target Compound Quantitation and Quantitation Limits: Acceptable.**

Sample results and quantitation limits were correctly calculated.

9. **Laboratory Contact**

No laboratory contact was required.

10. **Overall Assessment**

A total of nine results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050605 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064115
ELLE Group #: 2045313
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:39
SDG#: EUR61-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/l	ug/l	ug/l	
10461	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	2 U	5	1
10461	Fluoranthene	206-44-0	0.2 J	0.1	0.5	1
10461	Fluorene	86-73-7	N.D.	0.1 U	0.5	1
10461	Hexachlorobenzene	118-74-1	N.D.	0.1	0.5	1
10461	Hexachlorobutadiene	87-68-3	N.D.	0.6	2	1
10461	Hexachlorocyclopentadiene	77-47-4	N.D.	5	15	1
10461	Hexachloroethane	67-72-1	N.D.	1	5	1
10461	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.5	1
10461	Isophorone	78-59-1	N.D.	0.5	2	1
10461	2-Methylnaphthalene	91-57-6	N.D.	0.1	0.5	1
10461	2-Methylphenol	95-48-7	N.D.	0.7	2	1
10461	4-Methylphenol	106-44-5	N.D.	0.5 U	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10461	Naphthalene	91-20-3	N.D.	0.1 U	0.5	1
10461	2-Nitroaniline	88-74-4	N.D.	0.7	2	1
10461	3-Nitroaniline	99-09-2	N.D.	0.5	2	1
10461	4-Nitroaniline	100-01-6	N.D.	0.6	2	1
10461	Nitrobenzene	98-95-3	N.D.	0.8	2	1
10461	2-Nitrophenol	88-75-5	N.D.	0.7	2	1
10461	4-Nitrophenol	100-02-7	N.D.	10	30	1
10461	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.5	2	1
10461	N-Nitrosodiphenylamine	86-30-6	N.D.	0.5 U	2	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10461	Di-n-octylphthalate	117-84-0	N.D.	2 U	5	1
10461	Pentachlorophenol	87-86-5	N.D.	1	5	1
10461	Phenanthrene	85-01-8	N.D.	0.1	0.5	1
10461	Phenol	108-95-2	N.D.	0.5	2	1
10461	Pyrene	129-00-0	N.D.	0.1	0.5	1
10461	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	0.6	2	1
10461	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	0.7	2	1
10461	2,4,5-Trichlorophenol	95-95-4	N.D.	0.7	2	1
10461	2,4,6-Trichlorophenol	88-06-2	N.D.	0.6	2	1
PCBs	**SW-846 8082A**		ug/l	ug/l	ug/l	
14184	PCB-1016	12674-11-2	N.D. D1	0.099 U	0.49	1
14184	PCB-1221	11104-28-2	N.D. D1	0.099	0.49	1
14184	PCB-1232	11141-16-5	N.D. D1	0.099	0.49	1
14184	PCB-1242	53469-21-9	N.D. D1	0.099	0.49	1

*=This limit was used in the evaluation of the final result

7-8-19

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Analysis Report

Sample Description: 19050605 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064115
ELLE Group #: 2045313
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:39
SDG#: EUR61-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A**		ug/l	ug/l	ug/l	
14184	PCB-1248	12672-29-6	N.D. D1	0.099	0.49	1
14184	PCB-1254	11097-69-1	N.D. D1	0.099	0.49	1
14184	PCB-1260	11096-82-5	N.D. D1	0.099	0.49	1
14184	PCB-1262	37324-23-5	N.D. D1	0.099	0.49	1
14184	PCB-1268	11100-14-4	N.D. D1	0.099	0.49	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		ug/l	ug/l	ug/l	
08271	Diesel Range Organics C12-C24	n.a.	69 J Q	33	110	1
08271	Heavy Range Organics C24-C40	n.a.	110 J Q	74	260	1

The recovery for the method blank surrogate(s) is outside the QC acceptance limits as noted on the QC Summary. The following action was taken: The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10461	SVOAs by 8270D in Water	SW-846 8270D	1	19143WAP026	05/25/2019 04:38	Brandon K Cordova	1
11010	8270D BNA Extraction	SW-846 3510C	1	19143WAP026	05/24/2019 10:45	David S Schrum	1
14184	PCBs (8082A/3510C) 1000 ml	SW-846 8082A	1	191440008A	05/28/2019 10:34	Covenant Mutuku	1
11121	PCB Waters Update IV Ext	SW-846 3510C	1	191440008A	05/24/2019 17:36	Christine E Gleim	1
08271	NWTPH-Dx water	ECY 97-602 NWTPH-Dx modified	1	191430037A	05/28/2019 19:37	Nicholas R Rossi	1
11197	WA DRO NW DX Ext (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	191430037A	05/24/2019 10:45	David S Schrum	1

*=This limit was used in the evaluation of the final result

7-8-19

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720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050605

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained at 4°C ± 2°C. The sample was collected on May 20, 2019, extracted on May 24, 2019, and analyzed by May 28, 2019, therefore meeting QC criteria of less than 7 days between collection and extraction for water samples and less than 40 days between extraction and analysis.

2. **Initial Calibration: Acceptable.**

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. **Continuing Calibration: Acceptable.**

Calculations were verified as correct. All percent differences (%Ds) were within the laboratory control limits.

4. **Blanks: Acceptable.**

A method blank was analyzed for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in the method blank.

5. **System Monitoring Compounds (SMC): Satisfactory.**

All recoveries of the SMCs were greater than 10% and within QC limits except the method blank with a low recovery of 40% (QC limits of 50% - 150%); no actions were taken as the other SMCs were all within QC limits.

6. Blank Spike (BS) and BS Duplicate (BSD): Acceptable.

BS and BSD recoveries were within QC limits.

7. Duplicates: Acceptable.

All spike duplicate results were within QC limits.

8. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

9. Laboratory Contact: Not Required.

No laboratory contact was required.

10. Overall Assessment of Data for Use

A total of two results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Analysis Report

Sample Description: 19050605 Grab Surface Water

Project Name: Ecology & Environment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:39
SDG#: EUR61-01

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064115
ELLE Group #: 2045313
Matrix: Surface Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A**		ug/l	ug/l	ug/l	
14184	PCB-1248	12672-29-6	N.D. D1	0.099	0.49	1
14184	PCB-1254	11097-69-1	N.D. D1	0.099	0.49	1
14184	PCB-1260	11096-82-5	N.D. D1	0.099	0.49	1
14184	PCB-1262	37324-23-5	N.D. D1	0.099	0.49	1
14184	PCB-1268	11100-14-4	N.D. D1	0.099	0.49	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		ug/l	ug/l	ug/l	
08271	Diesel Range Organics C12-C24	n.a.	69 J	33	110	1
08271	Heavy Range Organics C24-C40	n.a.	110 J	74	260	1

The recovery for the method blank surrogate(s) is outside the QC acceptance limits as noted on the QC Summary. The following action was taken: The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10461	SVOAs by 8270D in Water	SW-846 8270D	1	19143WAP026	05/25/2019 04:38	Brandon K Cordova	1
11010	8270D BNA Extraction	SW-846 3510C	1	19143WAP026	05/24/2019 10:45	David S Schrum	1
14184	PCBs (8082A/3510C) 1000 ml	SW-846 8082A	1	191440008A	05/28/2019 10:34	Covenant Mutuku	1
11121	PCB Waters Update IV Ext	SW-846 3510C	1	191440008A	05/24/2019 17:36	Christine E Gleim	1
08271	NWTPH-Dx water	ECY 97-602 NWTPH-Dx modified	1	191430037A	05/28/2019 19:37	Nicholas R Rossi	1
11197	WA DRO NW DX Ext (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	191430037A	05/24/2019 10:45	David S Schrum	1

*=This limit was used in the evaluation of the final result

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720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 1, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analyses for Polychlorinated Biphenyls (PCBs - EPA Method 8082) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050602

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained at 0°C to 6°C. The sample was collected on May 20, 2019, extracted on May x24 2019, and was analyzed by May 28, 2019. There are no holding time limits for Method 8082 PCB analyses.

2. **Instrument Performance: Acceptable.**

The surrogate retention time percent difference was within QC limits.

3. **Initial and Continuing Calibration: Acceptable.**

All initial calibration relative standard deviations (RSDs) were within QC limits. All continuing calibration % differences (% D) were within QC limits.

4. **Blanks: Acceptable.**

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each analytical system. There were no detections in the method blank.

5. **System Monitoring Compounds (SMCs): Acceptable.**

All recoveries of the SMCs were within the established control limits.

6. Matrix Spike (MS) Analyses: Acceptable.

MS recoveries were within QC limits.

7. Blank Spike (BS) and BS Duplicate (BSD) Analyses: Acceptable.

BS and BSD recoveries were within QC limits.

8. Duplicates: Acceptable.

Relative Percent Differences (RPDs) of all spiked analytes were within QC limits.

9. Compound Identification: Acceptable.

All positive sample results were dual-column confirmed with differences between the columns less than 40%.

10. Target Compound Quantitation and Quantitation Limits: Acceptable.

Sample results and quantitation limits were correctly calculated.

11. Laboratory Contact

No laboratory contact was required.

12. Overall Assessment

A total of 9 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Sample Description: **19050602 Grab Surface Water**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064116
ELLE Group #: 2045314
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:48
SDG#: EUR62-01BKG

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A**		ug/l	ug/l	ug/l	
14184	PCB-1016	12674-11-2	N.D. D1	0.11	0.57	1
14184	PCB-1221	11104-28-2	N.D. D1	0.11	0.57	1
14184	PCB-1232	11141-16-5	N.D. D1	0.11	0.57	1
14184	PCB-1242	53469-21-9	N.D. D1	0.11	0.57	1
14184	PCB-1248	12672-29-6	N.D. D1	0.11	0.57	1
14184	PCB-1254	11097-69-1	N.D. D1	0.11	0.57	1
14184	PCB-1260	11096-82-5	N.D. D1	0.11	0.57	1
14184	PCB-1262	37324-23-5	N.D. D1	0.11	0.57	1
14184	PCB-1268	11100-14-4	N.D. D1	0.11	0.57	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14184	PCBs (8082A/3510C) 1000 ml	SW-846 8082A	1	191440008A	05/28/2019 10:44	Covenant Mutuku	1
11121	PCB Waters Update IV Ext	SW-846 3510C	1	191440008A	05/24/2019 17:36	Christine E Gleim	1

*=This limit was used in the evaluation of the final result

JW 7-1-19

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720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of three sediment samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Target Analyte List (TAL) metals analyses (EPA Methods 6010, 6020, 7470) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050401 19050402 19050403

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained at < 6°C (only applies to mercury). The samples were collected on May 20, 2019, and were analyzed by May 31, 2019, therefore meeting QC criteria of less than 6 months between collection, extraction, and analysis (28 days for mercury).

2. Initial and Continuing Calibration: Acceptable.

A minimum of one calibration standard and a blank were analyzed at the beginning of the ICP analysis sequence and after every 10 samples. No results were greater than 110% of the highest calibration standard. All ICP recoveries were within the QC limits. All AA recoveries were within QC limits and the initial calibration correlation coefficient was > 0.995.

3. Blanks: Satisfactory.

A preparation blank was analyzed for each 20 samples or per matrix per concentration level. Blanks were analyzed after each Initial or Continuing Calibration Verification. There were no detections in any blanks except potassium (21.5 mg/kg) in the method blank and several results in the calibration blanks. All blank results were less than the absolute value of the quantitation limit; therefore, positive sample results greater than the quantitation limit were not qualified. Positive thallium results less than the quantitation limit were qualified as not detected (U).

4. ICP Interference Check Sample: Acceptable.

An Interference Check Sample (ICS) was analyzed at the beginning of each sequence or at least twice every 8 hours, whichever was more frequent. All applicable ICS (solution AB) results were within

recycled paper

QC limits of 80% - 120% recovery.

5. ICP Serial Dilution (SD): Satisfactory.

A serial dilution analysis was performed per matrix per concentration or per sample delivery group, whichever was more frequent. All serial dilution results were within QC limits except aluminum with the initial sample result greater than the SD result and barium, calcium, iron, lead, magnesium, manganese, potassium, vanadium, and zinc with initial sample results less than the SD result. Associated sample results were qualified as estimated quantities with a high bias (JH) for original sample results greater than the serial dilution results and estimated quantities with a low bias (JL) for original sample results less than the serial dilution results.

6. Matrix Spike Analysis: Satisfactory.

A matrix spike analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. Spike recoveries were within the QC limits except zinc with a high recovery (associated positive results were qualified as estimated quantities with a high bias [JH]) and antimony, chromium, mercury, and vanadium with low recoveries (associated positive results and sample quantitation limits were qualified as estimated quantities with a low bias [JL or UJL]).

7. Duplicate Analysis: Satisfactory.

A laboratory duplicate and spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate results were within QC limits except barium, antimony, arsenic, beryllium, chromium, cobalt, silver, selenium, sodium, and thallium; associated positive results and sample quantitation limits were qualified as estimated quantities with an unknown bias (JK or UJK).

8. Laboratory Control Sample Analysis: Acceptable.

A Laboratory Control Sample (LCS) was analyzed per SDG per matrix. All LCS results were within the established control limits.

9. Overall Assessment of Data for Use

A total of 69 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on holding time outliers, incorrect sample containers, sample temperature outliers, or serial dilution outliers. No sample results were rejected (R). A total of 20 sample results were qualified as estimated quantities based on spike accuracy outliers. A total of 40 sample results were qualified as estimated quantities based on duplicate precision outliers. A total of 40 sample results were qualified as estimated quantities based on serial dilution outliers. The following analyte was detected in blank(s) that affected sample results: thallium.

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Inorganic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Analysis Report

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	89	220	1
10726	Pentachlorophenol	87-86-5	N.D.	89	220	1
10726	Phenanthrene	85-01-8	1,400	4	22	1
10726	Phenol	108-95-2	N.D.	22	49	1
10726	Pyrene	129-00-0	1,900	4	22	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	22	49	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	89	220	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	40	89	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	36	76	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	4.0	86	317.23
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	4.8	23	1
10885	PCB-1221	11104-28-2	N.D. D1	6.2	23	1
10885	PCB-1232	11141-16-5	N.D. D1	11	23	1
10885	PCB-1242	53469-21-9	N.D. D1	4.4	23	1
10885	PCB-1248	12672-29-6	5.8 JD2	4.4	23	1
10885	PCB-1254	11097-69-1	N.D. D1	4.4	23	1
10885	PCB-1260	11096-82-5	N.D. D1	6.6	23	1
10885	PCB-1262	37324-23-5	N.D. D1	4.4	23	1
10885	PCB-1268	11100-14-4	N.D. D1	4.4	23	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	9.9 J	5.4	14	1
08272	Heavy Range Organics C24-C40	n.a.	31 J	14	41	1
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	11,000	13.2	33.6	1
01650	Calcium	7440-70-2	13,800	27.2	56.1	1
01654	Iron	7439-89-6	15,400	5.61	22.4	1
01657	Magnesium	7439-95-4	6,500	1.87	11.2	1
01662	Potassium	7440-09-7	2,010	22.2	56.1	1
01667	Sodium	7440-23-5	163	51.8	112	1

*=This limit was used in the evaluation of the final result

7-27-19

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Analysis Report

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals		**SW-846 6020A**	mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	0.259 J Q	0.142	0.449	2
06125	Arsenic	7440-38-2	13.0 JK	0.150	0.449	2
06126	Barium	7440-39-3	83.0 JK	0.433	0.897	2
06127	Beryllium	7440-41-7	0.491 JK	0.0256	0.112	2
06128	Cadmium	7440-43-9	0.232	0.0565	0.224	2
06131	Chromium	7440-47-3	10.9 JK	0.375	0.897	2
06132	Cobalt	7440-48-4	4.48 JK	0.0655	0.224	2
06133	Copper	7440-50-8	15.8	4.01	8.97	2
06135	Lead	7439-92-1	11.2 JL	0.0565	0.673	2
06137	Manganese	7439-96-5	368 JL	0.444	2.24	2
06139	Nickel	7440-02-0	13.8	0.381	0.897	2
06141	Selenium	7782-49-2	~~N.D.~~	0.146 UJK	0.449	2
06142	Silver	7440-22-4	0.0494 J Q	0.0455	0.112	2
06145	Thallium	7440-28-0	~~0.110 J~~	0.0440	0.112 UJK	2
06148	Vanadium	7440-62-2	16.8 JL	0.0962	0.224	2
06149	Zinc	7440-66-6	97.9 JK	1.36	3.36	2
		SW-846 7471B	mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	N.D.	0.0416 UJL	0.178	1
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	%	%	%	
00111	Moisture	n.a.	26.3	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A191512AA	05/31/2019 17:29	Linda C Pape	1.01
08389	GC/MS - LL Encore Prep	SW-846 5035A	1	201914353710	05/23/2019 15:15	Rebecca Williams	n.a.
08389	GC/MS - LL Encore Prep	SW-846 5035A	2	201914353710	05/23/2019 15:17	Rebecca Williams	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	1	201914353710	05/23/2019 15:06	Rebecca Williams	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	2	201914353710	05/23/2019 15:08	Rebecca Williams	n.a.
10726	SVOA 8270D/E (microwave)	SW-846 8270D	1	19143SLH026	05/25/2019 03:27	Anthony P Bauer	1
10813	BNA Soil Microwave APP IX	SW-846 3546	1	19143SLH026	05/24/2019 07:00	Joshua S Ruth	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	19147A34A	05/27/2019 19:43	Marie D Beamenderfer	317.23

*=This limit was used in the evaluation of the final result

MW72719

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	4-Nitrophenol	100-02-7	N.D.	850	2,600	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	260	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	85	190	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	340	850	1
10726	Pentachlorophenol	87-86-5	N.D.	340	850	1
10726	Phenanthrene	85-01-8	3,700	17	85	1
10726	Phenol	108-95-2	N.D.	85	190	1
10726	Pyrene	129-00-0	6,400	17	85	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	85	190	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	340	850	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	340	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	140	290	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	34	730	707.51
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	190	880	10
10885	PCB-1221	11104-28-2	N.D. D1	240	880	10
10885	PCB-1232	11141-16-5	N.D. D1	410	880	10
10885	PCB-1242	53469-21-9	N.D. D1	170	880	10
10885	PCB-1248	12672-29-6	N.D. D1	170	880	10
10885	PCB-1254	11097-69-1	N.D. D1	170	880	10
10885	PCB-1260	11096-82-5	N.D. D1	250	880	10
10885	PCB-1262	37324-23-5	N.D. D1	170	880	10
10885	PCB-1268	11100-14-4	12,000 D2	170	880	10
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	3,300	41	100	2
08272	Heavy Range Organics C24-C40	n.a.	3,000	100	310	2
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	42,200 JH	51.1	130	1
01650	Calcium	7440-70-2	10,300 JL	105	217	1
01654	Iron	7439-89-6	15,500 JL	21.7	86.6	1

*=This limit was used in the evaluation of the final result

MW 7-27-19

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Analysis Report

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals		**SW-846 6010D Rev.4, July 2014**	mg/kg	mg/kg	mg/kg	
01657	Magnesium	7439-95-4	3,810 JL	7.23	43.3	1
01662	Potassium	7440-09-7	1,930 JL	85.8	217	1
01667	Sodium	7440-23-5	1,030 JK	200	433	1
		SW-846 6020A	mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	4.60 JK	0.548	1.73	2
06125	Arsenic	7440-38-2	51.6	0.580	1.73	2
06126	Barium	7440-39-3	138	1.67	3.47	2
06127	Beryllium	7440-41-7	1.85	0.0988	0.433	2
06128	Cadmium	7440-43-9	9.32	0.218	0.866	2
06131	Chromium	7440-47-3	45.6 JK	1.45	3.47	2
06132	Cobalt	7440-48-4	12.4 JK	0.253	0.866	2
06133	Copper	7440-50-8	659	15.5	34.7	2
06135	Lead	7439-92-1	264 JL	0.218	2.60	2
06137	Manganese	7439-96-5	580 JL	1.72	8.66	2
06139	Nickel	7440-02-0	336	1.47	3.47	2
06141	Selenium	7782-49-2	4.13 JK	0.565	1.73	2
06142	Silver	7440-22-4	0.664 JK	0.176	0.433	2
06145	Thallium	7440-28-0	~~N.D.~~ JW	0.849 WJK	2.17	10
06148	Vanadium	7440-62-2	102 JL	0.372	0.866	2
06149	Zinc	7440-66-6	1,190 JK	5.26	13.0	2
		SW-846 7471B	mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	0.433 J Q	0.148	0.634	1
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	%	%	%	
00111	Moisture	n.a.	80.6	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A191512AA	05/31/2019 17:51	Linda C Pape	1.79
08389	GC/MS - LL Encore Prep	SW-846 5035A	1	201914353710	05/23/2019 15:27	Rebecca Williams	n.a.

*=This limit was used in the evaluation of the final result

7-27-19

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Analysis Report

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	86	210	1
10726	Pentachlorophenol	87-86-5	N.D.	86	210	1
10726	Phenanthrene	85-01-8	14,000	43	210	10
10726	Phenol	108-95-2	N.D.	21	47	1
10726	Pyrene	129-00-0	23,000	43	210	10
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	21	47	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	86	210	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	39	86	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	34	73	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	0.3	7.2	27.82
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	23	110	5
10885	PCB-1221	11104-28-2	N.D. D1	29	110	5
10885	PCB-1232	11141-16-5	N.D. D1	51	110	5
10885	PCB-1242	53469-21-9	N.D. D1	21	110	5
10885	PCB-1248	12672-29-6	160 D2	21	110	5
10885	PCB-1254	11097-69-1	N.D. D1	21	110	5
10885	PCB-1260	11096-82-5	N.D. D1	31	110	5
10885	PCB-1262	37324-23-5	N.D. D1	21	110	5
10885	PCB-1268	11100-14-4	1,500 D2	21	110	5
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	170	5.2	13	1
08272	Heavy Range Organics C24-C40	n.a.	580	13	39	1
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	29,300	14.2	36.0	1
01650	Calcium	7440-70-2	3,640	29.1	60.0	1
01654	Iron	7439-89-6	18,800	6.00	24.0	1
01657	Magnesium	7439-95-4	6,660	2.00	12.0	1
01662	Potassium	7440-09-7	2,120	23.7	60.0	1
01667	Sodium	7440-23-5	257	55.4	120	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals		**SW-846 6020A**	mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	0.352 J Q	0.152	0.480	2
06125	Arsenic	7440-38-2	12.4 JK	0.160	0.480	2
06126	Barium	7440-39-3	121	0.463	0.960	2
06127	Beryllium	7440-41-7	0.734	0.0273	0.120	2
06128	Cadmium	7440-43-9	0.708	0.0604	0.240	2
06131	Chromium	7440-47-3	14.6 JK	0.401	0.960	2
06132	Cobalt	7440-48-4	5.75 JK	0.0700	0.240	2
06133	Copper	7440-50-8	106	4.29	9.60	2
06135	Lead	7439-92-1	23.0 JL	0.0604	0.720	2
06137	Manganese	7439-96-5	290 JL	0.475	2.40	2
06139	Nickel	7440-02-0	40.3	0.408	0.960	2
06141	Selenium	7782-49-2	0.174 J Q	0.156	0.480	2
06142	Silver	7440-22-4	0.0899 J Q	0.0487	0.120	2
06145	Thallium	7440-28-0	0.145 JK	0.0470	0.120	2
06148	Vanadium	7440-62-2	28.2 JL	0.103	0.240	2
06149	Zinc	7440-66-6	178 JK	1.46	3.60	2
		SW-846 7471B	mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	0.0702 J Q	0.0404	0.173	1
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	%	%	%	
00111	Moisture	n.a.	22.8	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A191512AA	05/31/2019 16:21	Linda C Pape	1.01
08389	GC/MS - LL Encore Prep	SW-846 5035A	1	201914353710	05/23/2019 15:37	Rebecca Williams	n.a.
08389	GC/MS - LL Encore Prep	SW-846 5035A	2	201914353710	05/23/2019 15:39	Rebecca Williams	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	1	201914353710	05/23/2019 15:36	Rebecca Williams	n.a.
10726	SVOA 8270D/E (microwave)	SW-846 8270D	1	19144SLC026	05/29/2019 01:43	Brandon K Cordova	1
10726	SVOA 8270D/E (microwave)	SW-846 8270D	1	19144SLC026	05/30/2019 12:18	Edward C Monborne	10
10813	BNA Soil Microwave APP IX	SW-846 3546	1	19144SLC026	05/28/2019 07:00	Joshua S Ruth	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	19147A34A	05/27/2019 20:53	Marie D Beamenderfer	27.82

*=This limit was used in the evaluation of the final result

7-27-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of three sediment samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050401 19050402 19050403

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained at $4^{\circ}C \pm 2^{\circ}C$. The samples were collected on May 20, 2019, extracted on June 1, 2019, and analyzed by June 6, 2019, therefore meeting QC criteria of less than 14 days between collection and extraction for soil samples and less than 40 days between extraction and analysis.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences (%Ds) were within the laboratory control limits.

4. Blanks: Acceptable.

A method blank was analyzed for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in the method blank.

5. System Monitoring Compounds (SMC): Satisfactory.

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All recoveries of the SMCs were greater than 10% and within QC limits except several high recoveries; associated positive results in sample 19050403 were qualified as estimated quantities with a high bias (JH).

6. Matrix Spike (MS) and MS Duplicate (MSD): Satisfactory.

MS and MSD results were within QC limits except the low DRO recovery; the associated positive result was qualified as an estimated quantity with a low bias (JL).

7. Blank Spike (BS) and BS Duplicate (BSD): Acceptable.

BS and BSD recoveries were within QC limits.

8. Duplicates: Acceptable.

All spike duplicate results were within QC limits.

9. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

10. Laboratory Contact: Not Required.

No laboratory contact was required.

11. Overall Assessment of Data for Use

A total of six results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. A total of two sample results were qualified as estimated quantities based on spike accuracy outliers No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	89	220	1
10726	Pentachlorophenol	87-86-5	N.D.	89	220	1
10726	Phenanthrene	85-01-8	1,400	4	22	1
10726	Phenol	108-95-2	N.D.	22	49	1
10726	Pyrene	129-00-0	1,900	4	22	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	22	49	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	89	220	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	40	89	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	36	76	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	4.0	86	317.23
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	4.8	23	1
10885	PCB-1221	11104-28-2	N.D. D1	6.2	23	1
10885	PCB-1232	11141-16-5	N.D. D1	11	23	1
10885	PCB-1242	53469-21-9	N.D. D1	4.4	23	1
10885	PCB-1248	12672-29-6	5.8 JD2	4.4	23	1
10885	PCB-1254	11097-69-1	N.D. D1	4.4	23	1
10885	PCB-1260	11096-82-5	N.D. D1	6.6	23	1
10885	PCB-1262	37324-23-5	N.D. D1	4.4	23	1
10885	PCB-1268	11100-14-4	N.D. D1	4.4	23	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	9.9 J	5.4	14	1
08272	Heavy Range Organics C24-C40	n.a.	31 J	14	41	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	11,000	13.2	33.6	1
01650	Calcium	7440-70-2	13,800	27.2	56.1	1
01654	Iron	7439-89-6	15,400	5.61	22.4	1
01657	Magnesium	7439-95-4	6,500	1.87	11.2	1
01662	Potassium	7440-09-7	2,010	22.2	56.1	1
01667	Sodium	7440-23-5	163	51.8	112	1

*=This limit was used in the evaluation of the final result

7-27-19

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Analysis Report

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	4-Nitrophenol	100-02-7	N.D.	850	2,600	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	260	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	85	190	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	340	850	1
10726	Pentachlorophenol	87-86-5	N.D.	340	850	1
10726	Phenanthrene	85-01-8	3,700	17	85	1
10726	Phenol	108-95-2	N.D.	85	190	1
10726	Pyrene	129-00-0	6,400	17	85	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	85	190	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	340	850	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	340	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	140	290	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	34	730	707.51
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	190	880	10
10885	PCB-1221	11104-28-2	N.D. D1	240	880	10
10885	PCB-1232	11141-16-5	N.D. D1	410	880	10
10885	PCB-1242	53469-21-9	N.D. D1	170	880	10
10885	PCB-1248	12672-29-6	N.D. D1	170	880	10
10885	PCB-1254	11097-69-1	N.D. D1	170	880	10
10885	PCB-1260	11096-82-5	N.D. D1	250	880	10
10885	PCB-1262	37324-23-5	N.D. D1	170	880	10
10885	PCB-1268	11100-14-4	12,000 D2	170	880	10
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	3,300	41	100	2
08272	Heavy Range Organics C24-C40	n.a.	3,000	100	310	2
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	42,200	51.1	130	1
01650	Calcium	7440-70-2	10,300	105	217	1
01654	Iron	7439-89-6	15,500	21.7	86.6	1

*=This limit was used in the evaluation of the final result

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Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	86	210	1
10726	Pentachlorophenol	87-86-5	N.D.	86	210	1
10726	Phenanthrene	85-01-8	14,000	43	210	10
10726	Phenol	108-95-2	N.D.	21	47	1
10726	Pyrene	129-00-0	23,000	43	210	10
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	21	47	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	86	210	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	39	86	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	34	73	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	0.3	7.2	27.82
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	23	110	5
10885	PCB-1221	11104-28-2	N.D. D1	29	110	5
10885	PCB-1232	11141-16-5	N.D. D1	51	110	5
10885	PCB-1242	53469-21-9	N.D. D1	21	110	5
10885	PCB-1248	12672-29-6	160 D2	21	110	5
10885	PCB-1254	11097-69-1	N.D. D1	21	110	5
10885	PCB-1260	11096-82-5	N.D. D1	31	110	5
10885	PCB-1262	37324-23-5	N.D. D1	21	110	5
10885	PCB-1268	11100-14-4	1,500 D2	21	110	5
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	170	5.2	13	1
08272	Heavy Range Organics C24-C40	n.a.	580	13	39	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	29,300	14.2	36.0	1
01650	Calcium	7440-70-2	3,640	29.1	60.0	1
01654	Iron	7439-89-6	18,800	6.00	24.0	1
01657	Magnesium	7439-95-4	6,660	2.00	12.0	1
01662	Potassium	7440-09-7	2,120	23.7	60.0	1
01667	Sodium	7440-23-5	257	55.4	120	1

*=This limit was used in the evaluation of the final result

7-27-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of four sediment samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Gx) analyses was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050401 19050402 19050403 19050501

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of 4°C ± 2°C. The samples were collected on May 20, 2019, and were analyzed by May 27, 2019, therefore meeting QC criteria of less than 14 days between collection and analysis for soil samples.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. All relative percent differences (RPDs) were less than or equal to the laboratory control limits.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences were less than or equal to the laboratory control limits.

4. Blanks: Acceptable.

A method blank was analyzed at the required frequency of every 12 hours for each matrix, preparation technique, and analysis system. Gasoline-range TPHs were not detected in the method blank.

5. System Monitoring Compounds (SMC): Acceptable.

recycled paper

All recoveries of the SMCs were greater than 10% and within QC limits.

6. **Matrix Spike (MS) and MS Duplicate (MSD) Analyses: Acceptable.**

MS and MSD results were within laboratory QC limits.

7. **Blank Spikes (BS) Analyses: Acceptable.**

BS results were within laboratory QC limits.

8. **Duplicates: Acceptable.**

All spike duplicate results were within laboratory QC limits.

8. **Quantitation and Quantitation Limits: Acceptable.**

Sample quantitation and sample quantitation limits were correctly calculated.

9. **Laboratory Contact: Not Required.**

No laboratory contact was required.

10. **Overall Assessment of Data for Use**

A total of four results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	89	220	1
10726	Pentachlorophenol	87-86-5	N.D.	89	220	1
10726	Phenanthrene	85-01-8	1,400	4	22	1
10726	Phenol	108-95-2	N.D.	22	49	1
10726	Pyrene	129-00-0	1,900	4	22	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	22	49	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	89	220	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	40	89	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	36	76	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	4.0 U	86	317.23
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	4.8	23	1
10885	PCB-1221	11104-28-2	N.D. D1	6.2	23	1
10885	PCB-1232	11141-16-5	N.D. D1	11	23	1
10885	PCB-1242	53469-21-9	N.D. D1	4.4	23	1
10885	PCB-1248	12672-29-6	5.8 JD2	4.4	23	1
10885	PCB-1254	11097-69-1	N.D. D1	4.4	23	1
10885	PCB-1260	11096-82-5	N.D. D1	6.6	23	1
10885	PCB-1262	37324-23-5	N.D. D1	4.4	23	1
10885	PCB-1268	11100-14-4	N.D. D1	4.4	23	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	9.9 J	5.4	14	1
08272	Heavy Range Organics C24-C40	n.a.	31 J	14	41	1
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	11,000	13.2	33.6	1
01650	Calcium	7440-70-2	13,800	27.2	56.1	1
01654	Iron	7439-89-6	15,400	5.61	22.4	1
01657	Magnesium	7439-95-4	6,500	1.87	11.2	1
01662	Potassium	7440-09-7	2,010	22.2	56.1	1
01667	Sodium	7440-23-5	163	51.8	112	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	4-Nitrophenol	100-02-7	N.D.	850	2,600	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	260	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	85	190	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	340	850	1
10726	Pentachlorophenol	87-86-5	N.D.	340	850	1
10726	Phenanthrene	85-01-8	3,700	17	85	1
10726	Phenol	108-95-2	N.D.	85	190	1
10726	Pyrene	129-00-0	6,400	17	85	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	85	190	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	340	850	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	340	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	140	290	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	34	730	707.51
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	190	880	10
10885	PCB-1221	11104-28-2	N.D. D1	240	880	10
10885	PCB-1232	11141-16-5	N.D. D1	410	880	10
10885	PCB-1242	53469-21-9	N.D. D1	170	880	10
10885	PCB-1248	12672-29-6	N.D. D1	170	880	10
10885	PCB-1254	11097-69-1	N.D. D1	170	880	10
10885	PCB-1260	11096-82-5	N.D. D1	250	880	10
10885	PCB-1262	37324-23-5	N.D. D1	170	880	10
10885	PCB-1268	11100-14-4	12,000 D2	170	880	10
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	3,300	41	100	2
08272	Heavy Range Organics C24-C40	n.a.	3,000	100	310	2
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	42,200	51.1	130	1
01650	Calcium	7440-70-2	10,300	105	217	1
01654	Iron	7439-89-6	15,500	21.7	86.6	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	86	210	1
10726	Pentachlorophenol	87-86-5	N.D.	86	210	1
10726	Phenanthrene	85-01-8	14,000	43	210	10
10726	Phenol	108-95-2	N.D.	21	47	1
10726	Pyrene	129-00-0	23,000	43	210	10
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	21	47	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	86	210	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	39	86	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	34	73	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	0.3	7.2	27.82
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	23	110	5
10885	PCB-1221	11104-28-2	N.D. D1	29	110	5
10885	PCB-1232	11141-16-5	N.D. D1	51	110	5
10885	PCB-1242	53469-21-9	N.D. D1	21	110	5
10885	PCB-1248	12672-29-6	160 D2	21	110	5
10885	PCB-1254	11097-69-1	N.D. D1	21	110	5
10885	PCB-1260	11096-82-5	N.D. D1	31	110	5
10885	PCB-1262	37324-23-5	N.D. D1	21	110	5
10885	PCB-1268	11100-14-4	1,500 D2	21	110	5
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	170	5.2	13	1
08272	Heavy Range Organics C24-C40	n.a.	580	13	39	1
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	29,300	14.2	36.0	1
01650	Calcium	7440-70-2	3,640	29.1	60.0	1
01654	Iron	7439-89-6	18,800	6.00	24.0	1
01657	Magnesium	7439-95-4	6,660	2.00	12.0	1
01662	Potassium	7440-09-7	2,120	23.7	60.0	1
01667	Sodium	7440-23-5	257	55.4	120	1

*=This limit was used in the evaluation of the final result

7-22-19

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Analysis Report

Sample Description: 19050501 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064126
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:53
SDG#: EUR63-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Toluene	108-88-3	4 J	3	23	1.53
11995	1,2,3-Trichlorobenzene	87-61-6	N.D.	23	46	1.53
11995	1,2,4-Trichlorobenzene	120-82-1	N.D.	23	46	1.53
11995	1,1,1-Trichloroethane	71-55-6	N.D.	3	23	1.53
11995	1,1,2-Trichloroethane	79-00-5	N.D.	2	23	1.53
11995	Trichloroethene	79-01-6	N.D.	2	23	1.53
11995	Trichlorofluoromethane	75-69-4	N.D.	3	23	1.53
11995	Vinyl Chloride	75-01-4	N.D.	3	23	1.53
11995	m+p-Xylene	179601-23-1	N.D.	5	23	1.53
11995	o-Xylene	95-47-6	N.D.	2	23	1.53

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated:
Acetone and 2-Butanone.

The recovery for the sample internal standard is outside the QC acceptance limits. The following action was taken: The sample was re-analyzed and the QC is again outside of the acceptance limits, indicating a matrix effect. The data is reported from the initial trial.

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	14	310	511.48

Reporting limits were raised due to sample foaming.

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	66.9	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A191512AA	05/31/2019 18:14	Linda C Pape	1.53
08389	GC/MS - LL Encore Prep	SW-846 5035A	1	201914353710	05/23/2019 16:10	Rebecca Williams	n.a.
08389	GC/MS - LL Encore Prep	SW-846 5035A	2	201914353710	05/23/2019 16:11	Rebecca Williams	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	1	201914353710	05/23/2019 16:06	Rebecca Williams	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	2	201914353710	05/23/2019 16:08	Rebecca Williams	n.a.

*=This limit was used in the evaluation of the final result

7-27-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of three sediment samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analyses for Polychlorinated Biphenyls (PCBs - EPA Method 8082) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050401 19050402 19050403

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The samples were maintained at 0°C to 6°C. The samples were collected on May 20, 2019, extracted on May 24, 2019, and were analyzed by May 29, 2019. There are no holding time limits for Method 8082 PCB analyses.

2. **Instrument Performance: Acceptable.**

The surrogate retention time percent difference between the initial calibration standards and the remaining standards and samples was within QC limits.

3. **Initial and Continuing Calibration: Acceptable.**

All initial calibration relative standard deviations (RSDs) were within QC limits. All continuing calibration % differences (% D) were within QC limits.

4. **Blanks: Acceptable.**

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each analytical system. No target analytes were detected in the laboratory blank.

5. **System Monitoring Compounds (SMCs): Satisfactory.**

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All recoveries of the SMCs were within the established control limits except when diluted out; no actions were taken based on these outliers.

6. Matrix Spike (MS) and MS Duplicate (MSD) Analyses: Satisfactory.

MS and MSD recoveries were within QC limits except PCB-1260 with a high recovery; no actions were taken as PCB-1260 was not detected in any samples.

7. Blank Spike (BS) Analyses: Acceptable.

BS recoveries were within QC limits.

8. Duplicates: Acceptable.

Relative Percent Differences (RPDs) of all spiked analytes were within QC limits.

9. Compound Identification: Acceptable.

All results were dual-column confirmed with differences between the columns < 40%.

10. Target Compound Quantitation and Quantitation Limits: Acceptable.

Sample results and quantitation limits were correctly calculated.

11. Laboratory Contact

No laboratory contact was required.

12. Overall Assessment

A total of 27 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	89	220	1
10726	Pentachlorophenol	87-86-5	N.D.	89	220	1
10726	Phenanthrene	85-01-8	1,400	4	22	1
10726	Phenol	108-95-2	N.D.	22	49	1
10726	Pyrene	129-00-0	1,900	4	22	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	22	49	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	89	220	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	40	89	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	36	76	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	4.0	86	317.23
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	4.8	23	1
10885	PCB-1221	11104-28-2	N.D. D1	6.2	23	1
10885	PCB-1232	11141-16-5	N.D. D1	11	23	1
10885	PCB-1242	53469-21-9	N.D. D1	4.4	23	1
10885	PCB-1248	12672-29-6	5.8 JD1	4.4	23	1
10885	PCB-1254	11097-69-1	N.D. D1	4.4	23	1
10885	PCB-1260	11096-82-5	N.D. D1	6.6	23	1
10885	PCB-1262	37324-23-5	N.D. D1	4.4	23	1
10885	PCB-1268	11100-14-4	N.D. D1	4.4	23	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	9.9 J	5.4	14	1
08272	Heavy Range Organics C24-C40	n.a.	31 J	14	41	1
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	11,000	13.2	33.6	1
01650	Calcium	7440-70-2	13,800	27.2	56.1	1
01654	Iron	7439-89-6	15,400	5.61	22.4	1
01657	Magnesium	7439-95-4	6,500	1.87	11.2	1
01662	Potassium	7440-09-7	2,010	22.2	56.1	1
01667	Sodium	7440-23-5	163	51.8	112	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	4-Nitrophenol	100-02-7	N.D.	850	2,600	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	260	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	85	190	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	340	850	1
10726	Pentachlorophenol	87-86-5	N.D.	340	850	1
10726	Phenanthrene	85-01-8	3,700	17	85	1
10726	Phenol	108-95-2	N.D.	85	190	1
10726	Pyrene	129-00-0	6,480	17	85	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	85	190	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	340	850	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	340	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	140	290	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	34	730	707.51
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	190	880	10
10885	PCB-1221	11104-28-2	N.D. D1	240	880	10
10885	PCB-1232	11141-16-5	N.D. D1	410	880	10
10885	PCB-1242	53469-21-9	N.D. D1	170	880	10
10885	PCB-1248	12672-29-6	N.D. D1	170	880	10
10885	PCB-1254	11097-69-1	N.D. D1	170	880	10
10885	PCB-1260	11096-82-5	N.D. D1	250	880	10
10885	PCB-1262	37324-23-5	N.D. D1	170	880	10
10885	PCB-1268	11100-14-4	12,000 D2	170	880	10
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	3,300	41	100	2
08272	Heavy Range Organics C24-C40	n.a.	3,000	100	310	2
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	42,200	51.1	130	1
01650	Calcium	7440-70-2	10,300	105	217	1
01654	Iron	7439-89-6	15,500	21.7	86.6	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	86	210	1
10726	Pentachlorophenol	87-86-5	N.D.	86	210	1
10726	Phenanthrene	85-01-8	14,000	43	210	10
10726	Phenol	108-95-2	N.D.	21	47	1
10726	Pyrene	129-00-0	23,000	43	210	10
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	21	47	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	86	210	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	39	86	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	34	73	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	0.3	7.2	27.82
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	23	110	5
10885	PCB-1221	11104-28-2	N.D. D1	29	110	5
10885	PCB-1232	11141-16-5	N.D. D1	51	110	5
10885	PCB-1242	53469-21-9	N.D. D1	21	110	5
10885	PCB-1248	12672-29-6	160 D2	21	110	5
10885	PCB-1254	11097-69-1	N.D. D1	21	110	5
10885	PCB-1260	11096-82-5	N.D. D1	31	110	5
10885	PCB-1262	37324-23-5	N.D. D1	21	110	5
10885	PCB-1268	11100-14-4	1,500 D2	21	110	5
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	170	5.2	13	1
08272	Heavy Range Organics C24-C40	n.a.	580	13	39	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	29,300	14.2	36.0	1
01650	Calcium	7440-70-2	3,640	29.1	60.0	1
01654	Iron	7439-89-6	18,800	6.00	24.0	1
01657	Magnesium	7439-95-4	6,660	2.00	12.0	1
01662	Potassium	7440-09-7	2,120	23.7	60.0	1
01667	Sodium	7440-23-5	257	55.4	120	1

*=This limit was used in the evaluation of the final result

7-27-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, WA

SUBJ. **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF. TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of four sediment samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Volatile Organic Compound (VOC) analysis (EPA Method 8260) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050401 19050402 19050403 19050501

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The samples were maintained and received within the QC limits of 4°C ± 2°C. The samples were collected on May 20, 2019, were received at the laboratory on May 22, 2019, and were analyzed by May 27, 2019, therefore meeting QC criteria of less than 14 days between collection and analysis for soil samples.

2. **Tuning: Acceptable.**

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. **Initial Calibration: Acceptable.**

All average Relative Response Factors (RRFs) were within the QC limits. All applicable Relative Standard Deviations (RSDs) and/or correlation coefficients were within the QC limits.

4. **Continuing Calibration: Satisfactory.**

All RRFs were within the QC limits. All % differences were within the QC limits except acetone with a high recovery associated with sample 19050403; the associated positive result was qualified as an estimated quantity with a high bias (JH).

5. Blanks: Satisfactory.

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank. There were positive toluene and carbon disulfide results less than the reporting limit and positive acetone and 2-butanone results (greater than the reporting limit) in the trip blank (sample 19050501). Associated positive acetone and 2-butanone sample results less than five times the trip blank results were qualified as not detected (U) at the sample result/quantitation limit. Associated positive toluene and carbon disulfide results less than the reporting limit were qualified as not detected (U) at the quantitation limit.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS)/BS Duplicate (BSD) Analysis: Acceptable.

BS and BSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. Matrix Spike (MS)/MS Duplicate (MSD) Analysis: Satisfactory.

MS and MSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits except high methyl acetate and 1,1,2,2-tetrachloroethane recoveries (no actions were taken as these analytes were not detected in the native sample-19050403) and 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene with low recoveries (sample detection limits were qualified as estimated quantities with a low bias [UJL]).

9. Duplicate Analysis: Acceptable.

Duplicate and spike duplicate analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate and spike duplicate results were within QC limits.

10. Internal Standards: Satisfactory.

All internal standards were within $\pm$ 30 seconds of the continuing calibration internal standard retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts except low 1,4-dichlorobenzene-d4 recoveries in samples 19050401 and 19050501; no actions were taken as there were no associated detected analytes.

11. Overall Assessment of Data for Use

A total of 204 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. A total of two sample results were qualified as estimated quantities (UJL) based on spike accuracy outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Analysis Report

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Acetone	67-64-1	230	8	28	1.01
11995	Benzene	71-43-2	N.D.	0.7	7	1.01
11995	Bromochloromethane	74-97-5	N.D.	0.8	7	1.01
11995	Bromodichloromethane	75-27-4	N.D.	0.6	7	1.01
11995	Bromoform	75-25-2	N.D.	7	14	1.01
11995	Bromomethane	74-83-9	N.D.	1	7	1.01
11995	2-Butanone	78-93-3	18	1	14	1.01
11995	Carbon Disulfide	75-15-0	N.D.	0.8	7	1.01
11995	Carbon Tetrachloride	56-23-5	N.D.	0.7	7	1.01
11995	Chlorobenzene	108-90-7	N.D.	0.7	7	1.01
11995	Chloroethane	75-00-3	N.D.	1	7	1.01
11995	Chloroform	67-66-3	N.D.	0.8	7	1.01
11995	Chloromethane	74-87-3	N.D.	0.8	7	1.01
11995	Cyclohexane	110-82-7	N.D.	0.7	7	1.01
11995	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.6	7	1.01
11995	Dibromochloromethane	124-48-1	N.D.	0.6	7	1.01
11995	1,2-Dibromoethane	106-93-4	N.D.	0.6	7	1.01
11995	1,2-Dichlorobenzene	95-50-1	N.D.	0.7	7	1.01
11995	1,3-Dichlorobenzene	541-73-1	N.D.	0.7	7	1.01
11995	1,4-Dichlorobenzene	106-46-7	N.D.	0.6	7	1.01
11995	Dichlorodifluoromethane	75-71-8	N.D.	0.8	7	1.01
11995	1,1-Dichloroethane	75-34-3	N.D.	0.7	7	1.01
11995	1,2-Dichloroethane	107-06-2	N.D.	0.8	7	1.01
11995	1,1-Dichloroethene	75-35-4	N.D.	0.7	7	1.01
11995	cis-1,2-Dichloroethene	156-59-2	N.D.	0.7	7	1.01
11995	trans-1,2-Dichloroethene	156-60-5	N.D.	0.7	7	1.01
11995	1,2-Dichloropropane	78-87-5	N.D.	0.7	7	1.01
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.6	7	1.01
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.4	7	1.01
11995	Ethylbenzene	100-41-4	N.D.	0.6	7	1.01
11995	Freon 113	76-13-1	N.D.	0.8	14	1.01
11995	2-Hexanone	591-78-6	N.D.	1	14	1.01
11995	Isopropylbenzene	98-82-8	N.D.	0.6	7	1.01
11995	Methyl Acetate	79-20-9	N.D.	1	7	1.01
11995	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.7	7	1.01
11995	4-Methyl-2-pentanone	108-10-1	N.D.	1	14	1.01
11995	Methylcyclohexane	108-87-2	N.D.	0.8	7	1.01
11995	Methylene Chloride	75-09-2	N.D.	3	7	1.01
11995	Styrene	100-42-5	N.D.	0.4	7	1.01
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.6	7	1.01
11995	Tetrachloroethene	127-18-4	N.D.	0.7	7	1.01

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Toluene	108-88-3	2 J	0.8	7	1.01
11995	1,2,3-Trichlorobenzene	87-61-6	N.D.	7	14	1.01
11995	1,2,4-Trichlorobenzene	120-82-1	N.D.	7	14	1.01
11995	1,1,1-Trichloroethane	71-55-6	N.D.	0.8	7	1.01
11995	1,1,2-Trichloroethane	79-00-5	N.D.	0.7	7	1.01
11995	Trichloroethene	79-01-6	N.D.	0.7	7	1.01
11995	Trichlorofluoromethane	75-69-4	N.D.	1	7	1.01
11995	Vinyl Chloride	75-01-4	N.D.	0.8	7	1.01
11995	m+p-Xylene	179601-23-1	N.D.	1	7	1.01
11995	o-Xylene	95-47-6	N.D.	0.6	7	1.01

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated:
Acetone and 2-Butanone

GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	220	4	22	1
10726	Acenaphthylene	208-96-8	N.D.	4	22	1
10726	Acetophenone	98-86-2	N.D.	22	67	1
10726	Anthracene	120-12-7	340	4	22	1
10726	Atrazine	1912-24-9	N.D.	270	580	1
10726	Benzaldehyde	100-52-7	N.D.	89	220	1
10726	Benzo(a)anthracene	56-55-3	1,000	9	22	1
10726	Benzo(a)pyrene	50-32-8	1,100	4	22	1
10726	Benzo(b)fluoranthene	205-99-2	1,300	4	22	1
10726	Benzo(g,h,i)perylene	191-24-2	680	4	22	1
10726	Benzo(k)fluoranthene	207-08-9	500	4	22	1
10726	1,1'-Biphenyl	92-52-4	N.D.	22	49	1
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	31	67	1
10726	Butylbenzylphthalate	85-68-7	N.D.	89	220	1
10726	Di-n-butylphthalate	84-74-2	N.D.	89	220	1
10726	Caprolactam	105-60-2	N.D.	45	220	1
10726	Carbazole	86-74-8	190	22	49	1
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	31	67	1
10726	4-Chloroaniline	106-47-8	N.D.	45	220	1
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	22	49	1
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	31	67	1
10726	2-Chloronaphthalene	91-58-7	N.D.	9	45	1
10726	2-Chlorophenol	95-57-8	N.D.	22	49	1
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	27	58	1
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	27	58	1

*=This limit was used in the evaluation of the final result

7/27/19

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Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Acetone	67-64-1	2,100	55	180	1.79
11995	Benzene	71-43-2	5 J Q	5	46	1.79
11995	Bromochloromethane	74-97-5	N.D.	6	46	1.79
11995	Bromodichloromethane	75-27-4	N.D.	4	46	1.79
11995	Bromoform	75-25-2	N.D.	46	92	1.79
11995	Bromomethane	74-83-9	N.D.	6	46	1.79
11995	2-Butanone	78-93-3	170	9	92	1.79
11995	Carbon Disulfide	75-15-0	8 J Q	6	46	1.79
11995	Carbon Tetrachloride	56-23-5	N.D.	5	46	1.79
11995	Chlorobenzene	108-90-7	N.D.	5	46	1.79
11995	Chloroethane	75-00-3	N.D.	9	46	1.79
11995	Chloroform	67-66-3	N.D.	6	46	1.79
11995	Chloromethane	74-87-3	N.D.	6	46	1.79
11995	Cyclohexane	110-82-7	N.D.	5	46	1.79
11995	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	4	46	1.79
11995	Dibromochloromethane	124-48-1	N.D.	4	46	1.79
11995	1,2-Dibromoethane	106-93-4	N.D.	4	46	1.79
11995	1,2-Dichlorobenzene	95-50-1	N.D.	5	46	1.79
11995	1,3-Dichlorobenzene	541-73-1	N.D.	5	46	1.79
11995	1,4-Dichlorobenzene	106-46-7	N.D.	4	46	1.79
11995	Dichlorodifluoromethane	75-71-8	N.D.	6	46	1.79
11995	1,1-Dichloroethane	75-34-3	N.D.	5	46	1.79
11995	1,2-Dichloroethane	107-06-2	N.D.	6	46	1.79
11995	1,1-Dichloroethene	75-35-4	N.D.	5	46	1.79
11995	cis-1,2-Dichloroethene	156-59-2	N.D.	5	46	1.79
11995	trans-1,2-Dichloroethene	156-60-5	N.D.	5	46	1.79
11995	1,2-Dichloropropane	78-87-5	N.D.	5	46	1.79
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.	4	46	1.79
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.	3	46	1.79
11995	Ethylbenzene	100-41-4	N.D.	4	46	1.79
11995	Freon 113	76-13-1	N.D.	6	92	1.79
11995	2-Hexanone	591-78-6	N.D.	9	92	1.79
11995	Isopropylbenzene	98-82-8	N.D.	4	46	1.79
11995	Methyl Acetate	79-20-9	30 J Q	9	46	1.79
11995	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	5	46	1.79
11995	4-Methyl-2-pentanone	108-10-1	11 J Q	9	92	1.79
11995	Methylcyclohexane	108-87-2	N.D.	6	46	1.79
11995	Methylene Chloride	75-09-2	N.D.	18	46	1.79
11995	Styrene	100-42-5	N.D.	3	46	1.79
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	4	46	1.79
11995	Tetrachloroethene	127-18-4	N.D.	5	46	1.79

*=This limit was used in the evaluation of the final result

7-27-19

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Analysis Report

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Toluene	108-88-3	25 J Q	6	46	1.79
11995	1,2,3-Trichlorobenzene	87-61-6	N.D.	46	92	1.79
11995	1,2,4-Trichlorobenzene	120-82-1	N.D.	46	92	1.79
11995	1,1,1-Trichloroethane	71-55-6	N.D.	6	46	1.79
11995	1,1,2-Trichloroethane	79-00-5	N.D.	5	46	1.79
11995	Trichloroethene	79-01-6	N.D.	5	46	1.79
11995	Trichlorofluoromethane	75-69-4	N.D.	6	46	1.79
11995	Vinyl Chloride	75-01-4	N.D.	6	46	1.79
11995	m+p-Xylene	179601-23-1	N.D.	9	46	1.79
11995	o-Xylene	95-47-6	N.D.	4	46	1.79

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated:
Acetone, 2-Butanone, Methyl Acetate and 4-Methyl-2-Butanone

The recovery for the sample internal standard is outside the QC acceptance limits. The following action was taken: The sample was re-analyzed and the QC is again outside of the acceptance limits, indicating a matrix effect. The data is reported from the initial trial.

GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	260	17	85	1
10726	Acenaphthylene	208-96-8	70 J	17	85	1
10726	Acetophenone	98-86-2	230 J	85	260	1
10726	Anthracene	120-12-7	920	17	85	1
10726	Atrazine	1912-24-9	N.D.	1,000	2,200	1
10726	Benzaldehyde	100-52-7	950	340	850	1
10726	Benzo(a)anthracene	56-55-3	3,600	34	85	1
10726	Benzo(a)pyrene	50-32-8	4,900	17	85	1
10726	Benzo(b)fluoranthene	205-99-2	9,400	17	85	1
10726	Benzo(g,h,i)perylene	191-24-2	5,100	17	85	1
10726	Benzo(k)fluoranthene	207-08-9	3,500	17	85	1
10726	1,1'-Biphenyl	92-52-4	N.D.	85	190	1
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	120	260	1
10726	Butylbenzylphthalate	85-68-7	N.D.	340	850	1
10726	Di-n-butylphthalate	84-74-2	N.D.	340	850	1
10726	Caprolactam	105-60-2	N.D.	170	850	1
10726	Carbazole	86-74-8	1,000	85	190	1
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	120	260	1
10726	4-Chloroaniline	106-47-8	N.D.	170	850	1
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	85	190	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Acetone	67-64-1	92 JH	8	26	1.01
11995	Benzene	71-43-2	N.D.	0.7 U	7	1.01
11995	Bromochloromethane	74-97-5	N.D.	0.8	7	1.01
11995	Bromodichloromethane	75-27-4	N.D.	0.5	7	1.01
11995	Bromoform	75-25-2	N.D.	7	13	1.01
11995	Bromomethane	74-83-9	N.D.	0.9	7	1.01
11995	2-Butanone	78-93-3	5 J	1	13	1.01
11995	Carbon Disulfide	75-15-0	3 J	0.8	7	1.01
11995	Carbon Tetrachloride	56-23-5	N.D.	0.7	7	1.01
11995	Chlorobenzene	108-90-7	N.D.	0.7	7	1.01
11995	Chloroethane	75-00-3	N.D.	1	7	1.01
11995	Chloroform	67-66-3	N.D.	0.8	7	1.01
11995	Chloromethane	74-87-3	N.D.	0.8	7	1.01
11995	Cyclohexane	110-82-7	N.D.	0.7	7	1.01
11995	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.5	7	1.01
11995	Dibromochloromethane	124-48-1	N.D.	0.5	7	1.01
11995	1,2-Dibromoethane	106-93-4	N.D.	0.5	7	1.01
11995	1,2-Dichlorobenzene	95-50-1	N.D.	0.7	7	1.01
11995	1,3-Dichlorobenzene	541-73-1	N.D.	0.7	7	1.01
11995	1,4-Dichlorobenzene	106-46-7	N.D.	0.5	7	1.01
11995	Dichlorodifluoromethane	75-71-8	N.D.	0.8	7	1.01
11995	1,1-Dichloroethane	75-34-3	N.D.	0.7	7	1.01
11995	1,2-Dichloroethane	107-06-2	N.D.	0.8	7	1.01
11995	1,1-Dichloroethene	75-35-4	N.D.	0.7	7	1.01
11995	cis-1,2-Dichloroethene	156-59-2	N.D.	0.7	7	1.01
11995	trans-1,2-Dichloroethene	156-60-5	N.D.	0.7	7	1.01
11995	1,2-Dichloropropane	78-87-5	N.D.	0.7	7	1.01
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.5	7	1.01
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.4	7	1.01
11995	Ethylbenzene	100-41-4	N.D.	0.5	7	1.01
11995	Freon 113	76-13-1	N.D.	0.8	13	1.01
11995	2-Hexanone	591-78-6	N.D.	1	13	1.01
11995	Isopropylbenzene	98-82-8	N.D.	0.5	7	1.01
11995	Methyl Acetate	79-20-9	N.D.	1	7	1.01
11995	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.7	7	1.01
11995	4-Methyl-2-pentanone	108-10-1	N.D.	1	13	1.01
11995	Methylcyclohexane	108-87-2	N.D.	0.8	7	1.01
11995	Methylene Chloride	75-09-2	N.D.	3	7	1.01
11995	Styrene	100-42-5	N.D.	0.4	7	1.01
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.5	7	1.01
11995	Tetrachloroethene	127-18-4	N.D.	0.7	7	1.01

*=This limit was used in the evaluation of the final result

7-22-19

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Analysis Report

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Toluene	108-88-3	0.9 J Q	0.8	7	1.01
11995	1,2,3-Trichlorobenzene	87-61-6	N.D.	7 U JL	13	1.01
11995	1,2,4-Trichlorobenzene	120-82-1	N.D.	7 JL	13	1.01
11995	1,1,1-Trichloroethane	71-55-6	N.D.	0.8	7	1.01
11995	1,1,2-Trichloroethane	79-00-5	N.D.	0.7	7	1.01
11995	Trichloroethene	79-01-6	N.D.	0.7	7	1.01
11995	Trichlorofluoromethane	75-69-4	N.D.	0.9	7	1.01
11995	Vinyl Chloride	75-01-4	N.D.	0.8	7	1.01
11995	m+p-Xylene	179601-23-1	N.D.	1	7	1.01
11995	o-Xylene	95-47-6	N.D.	0.5	7	1.01

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated: acetone.

GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	1,100	4	21	1
10726	Acenaphthylene	208-96-8	24	4	21	1
10726	Acetophenone	98-86-2	N.D.	21	64	1
10726	Anthracene	120-12-7	2,300	4	21	1
10726	Atrazine	1912-24-9	N.D.	260	560	1
10726	Benzaldehyde	100-52-7	N.D.	86	210	1
10726	Benzo(a)anthracene	56-55-3	15,000	86	210	10
10726	Benzo(a)pyrene	50-32-8	18,000	43	210	10
10726	Benzo(b)fluoranthene	205-99-2	27,000	43	210	10
10726	Benzo(g,h,i)perylene	191-24-2	13,000	43	210	10
10726	Benzo(k)fluoranthene	207-08-9	8,600	43	210	10
10726	1,1'-Biphenyl	92-52-4	24 J	21	47	1
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	30	64	1
10726	Butylbenzylphthalate	85-68-7	N.D.	86	210	1
10726	Di-n-butylphthalate	84-74-2	N.D.	86	210	1
10726	Caprolactam	105-60-2	N.D.	43	210	1
10726	Carbazole	86-74-8	1,900	21	47	1
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	30	64	1
10726	4-Chloroaniline	106-47-8	N.D.	43	210	1
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	21	47	1
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	30	64	1
10726	2-Chloronaphthalene	91-58-7	N.D.	9	43	1
10726	2-Chlorophenol	95-57-8	N.D.	21	47	1
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	26	56	1
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	26	56	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050501 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064126
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:53
SDG#: EUR63-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Acetone	67-64-1	890	28	92	1.53
11995	Benzene	71-43-2	N.D.	2	23	1.53
11995	Bromochloromethane	74-97-5	N.D.	3	23	1.53
11995	Bromodichloromethane	75-27-4	N.D.	2	23	1.53
11995	Bromoform	75-25-2	N.D.	23	46	1.53
11995	Bromomethane	74-83-9	N.D.	3	23	1.53
11995	2-Butanone	78-93-3	80	5	46	1.53
11995	Carbon Disulfide	75-15-0	8 J	3	23	1.53
11995	Carbon Tetrachloride	56-23-5	N.D.	2	23	1.53
11995	Chlorobenzene	108-90-7	N.D.	2	23	1.53
11995	Chloroethane	75-00-3	N.D.	5	23	1.53
11995	Chloroform	67-66-3	N.D.	3	23	1.53
11995	Chloromethane	74-87-3	N.D.	3	23	1.53
11995	Cyclohexane	110-82-7	N.D.	2	23	1.53
11995	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	2	23	1.53
11995	Dibromochloromethane	124-48-1	N.D.	2	23	1.53
11995	1,2-Dibromoethane	106-93-4	N.D.	2	23	1.53
11995	1,2-Dichlorobenzene	95-50-1	N.D.	2	23	1.53
11995	1,3-Dichlorobenzene	541-73-1	N.D.	2	23	1.53
11995	1,4-Dichlorobenzene	106-46-7	N.D.	2	23	1.53
11995	Dichlorodifluoromethane	75-71-8	N.D.	3	23	1.53
11995	1,1-Dichloroethane	75-34-3	N.D.	2	23	1.53
11995	1,2-Dichloroethane	107-06-2	N.D.	3	23	1.53
11995	1,1-Dichloroethene	75-35-4	N.D.	2	23	1.53
11995	cis-1,2-Dichloroethene	156-59-2	N.D.	2	23	1.53
11995	trans-1,2-Dichloroethene	156-60-5	N.D.	2	23	1.53
11995	1,2-Dichloropropane	78-87-5	N.D.	2	23	1.53
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.	2	23	1.53
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.	1	23	1.53
11995	Ethylbenzene	100-41-4	N.D.	2	23	1.53
11995	Freon 113	76-13-1	N.D.	3	46	1.53
11995	2-Hexanone	591-78-6	N.D.	5	46	1.53
11995	Isopropylbenzene	98-82-8	N.D.	2	23	1.53
11995	Methyl Acetate	79-20-9	N.D.	5	23	1.53
11995	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	2	23	1.53
11995	4-Methyl-2-pentanone	108-10-1	N.D.	5	46	1.53
11995	Methylcyclohexane	108-87-2	N.D.	3	23	1.53
11995	Methylene Chloride	75-09-2	N.D.	9	23	1.53
11995	Styrene	100-42-5	N.D.	1	23	1.53
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	2	23	1.53
11995	Tetrachloroethene	127-18-4	N.D.	2	23	1.53

*=This limit was used in the evaluation of the final result

MW 7-22-19

eurofins
Lancaster Laboratories Environmental
2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Analysis Report

Sample Description: 19050501 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064126
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:53
SDG#: EUR63-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Toluene	108-88-3	4 J	3	23	1.53
11995	1,2,3-Trichlorobenzene	87-61-6	N.D.	23	46	1.53
11995	1,2,4-Trichlorobenzene	120-82-1	N.D.	23	46	1.53
11995	1,1,1-Trichloroethane	71-55-6	N.D.	3	23	1.53
11995	1,1,2-Trichloroethane	79-00-5	N.D.	2	23	1.53
11995	Trichloroethene	79-01-6	N.D.	2	23	1.53
11995	Trichlorofluoromethane	75-69-4	N.D.	3	23	1.53
11995	Vinyl Chloride	75-01-4	N.D.	3	23	1.53
11995	m+p-Xylene	179601-23-1	N.D.	5	23	1.53
11995	o-Xylene	95-47-6	N.D.	2	23	1.53

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated: Acetone and 2-Butanone.

The recovery for the sample internal standard is outside the QC acceptance limits. The following action was taken: The sample was re-analyzed and the QC is again outside of the acceptance limits, indicating a matrix effect. The data is reported from the initial trial.

GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	14	310	511.48

Reporting limits were raised due to sample foaming.

Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	66.9	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A191512AA	05/31/2019 18:14	Linda C Pape	1.53
08389	GC/MS - LL Encore Prep	SW-846 5035A	1	201914353710	05/23/2019 16:10	Rebecca Williams	n.a.
08389	GC/MS - LL Encore Prep	SW-846 5035A	2	201914353710	05/23/2019 16:11	Rebecca Williams	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	1	201914353710	05/23/2019 16:06	Rebecca Williams	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	2	201914353710	05/23/2019 16:08	Rebecca Williams	n.a.

*=This limit was used in the evaluation of the final result

7-22-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of three sediment samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Semivolatile Organic Compound (SVOC) analysis (EPA Method 8270) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050401 19050402 19050403

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The samples were maintained and received within the QC limits of 0°C to 6°C. The samples were collected on May 20, 2019, were extracted and analyzed by May 28, 2019, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

2. **Tuning: Acceptable.**

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. **Initial Calibration: Acceptable.**

All average Relative Response Factors (RRFs) were within the QC limits. All Relative Standard Deviations (RSDs) were within the QC limits.

4. **Continuing Calibration: Acceptable.**

All RRFs were within the QC limits. All % differences were within the QC limits.

5. **Blanks: Acceptable.**

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank.

6. **System Monitoring Compounds (SMCs): Acceptable.**

All SMC recoveries were within QC limits.

7. **Matrix Spike (MS)/MS Duplicate (MSD) Analysis: Satisfactory.**

MS and MSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits except hexachloroethane, hexachloro-cyclopentadiene, 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol, anthracene, carbazole, and dibenzo(a,h)-anthracene with low recoveries; associated positive results and detection limits were qualified as estimated quantities with a low bias (JL or UJL).

8. **Blank Spike (BS)/BS Duplicate (BSD) Analysis: Acceptable.**

BS and BSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

9. **Duplicate Analysis: Satisfactory.**

Duplicate and spike duplicate analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All applicable duplicate and/or spike duplicate results were within QC limits except 4-chloroaniline; the associated sample detection limit was qualified as an estimated quantity with an unknown bias (UJK).

10. **Internal Standards: Acceptable.**

All internal standards (IS) were within $\pm$ 30 seconds of the continuing calibration IS retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts.

11. **Overall Assessment of Data for Use**

A total of 222 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on holding time outliers, incorrect sample containers, or sample temperature outliers. A total of seven results were qualified as estimated quantities based on spike accuracy outliers and one sample result was qualified as an estimated quantity based on duplicate precision outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Toluene	108-88-3	2 J	0.8	7	1.01
11995	1,2,3-Trichlorobenzene	87-61-6	N.D.	7	14	1.01
11995	1,2,4-Trichlorobenzene	120-82-1	N.D.	7	14	1.01
11995	1,1,1-Trichloroethane	71-55-6	N.D.	0.8	7	1.01
11995	1,1,2-Trichloroethane	79-00-5	N.D.	0.7	7	1.01
11995	Trichloroethene	79-01-6	N.D.	0.7	7	1.01
11995	Trichlorofluoromethane	75-69-4	N.D.	1	7	1.01
11995	Vinyl Chloride	75-01-4	N.D.	0.8	7	1.01
11995	m+p-Xylene	179601-23-1	N.D.	1	7	1.01
11995	o-Xylene	95-47-6	N.D.	0.6	7	1.01

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated:
Acetone and 2-Butanone

GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	220	4	22	1
10726	Acenaphthylene	208-96-8	N.D.	4	22	1
10726	Acetophenone	98-86-2	N.D.	22	67	1
10726	Anthracene	120-12-7	340	4	22	1
10726	Atrazine	1912-24-9	N.D.	270	580	1
10726	Benzaldehyde	100-52-7	N.D.	89	220	1
10726	Benzo(a)anthracene	56-55-3	1,000	9	22	1
10726	Benzo(a)pyrene	50-32-8	1,100	4	22	1
10726	Benzo(b)fluoranthene	205-99-2	1,300	4	22	1
10726	Benzo(g,h,i)perylene	191-24-2	680	4	22	1
10726	Benzo(k)fluoranthene	207-08-9	500	4	22	1
10726	1,1'-Biphenyl	92-52-4	N.D.	22	49	1
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	31	67	1
10726	Butylbenzylphthalate	85-68-7	N.D.	89	220	1
10726	Di-n-butylphthalate	84-74-2	N.D.	89	220	1
10726	Caprolactam	105-60-2	N.D.	45	220	1
10726	Carbazole	86-74-8	190	22	49	1
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	31	67	1
10726	4-Chloroaniline	106-47-8	N.D.	45	220	1
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	22	49	1
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	31	67	1
10726	2-Chloronaphthalene	91-58-7	N.D.	9	45	1
10726	2-Chlorophenol	95-57-8	N.D.	22	49	1
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	27	58	1
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	27	58	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	1,200	4	22	1
10726	Dibenz(a,h)anthracene	53-70-3	130	9	22	1
10726	Dibenzofuran	132-64-9	68	22	49	1
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	130 U	450	1
10726	2,4-Dichlorophenol	120-83-2	N.D.	27	58	1
10726	Diethylphthalate	84-66-2	N.D.	89	220	1
10726	2,4-Dimethylphenol	105-67-9	N.D.	40	89	1
10726	Dimethylphthalate	131-11-3	N.D.	89	220	1
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	310	670	1
10726	2,4-Dinitrophenol	51-28-5	N.D.	450	1,300	1
10726	2,4-Dinitrotoluene	121-14-2	N.D.	89	220	1
10726	2,6-Dinitrotoluene	606-20-2	N.D.	31	67	1
10726	1,4-Dioxane	123-91-1	N.D.	130	450	1
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	89	220	1
10726	Fluoranthene	206-44-0	1,700	4	22	1
10726	Fluorene	86-73-7	150	4	22	1
10726	Hexachlorobenzene	118-74-1	N.D.	9	22	1
10726	Hexachlorobutadiene	87-68-3	N.D.	49	100	1
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	270	670	1
10726	Hexachloroethane	67-72-1	N.D.	45	220	1
10726	Indeno(1,2,3-cd)pyrene	193-39-5	610	4	22	1
10726	Isophorone	78-59-1	N.D.	22 U	49	1
10726	2-Methylnaphthalene	91-57-6	35 J Q	4	45	1
10726	2-Methylphenol	95-48-7	N.D.	22 U	89	1
10726	4-Methylphenol	106-44-5	N.D.	22 U	67	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	75	9	22	1
10726	2-Nitroaniline	88-74-4	N.D.	22	67	1
10726	3-Nitroaniline	99-09-2	N.D.	89	220	1
10726	4-Nitroaniline	100-01-6	N.D.	89	220	1
10726	Nitrobenzene	98-95-3	N.D.	36	89	1
10726	2-Nitrophenol	88-75-5	N.D.	36	76	1
10726	4-Nitrophenol	100-02-7	N.D.	220	670	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	31	67	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	22	49	1

*=This limit was used in the evaluation of the final result

7/27/19

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	89	220	1
10726	Pentachlorophenol	87-86-5	N.D.	89	220	1
10726	Phenanthrene	85-01-8	1,400	4	22	1
10726	Phenol	108-95-2	N.D.	22	49	1
10726	Pyrene	129-00-0	1,900	4	22	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	22	49	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	89	220	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	40	89	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	36	76	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	4.0	86	317.23
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	4.8	23	1
10885	PCB-1221	11104-28-2	N.D. D1	6.2	23	1
10885	PCB-1232	11141-16-5	N.D. D1	11	23	1
10885	PCB-1242	53469-21-9	N.D. D1	4.4	23	1
10885	PCB-1248	12672-29-6	5.8 JD2	4.4	23	1
10885	PCB-1254	11097-69-1	N.D. D1	4.4	23	1
10885	PCB-1260	11096-82-5	N.D. D1	6.6	23	1
10885	PCB-1262	37324-23-5	N.D. D1	4.4	23	1
10885	PCB-1268	11100-14-4	N.D. D1	4.4	23	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	9.9 J	5.4	14	1
08272	Heavy Range Organics C24-C40	n.a.	31 J	14	41	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	11,000	13.2	33.6	1
01650	Calcium	7440-70-2	13,800	27.2	56.1	1
01654	Iron	7439-89-6	15,400	5.61	22.4	1
01657	Magnesium	7439-95-4	6,500	1.87	11.2	1
01662	Potassium	7440-09-7	2,010	22.2	56.1	1
01667	Sodium	7440-23-5	163	51.8	112	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Toluene	108-88-3	25 J	6	46	1.79
11995	1,2,3-Trichlorobenzene	87-61-6	N.D.	46	92	1.79
11995	1,2,4-Trichlorobenzene	120-82-1	N.D.	46	92	1.79
11995	1,1,1-Trichloroethane	71-55-6	N.D.	6	46	1.79
11995	1,1,2-Trichloroethane	79-00-5	N.D.	5	46	1.79
11995	Trichloroethene	79-01-6	N.D.	5	46	1.79
11995	Trichlorofluoromethane	75-69-4	N.D.	6	46	1.79
11995	Vinyl Chloride	75-01-4	N.D.	6	46	1.79
11995	m+p-Xylene	179601-23-1	N.D.	9	46	1.79
11995	o-Xylene	95-47-6	N.D.	4	46	1.79

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated:
Acetone, 2-Butanone, Methyl Acetate and 4-Methyl-2-Butanone

The recovery for the sample internal standard is outside the QC acceptance limits. The following action was taken: The sample was re-analyzed and the QC is again outside of the acceptance limits, indicating a matrix effect. The data is reported from the initial trial.

GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	260	17	85	1
10726	Acenaphthylene	208-96-8	70 J	17	85	1
10726	Acetophenone	98-86-2	230 J	85	260	1
10726	Anthracene	120-12-7	920	17	85	1
10726	Atrazine	1912-24-9	N.D.	1,000 U	2,200	1
10726	Benzaldehyde	100-52-7	950	340	850	1
10726	Benzo(a)anthracene	56-55-3	3,600	34	85	1
10726	Benzo(a)pyrene	50-32-8	4,900	17	85	1
10726	Benzo(b)fluoranthene	205-99-2	9,400	17	85	1
10726	Benzo(g,h,i)perylene	191-24-2	5,100	17	85	1
10726	Benzo(k)fluoranthene	207-08-9	3,500	17	85	1
10726	1,1'-Biphenyl	92-52-4	N.D.	85	190	1
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	120	260	1
10726	Butylbenzylphthalate	85-68-7	N.D.	340	850	1
10726	Di-n-butylphthalate	84-74-2	N.D.	340	850	1
10726	Caprolactam	105-60-2	N.D.	170	850	1
10726	Carbazole	86-74-8	1,000	85	190	1
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	120	260	1
10726	4-Chloroaniline	106-47-8	N.D.	170	850	1
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	85	190	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	120	260	1
10726	2-Chloronaphthalene	91-58-7	N.D.	34	170	1
10726	2-Chlorophenol	95-57-8	N.D.	85	190	1
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	100	220	1
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	100	220	1
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	5,400	17	85	1
10726	Dibenz(a,h)anthracene	53-70-3	1,400	34	85	1
10726	Dibenzofuran	132-64-9	170 J Q	85	190	1
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	510	1,700	1
10726	2,4-Dichlorophenol	120-83-2	N.D.	100	220	1
10726	Diethylphthalate	84-66-2	N.D.	340	850	1
10726	2,4-Dimethylphenol	105-67-9	N.D.	150	340	1
10726	Dimethylphthalate	131-11-3	N.D.	340	850	1
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	1,200	2,600	1
10726	2,4-Dinitrophenol	51-28-5	N.D.	1,700	5,100	1
10726	2,4-Dinitrotoluene	121-14-2	N.D.	340	850	1
10726	2,6-Dinitrotoluene	606-20-2	N.D.	120	260	1
10726	1,4-Dioxane	123-91-1	N.D.	510	1,700	1
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	340	850	1
10726	Fluoranthene	206-44-0	6,700	17	85	1
10726	Fluorene	86-73-7	180	17	85	1
10726	Hexachlorobenzene	118-74-1	N.D.	34	85	1
10726	Hexachlorobutadiene	87-68-3	N.D.	190	390	1
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	1,000	2,600	1
10726	Hexachloroethane	67-72-1	N.D.	170	850	1
10726	Indeno(1,2,3-cd)pyrene	193-39-5	4,300	17	85	1
10726	Isophorone	78-59-1	N.D.	85	190	1
10726	2-Methylnaphthalene	91-57-6	91 J Q	17	170	1
10726	2-Methylphenol	95-48-7	N.D.	85	340	1
10726	4-Methylphenol	106-44-5	N.D.	85	260	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	180	34	85	1
10726	2-Nitroaniline	88-74-4	N.D.	85	260	1
10726	3-Nitroaniline	99-09-2	N.D.	340	850	1
10726	4-Nitroaniline	100-01-6	N.D.	340	850	1
10726	Nitrobenzene	98-95-3	N.D.	140	340	1
10726	2-Nitrophenol	88-75-5	N.D.	140	290	1

*=This limit was used in the evaluation of the final result

MW 7-27-19

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	4-Nitrophenol	100-02-7	N.D.	850	2,600	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	260	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	85	190	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	340	850	1
10726	Pentachlorophenol	87-86-5	N.D.	340	850	1
10726	Phenanthrene	85-01-8	3,700	17	85	1
10726	Phenol	108-95-2	N.D.	85	190	1
10726	Pyrene	129-00-0	6,400	17	85	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	85	190	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	340	850	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	340	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	140	290	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	34	730	707.51
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	190	880	10
10885	PCB-1221	11104-28-2	N.D. D1	240	880	10
10885	PCB-1232	11141-16-5	N.D. D1	410	880	10
10885	PCB-1242	53469-21-9	N.D. D1	170	880	10
10885	PCB-1248	12672-29-6	N.D. D1	170	880	10
10885	PCB-1254	11097-69-1	N.D. D1	170	880	10
10885	PCB-1260	11096-82-5	N.D. D1	250	880	10
10885	PCB-1262	37324-23-5	N.D. D1	170	880	10
10885	PCB-1268	11100-14-4	12,000 D2	170	880	10
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	3,300	41	100	2
08272	Heavy Range Organics C24-C40	n.a.	3,000	100	310	2
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	42,200	51.1	130	1
01650	Calcium	7440-70-2	10,300	105	217	1
01654	Iron	7439-89-6	15,500	21.7	86.6	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Toluene	108-88-3	0.9 J	0.8	7	1.01
11995	1,2,3-Trichlorobenzene	87-61-6	N.D.	7	13	1.01
11995	1,2,4-Trichlorobenzene	120-82-1	N.D.	7	13	1.01
11995	1,1,1-Trichloroethane	71-55-6	N.D.	0.8	7	1.01
11995	1,1,2-Trichloroethane	79-00-5	N.D.	0.7	7	1.01
11995	Trichloroethene	79-01-6	N.D.	0.7	7	1.01
11995	Trichlorofluoromethane	75-69-4	N.D.	0.9	7	1.01
11995	Vinyl Chloride	75-01-4	N.D.	0.8	7	1.01
11995	m+p-Xylene	179601-23-1	N.D.	1	7	1.01
11995	o-Xylene	95-47-6	N.D.	0.5	7	1.01

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated: acetone.

GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	1,100	4	21	1
10726	Acenaphthylene	208-96-8	24	4	21	1
10726	Acetophenone	98-86-2	N.D.	21 U	64	1
10726	Anthracene	120-12-7	2,300 JL	4	21	1
10726	Atrazine	1912-24-9	N.D.	260 U	560	1
10726	Benzaldehyde	100-52-7	N.D.	86 U	210	1
10726	Benzo(a)anthracene	56-55-3	15,000	86	210	10
10726	Benzo(a)pyrene	50-32-8	18,000	43	210	10
10726	Benzo(b)fluoranthene	205-99-2	27,000	43	210	10
10726	Benzo(g,h,i)perylene	191-24-2	13,000	43	210	10
10726	Benzo(k)fluoranthene	207-08-9	8,600	43	210	10
10726	1,1'-Biphenyl	92-52-4	24 JQ	21	47	1
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	30 U	64	1
10726	Butylbenzylphthalate	85-68-7	N.D.	86 U	210	1
10726	Di-n-butylphthalate	84-74-2	N.D.	86 U	210	1
10726	Caprolactam	105-60-2	N.D.	43 U	210	1
10726	Carbazole	86-74-8	1,900 JL	21	47	1
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	30 U JK	64	1
10726	4-Chloroaniline	106-47-8	N.D.	43 U	210	1
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	21	47	1
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	30	64	1
10726	2-Chloronaphthalene	91-58-7	N.D.	9	43	1
10726	2-Chlorophenol	95-57-8	N.D.	21	47	1
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	26	56	1
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	26	56	1

*=This limit was used in the evaluation of the final result

MW 7-27-19

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Analysis Report

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	17,000 JL	43	210	10
10726	Dibenz(a,h)anthracene	53-70-3	2,400 JL	9	21	1
10726	Dibenzofuran	132-64-9	330	21	47	1
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	130 U	430	1
10726	2,4-Dichlorophenol	120-83-2	N.D.	26	56	1
10726	Diethylphthalate	84-66-2	N.D.	86	210	1
10726	2,4-Dimethylphenol	105-67-9	N.D.	39	86	1
10726	Dimethylphthalate	131-11-3	N.D.	86	210	1
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	300 JL	640	1
10726	2,4-Dinitrophenol	51-28-5	N.D.	430 JL	1,300	1
10726	2,4-Dinitrotoluene	121-14-2	N.D.	86	210	1
10726	2,6-Dinitrotoluene	606-20-2	N.D.	30	64	1
10726	1,4-Dioxane	123-91-1	N.D.	130	430	1
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D. MW	86	210	1
10726	Fluoranthene	206-44-0	23,000	43	210	10
10726	Fluorene	86-73-7	670	4	21	1
10726	Hexachlorobenzene	118-74-1	N.D.	9 U	21	1
10726	Hexachlorobutadiene	87-68-3	N.D.	47	99	1
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	260 JL	640	1
10726	Hexachloroethane	67-72-1	N.D. MW	43 JL	210	1
10726	Indeno(1,2,3-cd)pyrene	193-39-5	12,000	43	210	10
10726	Isophorone	78-59-1	N.D. MW	21 U	47	1
10726	2-Methylnaphthalene	91-57-6	130	4	43	1
10726	2-Methylphenol	95-48-7	N.D.	21 U	86	1
10726	4-Methylphenol	106-44-5	N.D. MW	21 U	64	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	200	9	21	1
10726	2-Nitroaniline	88-74-4	N.D.	21 U	64	1
10726	3-Nitroaniline	99-09-2	N.D.	86	210	1
10726	4-Nitroaniline	100-01-6	N.D.	86	210	1
10726	Nitrobenzene	98-95-3	N.D.	34	86	1
10726	2-Nitrophenol	88-75-5	N.D.	34	73	1
10726	4-Nitrophenol	100-02-7	N.D.	210	640	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	30	64	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	21	47	1

*=This limit was used in the evaluation of the final result

MW 7-22-19

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Analysis Report

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	86 U	210	1
10726	Pentachlorophenol	87-86-5	N.D. MW	86 U	210	1
10726	Phenanthrene	85-01-8	14,000	43	210	10
10726	Phenol	108-95-2	N.D. MW	21 U	47	1
10726	Pyrene	129-00-0	23,000	43	210	10
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	21 U	47	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	86	210	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	39	86	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D. MW	34	73	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	0.3	7.2	27.82
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	23	110	5
10885	PCB-1221	11104-28-2	N.D. D1	29	110	5
10885	PCB-1232	11141-16-5	N.D. D1	51	110	5
10885	PCB-1242	53469-21-9	N.D. D1	21	110	5
10885	PCB-1248	12672-29-6	160 D2	21	110	5
10885	PCB-1254	11097-69-1	N.D. D1	21	110	5
10885	PCB-1260	11096-82-5	N.D. D1	31	110	5
10885	PCB-1262	37324-23-5	N.D. D1	21	110	5
10885	PCB-1268	11100-14-4	1,500 D2	21	110	5
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	170	5.2	13	1
08272	Heavy Range Organics C24-C40	n.a.	580	13	39	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	29,300	14.2	36.0	1
01650	Calcium	7440-70-2	3,640	29.1	60.0	1
01654	Iron	7439-89-6	18,800	6.00	24.0	1
01657	Magnesium	7439-95-4	6,660	2.00	12.0	1
01662	Potassium	7440-09-7	2,120	23.7	60.0	1
01667	Sodium	7440-23-5	257	55.4	120	1

*=This limit was used in the evaluation of the final result

MW 7-22-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of three sediment samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Target Analyte List (TAL) metals analyses (EPA Methods 6010, 6020, 7470) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050401 19050402 19050403

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained at < 6°C (only applies to mercury). The samples were collected on May 20, 2019, and were analyzed by May 31, 2019, therefore meeting QC criteria of less than 6 months between collection, extraction, and analysis (28 days for mercury).

2. Initial and Continuing Calibration: Acceptable.

A minimum of one calibration standard and a blank were analyzed at the beginning of the ICP analysis sequence and after every 10 samples. No results were greater than 110% of the highest calibration standard. All ICP recoveries were within the QC limits. All AA recoveries were within QC limits and the initial calibration correlation coefficient was > 0.995.

3. Blanks: Satisfactory.

A preparation blank was analyzed for each 20 samples or per matrix per concentration level. Blanks were analyzed after each Initial or Continuing Calibration Verification. There were no detections in any blanks except potassium (21.5 mg/kg) in the method blank and several results in the calibration blanks. All blank results were less than the absolute value of the quantitation limit; therefore, positive sample results greater than the quantitation limit were not qualified. Positive thallium results less than the quantitation limit were qualified as not detected (U).

4. ICP Interference Check Sample: Acceptable.

An Interference Check Sample (ICS) was analyzed at the beginning of each sequence or at least twice every 8 hours, whichever was more frequent. All applicable ICS (solution AB) results were within

QC limits of 80% - 120% recovery.

5. ICP Serial Dilution (SD): Satisfactory.

A serial dilution analysis was performed per matrix per concentration or per sample delivery group, whichever was more frequent. All serial dilution results were within QC limits except aluminum with the initial sample result greater than the SD result and barium, calcium, iron, lead, magnesium, manganese, potassium, vanadium, and zinc with initial sample results less than the SD result. Associated sample results were qualified as estimated quantities with a high bias (JH) for original sample results greater than the serial dilution results and estimated quantities with a low bias (JL) for original sample results less than the serial dilution results.

6. Matrix Spike Analysis: Satisfactory.

A matrix spike analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. Spike recoveries were within the QC limits except zinc with a high recovery (associated positive results were qualified as estimated quantities with a high bias [JH]) and antimony, chromium, mercury, and vanadium with low recoveries (associated positive results and sample quantitation limits were qualified as estimated quantities with a low bias [JL or UJL]).

7. Duplicate Analysis: Satisfactory.

A laboratory duplicate and spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate results were within QC limits except barium, antimony, arsenic, beryllium, chromium, cobalt, silver, selenium, sodium, and thallium; associated positive results and sample quantitation limits were qualified as estimated quantities with an unknown bias (JK or UJK).

8. Laboratory Control Sample Analysis: Acceptable.

A Laboratory Control Sample (LCS) was analyzed per SDG per matrix. All LCS results were within the established control limits.

9. Overall Assessment of Data for Use

A total of 69 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on holding time outliers, incorrect sample containers, sample temperature outliers, or serial dilution outliers. No sample results were rejected (R). A total of 20 sample results were qualified as estimated quantities based on spike accuracy outliers. A total of 40 sample results were qualified as estimated quantities based on duplicate precision outliers. A total of 40 sample results were qualified as estimated quantities based on serial dilution outliers. The following analyte was detected in blank(s) that affected sample results: thallium.

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Inorganic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	89	220	1
10726	Pentachlorophenol	87-86-5	N.D.	89	220	1
10726	Phenanthrene	85-01-8	1,400	4	22	1
10726	Phenol	108-95-2	N.D.	22	49	1
10726	Pyrene	129-00-0	1,900	4	22	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	22	49	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	89	220	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	40	89	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	36	76	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	4.0	86	317.23
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	4.8	23	1
10885	PCB-1221	11104-28-2	N.D. D1	6.2	23	1
10885	PCB-1232	11141-16-5	N.D. D1	11	23	1
10885	PCB-1242	53469-21-9	N.D. D1	4.4	23	1
10885	PCB-1248	12672-29-6	5.8 JD2	4.4	23	1
10885	PCB-1254	11097-69-1	N.D. D1	4.4	23	1
10885	PCB-1260	11096-82-5	N.D. D1	6.6	23	1
10885	PCB-1262	37324-23-5	N.D. D1	4.4	23	1
10885	PCB-1268	11100-14-4	N.D. D1	4.4	23	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	9.9 J	5.4	14	1
08272	Heavy Range Organics C24-C40	n.a.	31 J	14	41	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	11,000	13.2	33.6	1
01650	Calcium	7440-70-2	13,800	27.2	56.1	1
01654	Iron	7439-89-6	15,400	5.61	22.4	1
01657	Magnesium	7439-95-4	6,500	1.87	11.2	1
01662	Potassium	7440-09-7	2,010	22.2	56.1	1
01667	Sodium	7440-23-5	163	51.8	112	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals		**SW-846 6020A**	mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	0.259 J Q	0.142	0.449	2
06125	Arsenic	7440-38-2	13.0 JK	0.150	0.449	2
06126	Barium	7440-39-3	83.0 JK	0.433	0.897	2
06127	Beryllium	7440-41-7	0.491 JK	0.0256	0.112	2
06128	Cadmium	7440-43-9	0.232	0.0565	0.224	2
06131	Chromium	7440-47-3	10.9 JK	0.375	0.897	2
06132	Cobalt	7440-48-4	4.48 JK	0.0655	0.224	2
06133	Copper	7440-50-8	15.8	4.01	8.97	2
06135	Lead	7439-92-1	11.2 JL	0.0565	0.673	2
06137	Manganese	7439-96-5	368 JL	0.444	2.24	2
06139	Nickel	7440-02-0	13.8	0.381	0.897	2
06141	Selenium	7782-49-2	~~N.D.~~	0.146 UJK	0.449	2
06142	Silver	7440-22-4	0.0494 J Q	0.0455	0.112	2
06145	Thallium	7440-28-0	~~0.110 J~~	0.0440	0.112 UJK	2
06148	Vanadium	7440-62-2	16.8 JL	0.0962	0.224	2
06149	Zinc	7440-66-6	97.9 JK	1.36	3.36	2
		SW-846 7471B	mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	N.D.	0.0416 UJL	0.178	1
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	%	%	%	
00111	Moisture	n.a.	26.3	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A191512AA	05/31/2019 17:29	Linda C Pape	1.01
08389	GC/MS - LL Encore Prep	SW-846 5035A	1	201914353710	05/23/2019 15:15	Rebecca Williams	n.a.
08389	GC/MS - LL Encore Prep	SW-846 5035A	2	201914353710	05/23/2019 15:17	Rebecca Williams	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	1	201914353710	05/23/2019 15:06	Rebecca Williams	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	2	201914353710	05/23/2019 15:08	Rebecca Williams	n.a.
10726	SVOA 8270D/E (microwave)	SW-846 8270D	1	19143SLH026	05/25/2019 03:27	Anthony P Bauer	1
10813	BNA Soil Microwave APP IX	SW-846 3546	1	19143SLH026	05/24/2019 07:00	Joshua S Ruth	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	19147A34A	05/27/2019 19:43	Marie D Beamenderfer	317.23

*=This limit was used in the evaluation of the final result

MW 7-27-19

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
10726	4-Nitrophenol	100-02-7	N.D.	850	2,600	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	260	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	85	190	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	340	850	1
10726	Pentachlorophenol	87-86-5	N.D.	340	850	1
10726	Phenanthrene	85-01-8	3,700	17	85	1
10726	Phenol	108-95-2	N.D.	85	190	1
10726	Pyrene	129-00-0	6,400	17	85	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	85	190	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	340	850	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	340	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	140	290	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	34	730	707.51
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	190	880	10
10885	PCB-1221	11104-28-2	N.D. D1	240	880	10
10885	PCB-1232	11141-16-5	N.D. D1	410	880	10
10885	PCB-1242	53469-21-9	N.D. D1	170	880	10
10885	PCB-1248	12672-29-6	N.D. D1	170	880	10
10885	PCB-1254	11097-69-1	N.D. D1	170	880	10
10885	PCB-1260	11096-82-5	N.D. D1	250	880	10
10885	PCB-1262	37324-23-5	N.D. D1	170	880	10
10885	PCB-1268	11100-14-4	12,000 D2	170	880	10
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	3,300	41	100	2
08272	Heavy Range Organics C24-C40	n.a.	3,000	100	310	2
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	42,200 JH	51.1	130	1
01650	Calcium	7440-70-2	10,300 JL	105	217	1
01654	Iron	7439-89-6	15,500 JL	21.7	86.6	1

*=This limit was used in the evaluation of the final result

MW 7-27-19

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01657	Magnesium	7439-95-4	3,810 JL	7.23	43.3	1
01662	Potassium	7440-09-7	1,930 JL	85.8	217	1
01667	Sodium	7440-23-5	1,030 JK	200	433	1
	SW-846 6020A		mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	4.60 JK	0.548	1.73	2
06125	Arsenic	7440-38-2	51.6	0.580	1.73	2
06126	Barium	7440-39-3	138	1.67	3.47	2
06127	Beryllium	7440-41-7	1.85	0.0988	0.433	2
06128	Cadmium	7440-43-9	9.32	0.218	0.866	2
06131	Chromium	7440-47-3	45.6 JK	1.45	3.47	2
06132	Cobalt	7440-48-4	12.4 JK	0.253	0.866	2
06133	Copper	7440-50-8	659	15.5	34.7	2
06135	Lead	7439-92-1	264 JL	0.218	2.60	2
06137	Manganese	7439-96-5	580 JL	1.72	8.66	2
06139	Nickel	7440-02-0	336	1.47	3.47	2
06141	Selenium	7782-49-2	4.13 JK	0.565	1.73	2
06142	Silver	7440-22-4	0.664 JK	0.176	0.433	2
06145	Thallium	7440-28-0	~~N.D.~~ TW	0.849 WJK	2.17	10
06148	Vanadium	7440-62-2	102 JL	0.372	0.866	2
06149	Zinc	7440-66-6	1,190 JK	5.26	13.0	2
	SW-846 7471B		mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	0.433 J Q	0.148	0.634	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	80.6	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A191512AA	05/31/2019 17:51	Linda C Pape	1.79
08389	GC/MS - LL Encore Prep	SW-846 5035A	1	201914353710	05/23/2019 15:27	Rebecca Williams	n.a.

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	86	210	1
10726	Pentachlorophenol	87-86-5	N.D.	86	210	1
10726	Phenanthrene	85-01-8	14,000	43	210	10
10726	Phenol	108-95-2	N.D.	21	47	1
10726	Pyrene	129-00-0	23,000	43	210	10
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	21	47	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	86	210	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	39	86	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	34	73	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	0.3	7.2	27.82
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	23	110	5
10885	PCB-1221	11104-28-2	N.D. D1	29	110	5
10885	PCB-1232	11141-16-5	N.D. D1	51	110	5
10885	PCB-1242	53469-21-9	N.D. D1	21	110	5
10885	PCB-1248	12672-29-6	160 D2	21	110	5
10885	PCB-1254	11097-69-1	N.D. D1	21	110	5
10885	PCB-1260	11096-82-5	N.D. D1	31	110	5
10885	PCB-1262	37324-23-5	N.D. D1	21	110	5
10885	PCB-1268	11100-14-4	1,500 D2	21	110	5
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	170	5.2	13	1
08272	Heavy Range Organics C24-C40	n.a.	580	13	39	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	29,300	14.2	36.0	1
01650	Calcium	7440-70-2	3,640	29.1	60.0	1
01654	Iron	7439-89-6	18,800	6.00	24.0	1
01657	Magnesium	7439-95-4	6,660	2.00	12.0	1
01662	Potassium	7440-09-7	2,120	23.7	60.0	1
01667	Sodium	7440-23-5	257	55.4	120	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals		**SW-846 6020A**	mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	0.352 J Q	0.152	0.480	2
06125	Arsenic	7440-38-2	12.4 JK	0.160	0.480	2
06126	Barium	7440-39-3	121 W	0.463	0.960	2
06127	Beryllium	7440-41-7	0.734	0.0273	0.120	2
06128	Cadmium	7440-43-9	0.708	0.0604	0.240	2
06131	Chromium	7440-47-3	14.6 JK	0.401	0.960	2
06132	Cobalt	7440-48-4	5.75 JK	0.0700	0.240	2
06133	Copper	7440-50-8	106	4.29	9.60	2
06135	Lead	7439-92-1	23.0 JL	0.0604	0.720	2
06137	Manganese	7439-96-5	290 JL	0.475	2.40	2
06139	Nickel	7440-02-0	40.3	0.408	0.960	2
06141	Selenium	7782-49-2	0.174 J Q	0.156	0.480	2
06142	Silver	7440-22-4	0.0899 J Q	0.0487	0.120	2
06145	Thallium	7440-28-0	0.145 JK	0.0470	0.120	2
06148	Vanadium	7440-62-2	28.2 JL	0.103	0.240	2
06149	Zinc	7440-66-6	178 JK	1.46	3.60	2
		SW-846 7471B	mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	0.0702 J Q	0.0404	0.173	1
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	%	%	%	
00111	Moisture	n.a.	22.8	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A191512AA	05/31/2019 16:21	Linda C Pape	1.01
08389	GC/MS - LL Encore Prep	SW-846 5035A	1	201914353710	05/23/2019 15:37	Rebecca Williams	n.a.
08389	GC/MS - LL Encore Prep	SW-846 5035A	2	201914353710	05/23/2019 15:39	Rebecca Williams	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	1	201914353710	05/23/2019 15:36	Rebecca Williams	n.a.
10726	SVOA 8270D/E (microwave)	SW-846 8270D	1	19144SLC026	05/29/2019 01:43	Brandon K Cordova	1
10726	SVOA 8270D/E (microwave)	SW-846 8270D	1	19144SLC026	05/30/2019 12:18	Edward C Monborne	10
10813	BNA Soil Microwave APP IX	SW-846 3546	1	19144SLC026	05/28/2019 07:00	Joshua S Ruth	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	19147A34A	05/27/2019 20:53	Marie D Beamenderfer	27.82

*=This limit was used in the evaluation of the final result

7-27-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of three sediment samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050401 19050402 19050403

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The samples were maintained at 4°C ± 2°C. The samples were collected on May 20, 2019, extracted on June 1, 2019, and analyzed by June 6, 2019, therefore meeting QC criteria of less than 14 days between collection and extraction for soil samples and less than 40 days between extraction and analysis.

2. **Initial Calibration: Acceptable.**

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. **Continuing Calibration: Acceptable.**

Calculations were verified as correct. All percent differences (%Ds) were within the laboratory control limits.

4. **Blanks: Acceptable.**

A method blank was analyzed for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in the method blank.

5. **System Monitoring Compounds (SMC): Satisfactory.**

All recoveries of the SMCs were greater than 10% and within QC limits except several high recoveries; associated positive results in sample 19050403 were qualified as estimated quantities with a high bias (JH).

6. Matrix Spike (MS) and MS Duplicate (MSD): Satisfactory.

MS and MSD results were within QC limits except the low DRO recovery; the associated positive result was qualified as an estimated quantity with a low bias (JL).

7. Blank Spike (BS) and BS Duplicate (BSD): Acceptable.

BS and BSD recoveries were within QC limits.

8. Duplicates: Acceptable.

All spike duplicate results were within QC limits.

9. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

10. Laboratory Contact: Not Required.

No laboratory contact was required.

11. Overall Assessment of Data for Use

A total of six results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. A total of two sample results were qualified as estimated quantities based on spike accuracy outliers No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Analysis Report

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	89	220	1
10726	Pentachlorophenol	87-86-5	N.D.	89	220	1
10726	Phenanthrene	85-01-8	1,400	4	22	1
10726	Phenol	108-95-2	N.D.	22	49	1
10726	Pyrene	129-00-0	1,900	4	22	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	22	49	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	89	220	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	40	89	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	36	76	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	4.0	86	317.23
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	4.8	23	1
10885	PCB-1221	11104-28-2	N.D. D1	6.2	23	1
10885	PCB-1232	11141-16-5	N.D. D1	11	23	1
10885	PCB-1242	53469-21-9	N.D. D1	4.4	23	1
10885	PCB-1248	12672-29-6	5.8 JD2	4.4	23	1
10885	PCB-1254	11097-69-1	N.D. D1	4.4	23	1
10885	PCB-1260	11096-82-5	N.D. D1	6.6	23	1
10885	PCB-1262	37324-23-5	N.D. D1	4.4	23	1
10885	PCB-1268	11100-14-4	N.D. D1	4.4	23	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	9.9 J	5.4	14	1
08272	Heavy Range Organics C24-C40	n.a.	31 J	14	41	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	11,000	13.2	33.6	1
01650	Calcium	7440-70-2	13,800	27.2	56.1	1
01654	Iron	7439-89-6	15,400	5.61	22.4	1
01657	Magnesium	7439-95-4	6,500	1.87	11.2	1
01662	Potassium	7440-09-7	2,010	22.2	56.1	1
01667	Sodium	7440-23-5	163	51.8	112	1

*=This limit was used in the evaluation of the final result

7-22-19

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
10726	4-Nitrophenol	100-02-7	N.D.	850	2,600	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	260	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	85	190	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	340	850	1
10726	Pentachlorophenol	87-86-5	N.D.	340	850	1
10726	Phenanthrene	85-01-8	3,700	17	85	1
10726	Phenol	108-95-2	N.D.	85	190	1
10726	Pyrene	129-00-0	6,400	17	85	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	85	190	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	340	850	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	340	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	140	290	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	34	730	707.51
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	190	880	10
10885	PCB-1221	11104-28-2	N.D. D1	240	880	10
10885	PCB-1232	11141-16-5	N.D. D1	410	880	10
10885	PCB-1242	53469-21-9	N.D. D1	170	880	10
10885	PCB-1248	12672-29-6	N.D. D1	170	880	10
10885	PCB-1254	11097-69-1	N.D. D1	170	880	10
10885	PCB-1260	11096-82-5	N.D. D1	250	880	10
10885	PCB-1262	37324-23-5	N.D. D1	170	880	10
10885	PCB-1268	11100-14-4	12,000 D2	170	880	10
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	3,300	41	100	2
08272	Heavy Range Organics C24-C40	n.a.	3,000	100	310	2
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	42,200	51.1	130	1
01650	Calcium	7440-70-2	10,300	105	217	1
01654	Iron	7439-89-6	15,500	21.7	86.6	1

*=This limit was used in the evaluation of the final result

MW72719

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	86	210	1
10726	Pentachlorophenol	87-86-5	N.D.	86	210	1
10726	Phenanthrene	85-01-8	14,000	43	210	10
10726	Phenol	108-95-2	N.D.	21	47	1
10726	Pyrene	129-00-0	23,000	43	210	10
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	21	47	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	86	210	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	39	86	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	34	73	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	0.3	7.2	27.82
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	23	110	5
10885	PCB-1221	11104-28-2	N.D. D1	29	110	5
10885	PCB-1232	11141-16-5	N.D. D1	51	110	5
10885	PCB-1242	53469-21-9	N.D. D1	21	110	5
10885	PCB-1248	12672-29-6	160 D2	21	110	5
10885	PCB-1254	11097-69-1	N.D. D1	21	110	5
10885	PCB-1260	11096-82-5	N.D. D1	31	110	5
10885	PCB-1262	37324-23-5	N.D. D1	21	110	5
10885	PCB-1268	11100-14-4	1,500 D2	21	110	5
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	170	5.2	13	1
08272	Heavy Range Organics C24-C40	n.a.	580	13	39	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	29,300	14.2	36.0	1
01650	Calcium	7440-70-2	3,640	29.1	60.0	1
01654	Iron	7439-89-6	18,800	6.00	24.0	1
01657	Magnesium	7439-95-4	6,660	2.00	12.0	1
01662	Potassium	7440-09-7	2,120	23.7	60.0	1
01667	Sodium	7440-23-5	257	55.4	120	1

*=This limit was used in the evaluation of the final result

7-27-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of four sediment samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Gx) analyses was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050401 19050402 19050403 19050501

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The samples were maintained and received within the QC limits of 4°C ± 2°C. The samples were collected on May 20, 2019, and were analyzed by May 27, 2019, therefore meeting QC criteria of less than 14 days between collection and analysis for soil samples.

2. **Initial Calibration: Acceptable.**

Calculations were verified as correct. All relative percent differences (RPDs) were less than or equal to the laboratory control limits.

3. **Continuing Calibration: Acceptable.**

Calculations were verified as correct. All percent differences were less than or equal to the laboratory control limits.

4. **Blanks: Acceptable.**

A method blank was analyzed at the required frequency of every 12 hours for each matrix, preparation technique, and analysis system. Gasoline-range TPHs were not detected in the method blank.

5. **System Monitoring Compounds (SMC): Acceptable.**

All recoveries of the SMCs were greater than 10% and within QC limits.

6. **Matrix Spike (MS) and MS Duplicate (MSD) Analyses: Acceptable.**

MS and MSD results were within laboratory QC limits.

7. **Blank Spikes (BS) Analyses: Acceptable.**

BS results were within laboratory QC limits.

8. **Duplicates: Acceptable.**

All spike duplicate results were within laboratory QC limits.

8. **Quantitation and Quantitation Limits: Acceptable.**

Sample quantitation and sample quantitation limits were correctly calculated.

9. **Laboratory Contact: Not Required.**

No laboratory contact was required.

10. **Overall Assessment of Data for Use**

A total of four results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	89	220	1
10726	Pentachlorophenol	87-86-5	N.D.	89	220	1
10726	Phenanthrene	85-01-8	1,400	4	22	1
10726	Phenol	108-95-2	N.D.	22	49	1
10726	Pyrene	129-00-0	1,900	4	22	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	22	49	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	89	220	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	40	89	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	36	76	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	4.0	86	317.23
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	4.8	23	1
10885	PCB-1221	11104-28-2	N.D. D1	6.2	23	1
10885	PCB-1232	11141-16-5	N.D. D1	11	23	1
10885	PCB-1242	53469-21-9	N.D. D1	4.4	23	1
10885	PCB-1248	12672-29-6	5.8 JD2	4.4	23	1
10885	PCB-1254	11097-69-1	N.D. D1	4.4	23	1
10885	PCB-1260	11096-82-5	N.D. D1	6.6	23	1
10885	PCB-1262	37324-23-5	N.D. D1	4.4	23	1
10885	PCB-1268	11100-14-4	N.D. D1	4.4	23	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	9.9 J	5.4	14	1
08272	Heavy Range Organics C24-C40	n.a.	31 J	14	41	1
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	11,000	13.2	33.6	1
01650	Calcium	7440-70-2	13,800	27.2	56.1	1
01654	Iron	7439-89-6	15,400	5.61	22.4	1
01657	Magnesium	7439-95-4	6,500	1.87	11.2	1
01662	Potassium	7440-09-7	2,010	22.2	56.1	1
01667	Sodium	7440-23-5	163	51.8	112	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	4-Nitrophenol	100-02-7	N.D.	850	2,600	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	260	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	85	190	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	340	850	1
10726	Pentachlorophenol	87-86-5	N.D.	340	850	1
10726	Phenanthrene	85-01-8	3,700	17	85	1
10726	Phenol	108-95-2	N.D.	85	190	1
10726	Pyrene	129-00-0	6,400	17	85	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	85	190	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	340	850	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	340	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	140	290	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	34	730	707.51
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	190	880	10
10885	PCB-1221	11104-28-2	N.D. D1	240	880	10
10885	PCB-1232	11141-16-5	N.D. D1	410	880	10
10885	PCB-1242	53469-21-9	N.D. D1	170	880	10
10885	PCB-1248	12672-29-6	N.D. D1	170	880	10
10885	PCB-1254	11097-69-1	N.D. D1	170	880	10
10885	PCB-1260	11096-82-5	N.D. D1	250	880	10
10885	PCB-1262	37324-23-5	N.D. D1	170	880	10
10885	PCB-1268	11100-14-4	12,000 D2	170	880	10
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	3,300	41	100	2
08272	Heavy Range Organics C24-C40	n.a.	3,000	100	310	2
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	42,200	51.1	130	1
01650	Calcium	7440-70-2	10,300	105	217	1
01654	Iron	7439-89-6	15,500	21.7	86.6	1

*=This limit was used in the evaluation of the final result

7-27-19

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Lancaster Laboratories Environmental
2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Analysis Report

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	86	210	1
10726	Pentachlorophenol	87-86-5	N.D.	86	210	1
10726	Phenanthrene	85-01-8	14,000	43	210	10
10726	Phenol	108-95-2	N.D.	21	47	1
10726	Pyrene	129-00-0	23,000	43	210	10
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	21	47	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	86	210	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	39	86	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	34	73	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	0.3	7.2	27.82
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	23	110	5
10885	PCB-1221	11104-28-2	N.D. D1	29	110	5
10885	PCB-1232	11141-16-5	N.D. D1	51	110	5
10885	PCB-1242	53469-21-9	N.D. D1	21	110	5
10885	PCB-1248	12672-29-6	160 D2	21	110	5
10885	PCB-1254	11097-69-1	N.D. D1	21	110	5
10885	PCB-1260	11096-82-5	N.D. D1	31	110	5
10885	PCB-1262	37324-23-5	N.D. D1	21	110	5
10885	PCB-1268	11100-14-4	1,500 D2	21	110	5
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	170	5.2	13	1
08272	Heavy Range Organics C24-C40	n.a.	580	13	39	1
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	29,300	14.2	36.0	1
01650	Calcium	7440-70-2	3,640	29.1	60.0	1
01654	Iron	7439-89-6	18,800	6.00	24.0	1
01657	Magnesium	7439-95-4	6,660	2.00	12.0	1
01662	Potassium	7440-09-7	2,120	23.7	60.0	1
01667	Sodium	7440-23-5	257	55.4	120	1

*=This limit was used in the evaluation of the final result

7-27-19

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Analysis Report

Sample Description: 19050501 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064126
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:53
SDG#: EUR63-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Toluene	108-88-3	4 J	3	23	1.53
11995	1,2,3-Trichlorobenzene	87-61-6	N.D.	23	46	1.53
11995	1,2,4-Trichlorobenzene	120-82-1	N.D.	23	46	1.53
11995	1,1,1-Trichloroethane	71-55-6	N.D.	3	23	1.53
11995	1,1,2-Trichloroethane	79-00-5	N.D.	2	23	1.53
11995	Trichloroethene	79-01-6	N.D.	2	23	1.53
11995	Trichlorofluoromethane	75-69-4	N.D.	3	23	1.53
11995	Vinyl Chloride	75-01-4	N.D.	3	23	1.53
11995	m+p-Xylene	179601-23-1	N.D.	5	23	1.53
11995	o-Xylene	95-47-6	N.D.	2	23	1.53

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated:
Acetone and 2-Butanone.

The recovery for the sample internal standard is outside the QC acceptance limits. The following action was taken: The sample was re-analyzed and the QC is again outside of the acceptance limits, indicating a matrix effect. The data is reported from the initial trial.

GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	14 U	310	511.48

Reporting limits were raised due to sample foaming.

Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	66.9	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A191512AA	05/31/2019 18:14	Linda C Pape	1.53
08389	GC/MS - LL Encore Prep	SW-846 5035A	1	201914353710	05/23/2019 16:10	Rebecca Williams	n.a.
08389	GC/MS - LL Encore Prep	SW-846 5035A	2	201914353710	05/23/2019 16:11	Rebecca Williams	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	1	201914353710	05/23/2019 16:06	Rebecca Williams	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	2	201914353710	05/23/2019 16:08	Rebecca Williams	n.a.

*=This limit was used in the evaluation of the final result

7-22-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of three sediment samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analyses for Polychlorinated Biphenyls (PCBs - EPA Method 8082) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050401 19050402 19050403

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The samples were maintained at 0°C to 6°C. The samples were collected on May 20, 2019, extracted on May 24, 2019, and were analyzed by May 29, 2019. There are no holding time limits for Method 8082 PCB analyses.

2. **Instrument Performance: Acceptable.**

The surrogate retention time percent difference between the initial calibration standards and the remaining standards and samples was within QC limits.

3. **Initial and Continuing Calibration: Acceptable.**

All initial calibration relative standard deviations (RSDs) were within QC limits. All continuing calibration % differences (% D) were within QC limits.

4. **Blanks: Acceptable.**

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each analytical system. No target analytes were detected in the laboratory blank.

5. **System Monitoring Compounds (SMCs): Satisfactory.**

All recoveries of the SMCs were within the established control limits except when diluted out; no actions were taken based on these outliers.

6. Matrix Spike (MS) and MS Duplicate (MSD) Analyses: Satisfactory.

MS and MSD recoveries were within QC limits except PCB-1260 with a high recovery; no actions were taken as PCB-1260 was not detected in any samples.

7. Blank Spike (BS) Analyses: Acceptable.

BS recoveries were within QC limits.

8. Duplicates: Acceptable.

Relative Percent Differences (RPDs) of all spiked analytes were within QC limits.

9. Compound Identification: Acceptable.

All results were dual-column confirmed with differences between the columns < 40%.

10. Target Compound Quantitation and Quantitation Limits: Acceptable.

Sample results and quantitation limits were correctly calculated.

11. Laboratory Contact

No laboratory contact was required.

12. Overall Assessment

A total of 27 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050401 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064120
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:29
SDG#: EUR63-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	89	220	1
10726	Pentachlorophenol	87-86-5	N.D.	89	220	1
10726	Phenanthrene	85-01-8	1,400	4	22	1
10726	Phenol	108-95-2	N.D.	22	49	1
10726	Pyrene	129-00-0	1,900	4	22	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	22	49	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	89	220	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	40	89	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	36	76	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	4.0	86	17.23
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	4.8	23	1
10885	PCB-1221	11104-28-2	N.D. D1	6.2	23	1
10885	PCB-1232	11141-16-5	N.D. D1	11	23	1
10885	PCB-1242	53469-21-9	N.D. D1	4.4	23	1
10885	PCB-1248	12672-29-6	5.8 JD1	4.4	23	1
10885	PCB-1254	11097-69-1	N.D. D1	4.4	23	1
10885	PCB-1260	11096-82-5	N.D. D1	6.6	23	1
10885	PCB-1262	37324-23-5	N.D. D1	4.4	23	1
10885	PCB-1268	11100-14-4	N.D. D1	4.4	23	1
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	9.9 J	5.4	14	1
08272	Heavy Range Organics C24-C40	n.a.	31 J	14	41	1
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	11,000	13.2	33.6	1
01650	Calcium	7440-70-2	13,800	27.2	56.1	1
01654	Iron	7439-89-6	15,400	5.61	22.4	1
01657	Magnesium	7439-95-4	6,500	1.87	11.2	1
01662	Potassium	7440-09-7	2,010	22.2	56.1	1
01667	Sodium	7440-23-5	163	51.8	112	1

*=This limit was used in the evaluation of the final result

7-22-19

Sample Description: 19050402 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064121
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:59
SDG#: EUR63-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	4-Nitrophenol	100-02-7	N.D.	850	2,600	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	260	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	85	190	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	340	850	1
10726	Pentachlorophenol	87-86-5	N.D.	340	850	1
10726	Phenanthrene	85-01-8	3,700	17	85	1
10726	Phenol	108-95-2	N.D.	85	190	1
10726	Pyrene	129-00-0	6,400	17	85	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	85	190	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	340	850	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	340	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	140	290	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		mg/kg	mg/kg	mg/kg	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	34	730	707.51
	Reporting limits were raised due to sample foaming.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	190	880	10
10885	PCB-1221	11104-28-2	N.D. D1	240	880	10
10885	PCB-1232	11141-16-5	N.D. D1	410	880	10
10885	PCB-1242	53469-21-9	N.D. D1	170	880	10
10885	PCB-1248	12672-29-6	N.D. D1	170	880	10
10885	PCB-1254	11097-69-1	N.D. D1	170	880	10
10885	PCB-1260	11096-82-5	N.D. D1	250	880	10
10885	PCB-1262	37324-23-5	N.D. D1	170	880	10
10885	PCB-1268	11100-14-4	12,000 D2	170	880	10
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		mg/kg	mg/kg	mg/kg	
08272	Diesel Range Organics C12-C24	n.a.	3,300	41	100	2
08272	Heavy Range Organics C24-C40	n.a.	3,000	100	310	2
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	42,200	51.1	130	1
01650	Calcium	7440-70-2	10,300	105	217	1
01654	Iron	7439-89-6	15,500	21.7	86.6	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050403 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064122
ELLE Group #: 2045316
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:05
SDG#: EUR63-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	86	210	1
10726	Pentachlorophenol	87-86-5	N.D.	86	210	1
10726	Phenanthrene	85-01-8	14,000	43	210	10
10726	Phenol	108-95-2	N.D.	21	47	1
10726	Pyrene	129-00-0	23,000	43	210	10
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	21	47	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	86	210	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	39	86	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	34	73	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	0.3	7.2	27.82
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	23	110	5
10885	PCB-1221	11104-28-2	N.D. D1	29	110	5
10885	PCB-1232	11141-16-5	N.D. D1	51	110	5
10885	PCB-1242	53469-21-9	N.D. D1	21	110	5
10885	PCB-1248	12672-29-6	160 D2	21	110	5
10885	PCB-1254	11097-69-1	N.D. D1	21	110	5
10885	PCB-1260	11096-82-5	N.D. D1	31	110	5
10885	PCB-1262	37324-23-5	N.D. D1	21	110	5
10885	PCB-1268	11100-14-4	1,500 D2	21	110	5
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	170	5.2	13	1
08272	Heavy Range Organics C24-C40	n.a.	580	13	39	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	29,300	14.2	36.0	1
01650	Calcium	7440-70-2	3,640	29.1	60.0	1
01654	Iron	7439-89-6	18,800	6.00	24.0	1
01657	Magnesium	7439-95-4	6,660	2.00	12.0	1
01662	Potassium	7440-09-7	2,120	23.7	60.0	1
01667	Sodium	7440-23-5	257	55.4	120	1

*=This limit was used in the evaluation of the final result

7-27-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 29, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one sediment and five water samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Target Analyte List (TAL) metals analyses (EPA Methods 6010, 6020, 7471) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered:

19050501	19050601	19050602	19050603	19050604	19050605

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained at < 6°C (only applies to mercury). The samples were collected on May 20, 2019, and were analyzed by May 31, 2019, therefore meeting QC criteria of less than 6 months between collection, extraction, and analysis (28 days for mercury).

2. Initial and Continuing Calibration: Acceptable.

A minimum of one calibration standard and a blank were analyzed at the beginning of the ICP analysis sequence and after every 10 samples. No results were greater than 110% of the highest calibration standard. All ICP recoveries were within the QC limits. All AA recoveries were within QC limits and the initial calibration correlation coefficient was > 0.995.

3. Blanks: Satisfactory.

A preparation blank was analyzed for each 20 samples or per matrix per concentration level. Blanks were analyzed after each Initial or Continuing Calibration Verification. There were no detections in any blanks except potassium (21.5 mg/kg) in the soil method blank and several results in the calibration blanks. All blank results were less than the absolute value of the quantitation limit; therefore, positive sample results greater than the quantitation limit were not qualified. Positive sample results less than the quantitation limit associated with positive blank results less than the quantitation limit were qualified as not detected (U).

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4. ICP Interference Check Sample: Acceptable.

An Interference Check Sample (ICS) was analyzed at the beginning of each sequence or at least twice every 8 hours, whichever was more frequent. All applicable ICS (solution AB) results were within QC limits of 80% - 120% recovery.

5. ICP Serial Dilution: Satisfactory.

A serial dilution analysis was performed per matrix per concentration or per sample delivery group, whichever was more frequent. All serial dilution results were within QC limits except sodium associated with the water samples and aluminum, barium, calcium, iron, lead, magnesium, manganese, potassium, vanadium, and zinc associated with the soil sample. Associated sample results were qualified as estimated quantities with a low bias (JL) for original sample results less than the serial dilution results.

6. Laboratory Control Sample Analysis: Acceptable.

A Laboratory Control Sample (LCS) was analyzed per SDG per matrix. All LCS results were within the established control limits.

7. Overall Assessment of Data for Use

A total of 138 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, sample temperature outliers, or serial dilution outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Inorganic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample

quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050501 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064128
ELLE Group #: 2045318
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:53
SDG#: EUR64-01

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**		**ug/kg**	**ug/kg**	
10885	PCB-1242	53469-21-9	N.D.	D1	810	4,200	10
10885	PCB-1248	12672-29-6	2,400	JD1	810	4,200	10
10885	PCB-1254	11097-69-1	1,600	JD1	810	4,200	10
10885	PCB-1260	11096-82-5	N.D.	D1	1,200	4,200	10
10885	PCB-1262	37324-23-5	N.D.	D1	810	4,200	10
10885	PCB-1268	11100-14-4	11,000	D2	810	4,200	10
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**		**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	230		9.7	24	1
08272	Heavy Range Organics C24-C40	n.a.	1,200		24	73	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**		**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	131,000		99.5	253	5
01650	Calcium	7440-70-2	11,600		41.0	84.3	1
01654	Iron	7439-89-6	13,500		8.43	33.7	1
01657	Magnesium	7439-95-4	3,200		2.82	16.9	1
01662	Potassium	7440-09-7	1,210		33.4	84.3	1
01667	Sodium	7440-23-5	787		77.9	169	1
	SW-846 6020A		**mg/kg**		**mg/kg**	**mg/kg**	
06124	Antimony	7440-36-0	2.92		0.213	0.674	2
06125	Arsenic	7440-38-2	46.1		0.226	0.674	2
06126	Barium	7440-39-3	143		0.651	1.35	2
06127	Beryllium	7440-41-7	4.17		0.0384	0.169	2
06128	Cadmium	7440-43-9	3.29		0.0850	0.337	2
06131	Chromium	7440-47-3	26.3		0.563	1.35	2
06132	Cobalt	7440-48-4	5.93		0.0985	0.337	2
06133	Copper	7440-50-8	771		6.04	13.5	2
06135	Lead	7439-92-1	86.7		0.0850	1.01	2
06137	Manganese	7439-96-5	136		0.668	3.37	2
06139	Nickel	7440-02-0	464		0.573	1.35	2
06141	Selenium	7782-49-2	1.01		0.220	0.674	2
06142	Silver	7440-22-4	1.15		0.0685	0.169	2
06145	Thallium	7440-28-0	N.D.		0.330	0.843	10
06148	Vanadium	7440-62-2	119		0.145	0.337	2
06149	Zinc	7440-66-6	966		2.05	5.06	2
	SW-846 7471B		**mg/kg**		**mg/kg**	**mg/kg**	

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: 19050501 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064128
ELLE Group #: 2045318
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:53
SDG#: EUR64-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals		**SW-846 7471B**	mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	0.384	0.0714	0.306	1
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	%	%	%	
00111	Moisture	n.a.	59.1	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10726	SVOA 8270D/E (microwave)	SW-846 8270D	1	19144SLC026	05/29/2019 02:58	Brandon K Cordova	1
10726	SVOA 8270D/E (microwave)	SW-846 8270D	1	19144SLC026	05/29/2019 11:53	Edward C Monborne	5
10813	BNA Soil Microwave APP IX	SW-846 3546	1	19144SLC026	05/28/2019 07:00	Joshua S Ruth	1
10885	PCBs 8082A/3546	SW-846 8082A Feb 2007 Rev 1	1	191580020A	06/17/2019 19:28	Covenant Mutuku	10
10497	PCB Microwave Soil Extraction	SW-846 3546	2	191580020A	06/07/2019 19:10	Elizabeth E Donovan	1
08272	NWTPH-Dx soil	ECY 97-602 NWTPH-Dx modified	1	191510023A	06/06/2019 14:24	Nicholas R Rossi	1
11234	WA DRO NW DX Soils (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	191510023A	06/01/2019 02:00	Sherry L Morrow	1
01643	Aluminum	SW-846 6010D Rev.4, July 2014	1	191431404905	05/28/2019 03:47	Lisa J Cooke	5
01650	Calcium	SW-846 6010D Rev.4, July 2014	1	191431404905	05/27/2019 21:34	Elaine F Stoltzfus	1
01654	Iron	SW-846 6010D Rev.4, July 2014	1	191431404905	05/27/2019 21:34	Elaine F Stoltzfus	1
01657	Magnesium	SW-846 6010D Rev.4, July 2014	1	191431404905	05/27/2019 21:34	Elaine F Stoltzfus	1
01662	Potassium	SW-846 6010D Rev.4, July 2014	1	191431404905	05/27/2019 21:34	Elaine F Stoltzfus	1
01667	Sodium	SW-846 6010D Rev.4, July 2014	1	191431404905	05/27/2019 21:34	Elaine F Stoltzfus	1
06124	Antimony	SW-846 6020A	1	191431404905A	05/31/2019 05:48	Choon Y Tian	2
06125	Arsenic	SW-846 6020A	1	191431404905A	05/28/2019 09:20	Choon Y Tian	2
06126	Barium	SW-846 6020A	1	191431404905A	05/28/2019 09:20	Choon Y Tian	2
06127	Beryllium	SW-846 6020A	1	191431404905A	05/28/2019 09:20	Choon Y Tian	2
06128	Cadmium	SW-846 6020A	1	191431404905A	05/28/2019 09:20	Choon Y Tian	2
06131	Chromium	SW-846 6020A	1	191431404905A	05/28/2019 09:20	Choon Y Tian	2
06132	Cobalt	SW-846 6020A	1	191431404905A	05/28/2019 09:20	Choon Y Tian	2
06133	Copper	SW-846 6020A	1	191431404905A	05/28/2019 09:20	Choon Y Tian	2

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: 19050601 Grab Surface Water

Project Name: Ecology & Environment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:02
SDG#: EUR64-02

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064129
ELLE Group #: 2045318
Matrix: Surface Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals		**SW-846 6020A**	mg/l	mg/l	mg/l	
06023	Aluminum	7429-90-5	~~N.D.~~	0.0197 U	0.400	1
06024	Antimony	7440-36-0	~~N.D. K3~~	0.00041 U	0.0020	1
06025	Arsenic	7440-38-2	~~0.00094 J~~	~~0.00068~~ U	0.0020 U	1
06026	Barium	7440-39-3	0.0799	0.00075	0.0040	1
06027	Beryllium	7440-41-7	N.D.	0.000091 U	0.00050	1
06028	Cadmium	7440-43-9	N.D.	0.00015 U	0.0010	1
06029	Calcium	7440-70-2	78.1	0.0598	0.700	1
06031	Chromium	7440-47-3	N.D.	0.00070 U	0.0040	1
06032	Cobalt	7440-48-4	N.D.	0.00016	0.0010	1
06033	Copper	7440-50-8	N.D. K4	0.0099	0.0400	1
06034	Iron	7439-89-6	N.D.	0.0228	0.100	1
06035	Lead	7439-92-1	N.D.	0.0011	0.0030	1
06036	Magnesium	7439-95-4	32.1	0.0104	0.100	1
06037	Manganese	7439-96-5	~~N.D.~~	0.0049 U	0.0100	1
06039	Nickel	7440-02-0	~~0.0012 J~~	~~0.00060~~ U	0.0040 U	1
06040	Potassium	7440-09-7	4.49	0.107	0.400	1
06041	Selenium	7782-49-2	N.D.	0.00065 U	0.0020	1
06042	Silver	7440-22-4	N.D.	0.00017 U	0.00050	1
06043	Sodium	7440-23-5	28.9	0.0500	0.900	1
06045	Thallium	7440-28-0	~~N.D.~~	0.00011 U	0.00050	1
06048	Vanadium	7440-62-2	~~0.00054 J~~	~~0.00024~~ U	0.0010 U	1
06049	Zinc	7440-66-6	~~N.D. K4~~	0.0062 U	0.0150	1
		SW-846 7470A	mg/l	mg/l	mg/l	
00259	Mercury	7439-97-6	N.D.	0.000050 U	0.00020	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
06023	Aluminum	SW-846 6020A	1	191431404708A	05/29/2019 00:12	Patrick J Engle	1
06024	Antimony	SW-846 6020A	1	191431404708A	05/29/2019 00:12	Patrick J Engle	1
06025	Arsenic	SW-846 6020A	1	191431404708A	05/29/2019 00:12	Patrick J Engle	1
06026	Barium	SW-846 6020A	1	191431404708A	05/29/2019 00:12	Patrick J Engle	1
06027	Beryllium	SW-846 6020A	1	191431404708A	05/29/2019 00:12	Patrick J Engle	1
06028	Cadmium	SW-846 6020A	1	191431404708A	05/29/2019 00:12	Patrick J Engle	1
06029	Calcium	SW-846 6020A	1	191431404708A	05/29/2019 00:12	Patrick J Engle	1
06031	Chromium	SW-846 6020A	1	191431404708A	05/29/2019 00:12	Patrick J Engle	1
06032	Cobalt	SW-846 6020A	1	191431404708A	05/29/2019 00:12	Patrick J Engle	1
06033	Copper	SW-846 6020A	1	191431404708A	05/29/2019 00:12	Patrick J Engle	1

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Analysis Report

Sample Description: 19050602 Grab Surface Water

Project Name: Ecology & Environment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:48
SDG#: EUR64-03

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064130
ELLE Group #: 2045318
Matrix: Surface Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals		**SW-846 6020A**	mg/l	mg/l	mg/l	
06023	Aluminum	7429-90-5	0.0919 J Q	0.0197	0.400	1
06024	Antimony	7440-36-0	N.D.	0.00041 U	0.0020	1
06025	Arsenic	7440-38-2	0.0013 J Q	0.00066 U	0.0020 U	1
06026	Barium	7440-39-3	0.0334	0.00075	0.0040	1
06027	Beryllium	7440-41-7	N.D.	0.000091 U	0.00050	1
06028	Cadmium	7440-43-9	N.D.	0.00015 U	0.0010	1
06029	Calcium	7440-70-2	25.4	0.0598	0.700	1
06031	Chromium	7440-47-3	N.D.	0.00070 U	0.0040	1
06032	Cobalt	7440-48-4	0.00021 J Q	0.00016 U	0.0010 U	1
06033	Copper	7440-50-8	N.D.	0.0099 U	0.0400	1
06034	Iron	7439-89-6	0.472	0.0228	0.100	1
06035	Lead	7439-92-1	0.0015 J Q	0.0011	0.0030	1
06036	Magnesium	7439-95-4	7.01	0.0104	0.100	1
06037	Manganese	7439-96-5	0.100	0.0049	0.0100	1
06039	Nickel	7440-02-0	0.0029 J Q	0.00060 U	0.0040 U	1
06040	Potassium	7440-09-7	4.48	0.107	0.400	1
06041	Selenium	7782-49-2	N.D.	0.00065 U	0.0020	1
06042	Silver	7440-22-4	N.D.	0.00017 U	0.00050	1
06043	Sodium	7440-23-5	9.03	0.0500	0.900	1
06045	Thallium	7440-28-0	N.D.	0.00011 U	0.00050	1
06048	Vanadium	7440-62-2	0.00034 J Q	0.00024 U	0.0010 U	1
06049	Zinc	7440-66-6	0.0179	0.0062	0.0150	1
		SW-846 7470A	mg/l	mg/l	mg/l	
00259	Mercury	7439-97-6	N.D.	0.000050 U	0.00020	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
06023	Aluminum	SW-846 6020A	1	191431404709A	05/29/2019 02:25	Patrick J Engle	1
06024	Antimony	SW-846 6020A	1	191431404709A	05/29/2019 02:25	Patrick J Engle	1
06025	Arsenic	SW-846 6020A	1	191431404709A	05/29/2019 02:25	Patrick J Engle	1
06026	Barium	SW-846 6020A	1	191431404709A	05/29/2019 02:25	Patrick J Engle	1
06027	Beryllium	SW-846 6020A	1	191431404709A	05/29/2019 02:25	Patrick J Engle	1
06028	Cadmium	SW-846 6020A	1	191431404709A	05/29/2019 02:25	Patrick J Engle	1
06029	Calcium	SW-846 6020A	1	191431404709A	05/29/2019 02:25	Patrick J Engle	1
06031	Chromium	SW-846 6020A	1	191431404709A	05/29/2019 02:25	Patrick J Engle	1
06032	Cobalt	SW-846 6020A	1	191431404709A	05/31/2019 17:47	Patrick J Engle	1
06033	Copper	SW-846 6020A	1	191431404709A	05/29/2019 02:25	Patrick J Engle	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: 19050603 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064131
ELLE Group #: 2045318
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 11:54
SDG#: EUR64-04

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals		**SW-846 6020A**	mg/l	mg/l	mg/l	
06023	Aluminum	7429-90-5	0.326 J Q	0.0197	0.400	1
06024	Antimony	7440-36-0	0.00061 J Q	0.00041	0.0020	1
06025	Arsenic	7440-38-2	0.0071	0.00068	0.0020	1
06026	Barium	7440-39-3	0.0121	0.00075	0.0040	1
06027	Beryllium	7440-41-7	~~N.D.~~	0.000091 U	0.00050	1
06028	Cadmium	7440-43-9	0.00022 J Q	0.00015	0.0010	1
06029	Calcium	7440-70-2	18.7	0.0598	0.700	1
06031	Chromium	7440-47-3	~~0.00072 J Q~~	~~0.00070~~	0.0040 U	1
06032	Cobalt	7440-48-4	~~N.D. K1K2~~	0.00016 U	0.0010	1
06033	Copper	7440-50-8	~~N.D.~~	0.0099 U	0.0400	1
06034	Iron	7439-89-6	0.0364 J Q	0.0228	0.100	1
06035	Lead	7439-92-1	~~N.D.~~	0.0011 U	0.0030	1
06036	Magnesium	7439-95-4	2.06	0.0104	0.100	1
06037	Manganese	7439-96-5	~~N.D.~~	0.0049 U	0.0100	1
06039	Nickel	7440-02-0	~~0.0017 J Q~~	~~0.00060~~	0.0040 U	1
06040	Potassium	7440-09-7	2.22	0.107	0.400	1
06041	Selenium	7782-49-2	N.D.	0.00065 U	0.0020	1
06042	Silver	7440-22-4	N.D.	0.00017 U	0.00050	1
06043	Sodium	7440-23-5	6.69	0.0500	0.900	1
06045	Thallium	7440-28-0	~~N.D.~~	0.00011 U	0.00050	1
06048	Vanadium	7440-62-2	0.0018	0.00024	0.0010	1
06049	Zinc	7440-66-6	0.0096 J Q	0.0062	0.0150	1
		SW-846 7470A	mg/l	mg/l	mg/l	
00259	Mercury	7439-97-6	~~N.D.~~	0.000050 U	0.00020	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
06023	Aluminum	SW-846 6020A	1	191431404709A	05/29/2019 02:28	Patrick J Engle	1
06024	Antimony	SW-846 6020A	1	191431404709A	05/29/2019 02:28	Patrick J Engle	1
06025	Arsenic	SW-846 6020A	1	191431404709A	05/29/2019 02:28	Patrick J Engle	1
06026	Barium	SW-846 6020A	1	191431404709A	05/31/2019 17:49	Patrick J Engle	1
06027	Beryllium	SW-846 6020A	1	191431404709A	05/29/2019 02:28	Patrick J Engle	1
06028	Cadmium	SW-846 6020A	1	191431404709A	05/29/2019 02:28	Patrick J Engle	1
06029	Calcium	SW-846 6020A	1	191431404709A	05/29/2019 02:28	Patrick J Engle	1
06031	Chromium	SW-846 6020A	1	191431404709A	05/29/2019 02:28	Patrick J Engle	1
06032	Cobalt	SW-846 6020A	1	191431404709A	05/29/2019 02:28	Patrick J Engle	1
06033	Copper	SW-846 6020A	1	191431404709A	05/29/2019 02:28	Patrick J Engle	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: 19050604 Grab Surface Water

Project Name: Ecology & Environment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:19
SDG#: EUR64-05

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064132
ELLE Group #: 2045318
Matrix: Surface Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals		**SW-846 6020A**	mg/l	mg/l	mg/l	
06023	Aluminum	7429-90-5	0.452	0.0197	0.400	1
06024	Antimony	7440-36-0	~~N.D.~~	0.00041 U	0.0020	1
06025	Arsenic	7440-38-2	0.0045	0.00068	0.0020	1
06026	Barium	7440-39-3	0.0283	0.00075	0.0040	1
06027	Beryllium	7440-41-7	0.00022 J Q	0.000091	0.00050	1
06028	Cadmium	7440-43-9	~~N.D.~~	0.00015 U	0.0010	1
06029	Calcium	7440-70-2	21.1	0.0598	0.700	1
06031	Chromium	7440-47-3	N.D.	0.00070 U	0.0040	1
06032	Cobalt	7440-48-4	N.D. K1K2	0.00016 U	0.0010	1
06033	Copper	7440-50-8	N.D.	0.0099 U	0.0400	1
06034	Iron	7439-89-6	0.638	0.0228	0.100	1
06035	Lead	7439-92-1	~~N.D.~~	0.0011 U	0.0030	1
06036	Magnesium	7439-95-4	8.14	0.0104	0.100	1
06037	Manganese	7439-96-5	0.106	0.0049	0.0100	1
06039	Nickel	7440-02-0	0.0060	0.00060	0.0040	1
06040	Potassium	7440-09-7	4.14	0.107	0.400	1
06041	Selenium	7782-49-2	N.D.	0.00065 U	0.0020	1
06042	Silver	7440-22-4	N.D.	0.00017 U	0.00050	1
06043	Sodium	7440-23-5	12.3	0.0500	0.900	1
06045	Thallium	7440-28-0	~~N.D.~~	0.00011 U	0.00050	1
06048	Vanadium	7440-62-2	~~0.00036 J Q~~	~~0.00024~~ U	0.0010 U	1
06049	Zinc	7440-66-6	0.0082 J Q	0.0062	0.0150	1
		SW-846 7470A	mg/l	mg/l	mg/l	
00259	Mercury	7439-97-6	~~N.D.~~	0.000050 U	0.00020	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
06023	Aluminum	SW-846 6020A	1	191431404709A	05/29/2019 02:35	Patrick J Engle	1
06024	Antimony	SW-846 6020A	1	191431404709A	05/29/2019 02:35	Patrick J Engle	1
06025	Arsenic	SW-846 6020A	1	191431404709A	05/29/2019 02:35	Patrick J Engle	1
06026	Barium	SW-846 6020A	1	191431404709A	05/29/2019 02:35	Patrick J Engle	1
06027	Beryllium	SW-846 6020A	1	191431404709A	05/29/2019 02:35	Patrick J Engle	1
06028	Cadmium	SW-846 6020A	1	191431404709A	05/29/2019 02:35	Patrick J Engle	1
06029	Calcium	SW-846 6020A	1	191431404709A	05/29/2019 02:35	Patrick J Engle	1
06031	Chromium	SW-846 6020A	1	191431404709A	05/29/2019 02:35	Patrick J Engle	1
06032	Cobalt	SW-846 6020A	1	191431404709A	05/29/2019 02:35	Patrick J Engle	1
06033	Copper	SW-846 6020A	1	191431404709A	05/29/2019 02:35	Patrick J Engle	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: 19050605 Grab Surface Water

Project Name: Ecology & Environment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:39
SDG#: EUR64-06

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064133
ELLE Group #: 2045318
Matrix: Surface Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals		**SW-846 6020A**	mg/l	mg/l	mg/l	
06023	Aluminum	7429-90-5	0.585	0.0197	0.400	1
06024	Antimony	7440-36-0	~~N.D.~~	0.00041 U	0.0020	1
06025	Arsenic	7440-38-2	0.0056	0.00068	0.0020	1
06026	Barium	7440-39-3	0.0344	0.00075	0.0040	1
06027	Beryllium	7440-41-7	0.00027 J Q	0.000091	0.00050	1
06028	Cadmium	7440-43-9	~~N.D.~~	0.00015 U	0.0010	1
06029	Calcium	7440-70-2	19.8	0.0598	0.700	1
06031	Chromium	7440-47-3	~~0.00080 J~~	~~0.00076~~ U	0.0040 U	1
06032	Cobalt	7440-48-4	~~0.00027 J~~	~~0.00016~~ U	0.0010 U	1
06033	Copper	7440-50-8	~~N.D.~~	0.0099 U	0.0400	1
06034	Iron	7439-89-6	1.14	0.0228	0.100	1
06035	Lead	7439-92-1	~~N.D.~~	0.0011 U	0.0030	1
06036	Magnesium	7439-95-4	7.79	0.0104	0.100	1
06037	Manganese	7439-96-5	0.194	0.0049	0.0100	1
06039	Nickel	7440-02-0	0.0063	0.00060	0.0040	1
06040	Potassium	7440-09-7	4.03	0.107	0.400	1
06041	Selenium	7782-49-2	N.D.	0.00065 U	0.0020	1
06042	Silver	7440-22-4	N.D.	0.00017 U	0.00050	1
06043	Sodium	7440-23-5	12.2	0.0500	0.900	1
06045	Thallium	7440-28-0	~~N.D.~~	0.00011 U	0.00050	1
06048	Vanadium	7440-62-2	0.0018	0.00024	0.0010	1
06049	Zinc	7440-66-6	0.0152	0.0062	0.0150	1
		SW-846 7470A	mg/l	mg/l	mg/l	
00259	Mercury	7439-97-6	~~N.D.~~	0.000050 U	0.00020	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
06023	Aluminum	SW-846 6020A	1	191431404709A	05/31/2019 17:53	Patrick J Engle	1
06024	Antimony	SW-846 6020A	1	191431404709A	05/29/2019 02:37	Patrick J Engle	1
06025	Arsenic	SW-846 6020A	1	191431404709A	05/29/2019 02:37	Patrick J Engle	1
06026	Barium	SW-846 6020A	1	191431404709A	05/29/2019 02:37	Patrick J Engle	1
06027	Beryllium	SW-846 6020A	1	191431404709A	05/29/2019 02:37	Patrick J Engle	1
06028	Cadmium	SW-846 6020A	1	191431404709A	05/29/2019 02:37	Patrick J Engle	1
06029	Calcium	SW-846 6020A	1	191431404709A	05/29/2019 02:37	Patrick J Engle	1
06031	Chromium	SW-846 6020A	1	191431404709A	05/29/2019 02:37	Patrick J Engle	1
06032	Cobalt	SW-846 6020A	1	191431404709A	05/31/2019 17:53	Patrick J Engle	1
06033	Copper	SW-846 6020A	1	191431404709A	05/29/2019 02:37	Patrick J Engle	1

*=This limit was used in the evaluation of the final result

7-29-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 29, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one sediment sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050501

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained at 4°C ± 2°C. The sample was collected on May 20, 2019, extracted on June 1, 2019, and analyzed by June 6, 2019, therefore meeting QC criteria of less than 14 days between collection and extraction for soil samples and less than 40 days between extraction and analysis.

2. **Initial Calibration: Acceptable.**

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. **Continuing Calibration: Acceptable.**

Calculations were verified as correct. All percent differences (%Ds) were within the laboratory control limits.

4. **Blanks: Acceptable.**

A method blank was analyzed for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in the method blank. There were no detections in the rinsate blank.

5. **System Monitoring Compounds (SMC): Acceptable.**

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All recoveries of the SMCs were greater than 10% and within QC limits.

6. **Blank Spike (BS): Satisfactory.**

BS recoveries were within QC limits.

7. **Quantitation and Quantitation Limits: Acceptable.**

Sample concentrations were correctly calculated.

8. **Laboratory Contact: Not Required.**

No laboratory contact was required.

9. **Overall Assessment of Data for Use**

A total of two results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated

because QC criteria were not met.

Sample Description: 19050501 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064128
ELLE Group #: 2045318
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:53
SDG#: EUR64-01

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**		**ug/kg**	**ug/kg**	
10885	PCB-1242	53469-21-9	N.D.	D1	810	4,200	10
10885	PCB-1248	12672-29-6	2,400	JD1	810	4,200	10
10885	PCB-1254	11097-69-1	1,600	JD1	810	4,200	10
10885	PCB-1260	11096-82-5	N.D.	D1	1,200	4,200	10
10885	PCB-1262	37324-23-5	N.D.	D1	810	4,200	10
10885	PCB-1268	11100-14-4	11,000	D2	810	4,200	10
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**		**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	230		9.7	24	1
08272	Heavy Range Organics C24-C40	n.a.	1,200		24	73	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**		**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	131,000		99.5	253	5
01650	Calcium	7440-70-2	11,600		41.0	84.3	1
01654	Iron	7439-89-6	13,500		8.43	33.7	1
01657	Magnesium	7439-95-4	3,200		2.82	16.9	1
01662	Potassium	7440-09-7	1,210		33.4	84.3	1
01667	Sodium	7440-23-5	787		77.9	169	1
	SW-846 6020A		**mg/kg**		**mg/kg**	**mg/kg**	
06124	Antimony	7440-36-0	2.92		0.213	0.674	2
06125	Arsenic	7440-38-2	46.1		0.226	0.674	2
06126	Barium	7440-39-3	143		0.651	1.35	2
06127	Beryllium	7440-41-7	4.17		0.0384	0.169	2
06128	Cadmium	7440-43-9	3.29		0.0850	0.337	2
06131	Chromium	7440-47-3	26.3		0.563	1.35	2
06132	Cobalt	7440-48-4	5.93		0.0985	0.337	2
06133	Copper	7440-50-8	771		6.04	13.5	2
06135	Lead	7439-92-1	86.7		0.0850	1.01	2
06137	Manganese	7439-96-5	136		0.668	3.37	2
06139	Nickel	7440-02-0	464		0.573	1.35	2
06141	Selenium	7782-49-2	1.01		0.220	0.674	2
06142	Silver	7440-22-4	1.15		0.0685	0.169	2
06145	Thallium	7440-28-0	N.D.		0.330	0.843	10
06148	Vanadium	7440-62-2	119		0.145	0.337	2
06149	Zinc	7440-66-6	966		2.05	5.06	2
	SW-846 7471B		**mg/kg**		**mg/kg**	**mg/kg**	

*=This limit was used in the evaluation of the final result

7-29-19

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Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 29, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one sediment sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analyses for Polychlorinated Biphenyls (PCBs - EPA Method 8082) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050501

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained at 0°C to 6°C. The sample was collected on May 20, 2019, extracted on July 7, 2019, and were analyzed by July 17, 2019. There are no holding time limits for Method 8082 PCB analyses.

2. Instrument Performance: Acceptable.

The surrogate retention time percent difference between the initial calibration standards and the remaining standards and samples was within QC limits.

3. Initial and Continuing Calibration: Acceptable.

All initial calibration relative standard deviations (RSDs) were within QC limits. All continuing calibration % differences (% D) were within QC limits.

4. Blanks: Acceptable.

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each analytical system. No target analytes were detected in the laboratory blanks.

5. System Monitoring Compounds (SMCs): Satisfactory.

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All recoveries of the SMCs were within the established control limits except when diluted out or interfered with due to high analyte concentrations in the native sample; no actions were taken based on these outliers.

6. Blank Spike (BS) and BS Duplicate (BSD) Analyses: Acceptable.

BS and BSD recoveries were within QC limits.

7. Compound Identification: Acceptable.

All positive results were dual-column confirmed with differences between the columns < 40%.

8. Target Compound Quantitation and Quantitation Limits: Acceptable.

Sample results and quantitation limits were correctly calculated.

9. Laboratory Contact

No laboratory contact was required.

10. Overall Assessment

A total of 9 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050501 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064128
ELLE Group #: 2045318
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:53
SDG#: EUR64-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	160	400	1
10726	Fluoranthene	206-44-0	8,900	8	40	1
10726	Fluorene	86-73-7	170	8	40	1
10726	Hexachlorobenzene	118-74-1	N.D.	16	40	1
10726	Hexachlorobutadiene	87-68-3	N.D.	89	190	1
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	480	1,200	1
10726	Hexachloroethane	67-72-1	N.D.	81	400	1
10726	Indeno(1,2,3-cd)pyrene	193-39-5	8,600	8	40	1
10726	Isophorone	78-59-1	N.D.	40	89	1
10726	2-Methylnaphthalene	91-57-6	59 J	8	81	1
10726	2-Methylphenol	95-48-7	N.D.	40	160	1
10726	4-Methylphenol	106-44-5	44 J	40	120	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	76	16	40	1
10726	2-Nitroaniline	88-74-4	N.D.	40	120	1
10726	3-Nitroaniline	99-09-2	N.D.	160	400	1
10726	4-Nitroaniline	100-01-6	N.D.	160	400	1
10726	Nitrobenzene	98-95-3	N.D.	64	160	1
10726	2-Nitrophenol	88-75-5	N.D.	64	140	1
10726	4-Nitrophenol	100-02-7	N.D.	400	1,200	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	56	120	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	40	89	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	160	400	1
10726	Pentachlorophenol	87-86-5	N.D.	160	400	1
10726	Phenanthrene	85-01-8	3,600	8	40	1
10726	Phenol	108-95-2	N.D.	40	89	1
10726	Pyrene	129-00-0	11,000	40	200	5
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	40	89	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	160	400	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	72	160	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	64	140	1
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	880 U	4,200	10
10885	PCB-1221	11104-28-2	N.D. D1	1,100 U	4,200	10
10885	PCB-1232	11141-16-5	N.D. D1	2,000 U	4,200	10

*=This limit was used in the evaluation of the final result

MW 7-29-19

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Analysis Report

Sample Description: 19050501 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064128
ELLE Group #: 2045318
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:53
SDG#: EUR64-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1242	53469-21-9	~~N.D.~~ ~~D1~~	810 U	4,200	10
10885	PCB-1248	12672-29-6	2,400 JD1	810	4,200	10
10885	PCB-1254	11097-69-1	1,600 JD1	810	4,200	10
10885	PCB-1260	11096-82-5	N.D. D1	1,200 U	4,200	10
10885	PCB-1262	37324-23-5	N.D. D1	810 U	4,200	10
10885	PCB-1268	11100-14-4	11,000 D2	810	4,200	10
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	230	9.7	24	1
08272	Heavy Range Organics C24-C40	n.a.	1,200	24	73	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	131,000	99.5	253	5
01650	Calcium	7440-70-2	11,600	41.0	84.3	1
01654	Iron	7439-89-6	13,500	8.43	33.7	1
01657	Magnesium	7439-95-4	3,200	2.82	16.9	1
01662	Potassium	7440-09-7	1,210	33.4	84.3	1
01667	Sodium	7440-23-5	787	77.9	169	1
	SW-846 6020A		**mg/kg**	**mg/kg**	**mg/kg**	
06124	Antimony	7440-36-0	2.92	0.213	0.674	2
06125	Arsenic	7440-38-2	46.1	0.226	0.674	2
06126	Barium	7440-39-3	143	0.651	1.35	2
06127	Beryllium	7440-41-7	4.17	0.0384	0.169	2
06128	Cadmium	7440-43-9	3.29	0.0850	0.337	2
06131	Chromium	7440-47-3	26.3	0.583	1.35	2
06132	Cobalt	7440-48-4	5.93	0.0985	0.337	2
06133	Copper	7440-50-8	771	6.04	13.5	2
06135	Lead	7439-92-1	86.7	0.0850	1.01	2
06137	Manganese	7439-96-5	136	0.668	3.37	2
06139	Nickel	7440-02-0	464	0.573	1.35	2
06141	Selenium	7782-49-2	1.01	0.220	0.674	2
06142	Silver	7440-22-4	1.15	0.0685	0.169	2
06145	Thallium	7440-28-0	N.D.	0.330	0.843	10
06148	Vanadium	7440-62-2	119	0.145	0.337	2
06149	Zinc	7440-66-6	966	2.05	5.06	2
	SW-846 7471B		**mg/kg**	**mg/kg**	**mg/kg**	

*=This limit was used in the evaluation of the final result

MW 7-29-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 29, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one sediment sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Semivolatile Organic Compound (SVOC) analysis (EPA Method 8270) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050501

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of 0°C to 6°C. The sample was collected on May 20, 2019, was extracted by May 28, 2019, and analyzed by May 29, 2019, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

2. Tuning: Acceptable.

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. Initial Calibration: Acceptable.

All average Relative Response Factors (RRFs) were within the QC limits. All Relative Standard Deviations (RSDs) were within the QC limits.

4. Continuing Calibration: Acceptable.

All RRFs were within the QC limits. All % differences were within the QC limits.

5. Blanks: Acceptable.

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank.

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6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS) Analysis: Acceptable.

BS analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. Internal Standards: Acceptable.

All internal standards (IS) were within $\pm$ 30 seconds of the continuing calibration IS retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts.

9. Overall Assessment of Data for Use

A total of 85 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050501 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064128
ELLE Group #: 2045318
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:53
SDG#: EUR64-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	420	8	40	1
10726	Acenaphthylene	208-96-8	29 J Q	8	40	1
10726	Acetophenone	98-86-2	~~N.D.~~	40 U	120	1
10726	Anthracene	120-12-7	710	8	40	1
10726	Atrazine	1912-24-9	N.D.	480 U	1,000	1
10726	Benzaldehyde	100-52-7	N.D.	160 U	400	1
10726	Benzo(a)anthracene	56-55-3	7,000	16	40	1
10726	Benzo(a)pyrene	50-32-8	9,400	8	40	1
10726	Benzo(b)fluoranthene	205-99-2	16,000	40	200	5
10726	Benzo(g,h,i)perylene	191-24-2	12,000	40	200	5
10726	Benzo(k)fluoranthene	207-08-9	5,800	8	40	1
10726	1,1'-Biphenyl	92-52-4	N.D.	40 U	89	1
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	56	120	1
10726	Butylbenzylphthalate	85-68-7	N.D.	160	400	1
10726	Di-n-butylphthalate	84-74-2	N.D.	160	400	1
10726	Caprolactam	105-60-2	N.D.	81	400	1
10726	Carbazole	86-74-8	920	40	89	1
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	56 U	120	1
10726	4-Chloroaniline	106-47-8	N.D.	81	400	1
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	40	89	1
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	56	120	1
10726	2-Chloronaphthalene	91-58-7	N.D.	16	81	1
10726	2-Chlorophenol	95-57-8	N.D.	40	89	1
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	48	100	1
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	48	100	1
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	8,000	8	40	1
10726	Dibenz(a,h)anthracene	53-70-3	2,600	16	40	1
10726	Dibenzofuran	132-64-9	110	40	89	1
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	240 U	810	1
10726	2,4-Dichlorophenol	120-83-2	N.D.	48	100	1
10726	Diethylphthalate	84-66-2	N.D.	160	400	1
10726	2,4-Dimethylphenol	105-67-9	N.D.	72	160	1
10726	Dimethylphthalate	131-11-3	N.D.	160	400	1
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	560	1,200	1
10726	2,4-Dinitrophenol	51-28-5	N.D.	810	2,400	1
10726	2,4-Dinitrotoluene	121-14-2	N.D.	160	400	1
10726	2,6-Dinitrotoluene	606-20-2	N.D.	56	120	1
10726	1,4-Dioxane	123-91-1	N.D.	240	810	1

*=This limit was used in the evaluation of the final result

7-29-19

Sample Description: 19050501 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064128
ELLE Group #: 2045318
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:53
SDG#: EUR64-01

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg		ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	~~N.D.~~		160 U	400	1
10726	Fluoranthene	206-44-0	8,900		8	40	1
10726	Fluorene	86-73-7	170		8	40	1
10726	Hexachlorobenzene	118-74-1	N.D.		16	40	1
10726	Hexachlorobutadiene	87-68-3	N.D.		89	190	1
10726	Hexachlorocyclopentadiene	77-47-4	N.D.		480	1,200	1
10726	Hexachloroethane	67-72-1	N.D.		81	400	1
10726	Indeno(1,2,3-cd)pyrene	193-39-5	8,600		8	40	1
10726	Isophorone	78-59-1	~~N.D.~~		40 U	89	1
10726	2-Methylnaphthalene	91-57-6	59	J Q	8	81	1
10726	2-Methylphenol	95-48-7	~~N.D.~~		40 U	160	1
10726	4-Methylphenol	106-44-5	44	J Q	40	120	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.						
10726	Naphthalene	91-20-3	76		16	40	1
10726	2-Nitroaniline	88-74-4	N.D.		40	120	1
10726	3-Nitroaniline	99-09-2	N.D.		160	400	1
10726	4-Nitroaniline	100-01-6	N.D.		160	400	1
10726	Nitrobenzene	98-95-3	N.D.		64	160	1
10726	2-Nitrophenol	88-75-5	N.D.		64	140	1
10726	4-Nitrophenol	100-02-7	N.D.		400	1,200	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.		56	120	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.		40	89	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.						
10726	Di-n-octylphthalate	117-84-0	N.D.		160 U	400	1
10726	Pentachlorophenol	87-86-5	N.D.		160 U	400	1
10726	Phenanthrene	85-01-8	3,600		8	40	1
10726	Phenol	108-95-2	~~N.D.~~		40 U	89	1
10726	Pyrene	129-00-0	11,000		40	200	5
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.		40 U	89	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.		160	400	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.		72	160	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.		64	140	1
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg		ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D.	D1	880	4,200	10
10885	PCB-1221	11104-28-2	N.D.	D1	1,100	4,200	10
10885	PCB-1232	11141-16-5	N.D.	D1	2,000	4,200	10

*=This limit was used in the evaluation of the final result

MW 7-29-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 31, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of 13 solid samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Target Analyte List (TAL) metals and sulfur analyses (EPA Methods 6010, 6020, and 7471) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered:

19050201	19050202	19050203	19050204	19050301	19050302
19050701	19050702	19050801	19050802	19050803	19050804
19051002					

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained at < 6°C (only applies to mercury). The samples were collected on May 21, 2019, and were analyzed by June 5, 2019, therefore meeting QC criteria of less than 6 months between collection, extraction, and analysis (28 days for mercury).

2. Initial and Continuing Calibration: Acceptable.

A minimum of one calibration standard and a blank were analyzed at the beginning of the ICP analysis sequence and after every 10 samples. No results were greater than 110% of the highest calibration standard. All ICP recoveries were within the QC limits. All AA recoveries were within QC limits and the initial calibration correlation coefficient was > 0.995.

3. Blanks: Satisfactory.

A preparation blank was analyzed for each 20 samples or per matrix per concentration level. Blanks were analyzed after each Initial or Continuing Calibration Verification. There were no detections in any blanks that affected sample results except arsenic, chromium, cobalt, copper, manganese, thallium, cadmium, and lead. Positive sample results less than the quantitation limit associated with positive blank results less than the reporting limit were qualified as not detected (U).

4. ICP Interference Check Sample: Acceptable.

An Interference Check Sample (ICS) was analyzed at the beginning of each sequence or at least twice every 8 hours, whichever was more frequent. All applicable ICS (solution AB) results were within QC limits of 80% - 120% recovery.

5. ICP Serial Dilution: Satisfactory.

A serial dilution analysis was performed per matrix per concentration or per sample delivery group, whichever was more frequent. All serial dilution results were within QC limits except aluminum, barium, calcium, iron, lead, magnesium, manganese, potassium, vanadium, and zinc associated with samples 19050202 and 19050203. Associated sample results were qualified as estimated quantities with a low bias (JL) for original sample results less than the serial dilution results.

6. Matrix Spike Analysis: Satisfactory.

A matrix spike analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. Applicable spike recoveries were within the QC limits except the following (associated with all samples except 19050202 and 19050203):
High recoveries: Arsenic, chromium, cadmium, and vanadium. Positive results were qualified as estimated quantities with a high bias (JH).

7. Duplicate Analysis: Satisfactory.

A laboratory duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate results were within QC limits except in the MS/MSD associated with all samples except 19050202 and 19050203 for aluminum, antimony, barium, cadmium, chromium, lead, manganese, zinc, copper, and magnesium; associated positive results and sample quantitation limits were qualified as estimated quantities with an unknown bias (JK or UJK).

8. Laboratory Control Sample Analysis: Satisfactory.

A Laboratory Control Sample (LCS) was analyzed per SDG per matrix. All LCS results were within the established control limits except antimony with a high bias associated with samples 19050202 and 19050203; associated positive results were qualified as estimated quantities with a high bias (JH).

9. Overall Assessment of Data for Use

A total of 277 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, sample temperature outliers, or serial dilution outliers. No sample results were rejected (R). A total of 44 sample results were qualified as estimated quantities based on spike accuracy outliers. A total of 110 sample results were qualified as estimated quantities based on duplicate precision outliers. Some overlap in qualifications may have occurred.

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Inorganic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Analysis Report

Sample Description: 19050803 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064218
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:34
SDG#: EUR65-10

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A Feb 2007 Rev 1**	ug/kg	ug/kg	ug/kg	
10885	PCB-1242	53469-21-9	N.D. D1	17	85	5
10885	PCB-1248	12672-29-6	N.D. D1	17	85	5
10885	PCB-1254	11097-69-1	N.D. D1	17	85	5
10885	PCB-1260	11096-82-5	N.D. D1	25	85	5
10885	PCB-1262	37324-23-5	N.D. D1	17	85	5
10885	PCB-1268	11100-14-4	N.D. D1	17	85	5
Reporting limits were raised due to interference from the sample matrix.						
Metals		**SW-846 6010D Rev.4, July 2014**	mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	51.1	9.67	24.6	1
01650	Calcium	7440-70-2	35.1 J	19.9	41.0	1
01654	Iron	7439-89-6	176	4.10	16.4	1
01657	Magnesium	7439-95-4	10.3	1.37	8.20	1
01662	Potassium	7440-09-7	N.D.	16.2	41.0	1
01667	Sodium	7440-23-5	99.2	37.9	82.0	1
12003	Sulfur	7704-34-9	274	9.84	41.0	1
		SW-846 6020A	mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	N.D.	0.104	0.328	2
06125	Arsenic	7440-38-2	0.173 J	0.116	0.328	2
06126	Barium	7440-39-3	2.44	0.316	0.656	2
06127	Beryllium	7440-41-7	N.D.	0.0187	0.0820	2
06128	Cadmium	7440-43-9	0.0526 J	0.0413	0.164	2
06131	Chromium	7440-47-3	1.08	0.274	0.656	2
06132	Cobalt	7440-48-4	0.171	0.0479	0.164	2
06133	Copper	7440-50-8	N.D. K4	2.93	6.56	2
06135	Lead	7439-92-1	2.33	0.0413	0.492	2
06137	Manganese	7439-96-5	1.56 J	0.325	1.64	2
06139	Nickel	7440-02-0	28.9	0.279	0.656	2
06141	Selenium	7782-49-2	N.D.	0.107	0.328	2
06142	Silver	7440-22-4	N.D.	0.0333	0.0820	2
06145	Thallium	7440-28-0	N.D. K1	0.0321	0.0820	2
06148	Vanadium	7440-62-2	38.5	0.0703	0.164	2
06149	Zinc	7440-66-6	8.63	0.995	2.46	2
		SW-846 7471B	mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	N.D.	0.0307	0.131	1
Wet Chemistry		**SM 5310 B 2011**	mg/kg	mg/kg	mg/kg	
10065	Total Carbon in Soil	n.a.	940,000	77,300	227,000	1

*=This limit was used in the evaluation of the final result

7-31-19

Sample Description: 19050804 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064219
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:43
SDG#: EUR65-11

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1242	53469-21-9	N.D. D1	170	850	5
10885	PCB-1248	12672-29-6	N.D. D1	170	850	5
10885	PCB-1254	11097-69-1	N.D. D1	170	850	5
10885	PCB-1260	11096-82-5	N.D. D1	250	850	5
10885	PCB-1262	37324-23-5	N.D. D1	170	850	5
10885	PCB-1268	11100-14-4	N.D. D1	170	850	5
Reporting limits were raised due to interference from the sample matrix.						
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	3,390	10.6	27.0	1
01650	Calcium	7440-70-2	343	21.9	45.0	1
01654	Iron	7439-89-6	1,460	4.50	18.0	1
01657	Magnesium	7439-95-4	85.2	1.50	9.01	1
01662	Potassium	7440-09-7	99.1	17.8	45.0	1
01667	Sodium	7440-23-5	1,500	41.6	90.1	1
	SW-846 6020A		mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	0.446	0.114	0.360	2
06125	Arsenic	7440-38-2	1.39	0.121	0.360	2
06126	Barium	7440-39-3	12.8	0.348	0.721	2
06127	Beryllium	7440-41-7	0.167	0.0205	0.0901	2
06128	Cadmium	7440-43-9	1.46	0.0454	0.180	2
06131	Chromium	7440-47-3	3.71	0.301	0.721	2
06132	Cobalt	7440-48-4	0.348	0.0526	0.180	2
06133	Copper	7440-50-8	11.5	3.23	7.21	2
06135	Lead	7439-92-1	18.7	0.0454	0.541	2
06137	Manganese	7439-96-5	16.1	0.357	1.80	2
06139	Nickel	7440-02-0	18.8	0.306	0.721	2
06141	Selenium	7782-49-2	0.453	0.117	0.360	2
06142	Silver	7440-22-4	0.0491 J	0.0366	0.0901	2
06145	Thallium	7440-28-0	0.0920	0.0353	0.0901	2
06148	Vanadium	7440-62-2	33.1	0.0773	0.180	2
06149	Zinc	7440-66-6	91.4	1.09	2.70	2
	SW-846 7471B		mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	N.D.	0.0302	0.129	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	N.D.	0.50	0.50	1

*=This limit was used in the evaluation of the final result

7-31-19

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Sample Description: 19050202 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064206
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 12:17
SDG#: EUR65-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1242	53469-21-9	N.D. D1	10,000	53,000	200
10885	PCB-1248	12672-29-6	N.D. D1	10,000	53,000	200
10885	PCB-1254	11097-69-1	N.D. D1	10,000	53,000	200
10885	PCB-1260	11096-82-5	N.D. D1	15,000	53,000	200
10885	PCB-1262	37324-23-5	N.D. D1	10,000	53,000	200
10885	PCB-1268	11100-14-4	220,000 D1	10,000	53,000	200
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	136,000	62.2	158	5
01650	Calcium	7440-70-2	18,300	25.6	52.7	1
01654	Iron	7439-89-6	65,400	26.4	105	5
01657	Magnesium	7439-95-4	3,920	1.76	10.5	1
01662	Potassium	7440-09-7	1,240	20.9	52.7	1
01667	Sodium	7440-23-5	3,440	48.7	105	1
	SW-846 6020A		mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	5.96	0.133	0.422	2
06125	Arsenic	7440-38-2	51.0	0.141	0.422	2
06126	Barium	7440-39-3	372	0.407	0.844	2
06127	Beryllium	7440-41-7	3.78	0.0240	0.105	2
06128	Cadmium	7440-43-9	7.37	0.0532	0.211	2
06131	Chromium	7440-47-3	67.0	0.352	0.844	2
06132	Cobalt	7440-48-4	15.1	0.0616	0.211	2
06133	Copper	7440-50-8	1,830	18.9	42.2	10
06135	Lead	7439-92-1	381	0.266	3.16	10
06137	Manganese	7439-96-5	582	0.418	2.11	2
06139	Nickel	7440-02-0	376	0.359	0.844	2
06141	Selenium	7782-49-2	2.63	0.138	0.422	2
06142	Silver	7440-22-4	0.802	0.0428	0.105	2
06145	Thallium	7440-28-0	N.D.	0.207 U	0.527	10
06148	Vanadium	7440-62-2	96.0	0.0905	0.211	2
06149	Zinc	7440-66-6	1,310	1.28	3.16	2
	SW-846 7471B		mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	0.0921 J	0.0468	0.200	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	35.5	0.50	0.50	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: 19050203 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064207
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:32
SDG#: EUR65-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1242	53469-21-9	N.D. D1	200	1,100	50
10885	PCB-1248	12672-29-6	400 JD1	200	1,100	50
10885	PCB-1254	11097-69-1	N.D. D1	200	1,100	50
10885	PCB-1260	11096-82-5	N.D. D1	300	1,100	50
10885	PCB-1262	37324-23-5	N.D. D1	200	1,100	50
10885	PCB-1268	11100-14-4	3,500 D2	200	1,100	50
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	29,100 JL	12.5	31.8	1
01650	Calcium	7440-70-2	3,300 JL	25.7	53.0	1
01654	Iron	7439-89-6	15,300 JL	5.30	21.2	1
01657	Magnesium	7439-95-4	5,300 JL	1.77	10.6	1
01662	Potassium	7440-09-7	1,970 JL	21.0	53.0	1
01667	Sodium	7440-23-5	264	48.9	106	1
	SW-846 6020A		mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	0.411 J Q	0.134	0.424	2
06125	Arsenic	7440-38-2	12.3	0.142	0.424	2
06126	Barium	7440-39-3	79.5 JL	0.409	0.847	2
06127	Beryllium	7440-41-7	0.998	0.0241	0.106	2
06128	Cadmium	7440-43-9	0.718	0.0534	0.212	2
06131	Chromium	7440-47-3	15.6	0.354	0.847	2
06132	Cobalt	7440-48-4	4.83	0.0619	0.212	2
06133	Copper	7440-50-8	140	3.79	8.47	2
06135	Lead	7439-92-1	34.0 JL	0.0534	0.635	2
06137	Manganese	7439-96-5	340 JL	0.419	2.12	2
06139	Nickel	7440-02-0	31.5	0.360	0.847	2
06141	Selenium	7782-49-2	0.161 J Q	0.138	0.424	2
06142	Silver	7440-22-4	0.169	0.0430	0.106	2
06145	Thallium	7440-28-0	0.150	0.0415	0.106	2
06148	Vanadium	7440-62-2	37.5 JL	0.0909	0.212	2
06149	Zinc	7440-66-6	271 JL	1.29	3.18	2
	SW-846 7471B		mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	N.D.	0.0386 V	0.165	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	19.3	0.50	0.50	1

*=This limit was used in the evaluation of the final result

MW 7-3-19

Sample Description: 19050204 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064208
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:50
SDG#: EUR65-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	5,200	13,000	5
10726	Pentachlorophenol	87-86-5	N.D.	5,200	13,000	5
10726	Phenanthrene	85-01-8	1,500,000	5,200	26,000	100
10726	Phenol	108-95-2	1,900 J	1,300	2,900	5
10726	Pyrene	129-00-0	1,400,000	5,200	26,000	100
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	1,300	2,900	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	5,200	13,000	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	2,400	5,200	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	2,100	4,400	5
	Reporting limits were raised due to interference from the sample matrix.					
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	5.9 J Q	0.6	14	43.38
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	11,000	54,000	200
10885	PCB-1221	11104-28-2	N.D. D1	15,000	54,000	200
10885	PCB-1232	11141-16-5	N.D. D1	25,000	54,000	200
10885	PCB-1242	53469-21-9	N.D. D1	10,000	54,000	200
10885	PCB-1248	12672-29-6	N.D. D1	10,000	54,000	200
10885	PCB-1254	11097-69-1	N.D. D1	10,000	54,000	200
10885	PCB-1260	11096-82-5	N.D. D1	16,000	54,000	200
10885	PCB-1262	37324-23-5	N.D. D1	10,000	54,000	200
10885	PCB-1268	11100-14-4	70,000 D1	10,000	54,000	200
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	23,000	630	1,600	50
08272	Heavy Range Organics C24-C40	n.a.	32,000	1,600	4,800	50
	Reporting limits were raised due to interference from the sample matrix.					
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	11,800 JH	15.5	39.3	1
01650	Calcium	7440-70-2	3,840	31.8	65.5	1
01654	Iron	7439-89-6	21,300	6.55	26.2	1
01657	Magnesium	7439-95-4	3,800	2.19	13.1	1
01662	Potassium	7440-09-7	1,450	25.9	65.5	1
01667	Sodium	7440-23-5	291	60.5	131	1

*=This limit was used in the evaluation of the final result

MW 7-3-19

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Analysis Report

Sample Description: 19050204 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064208
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:50
SDG#: EUR65-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals		**SW-846 6020A**	mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	43.6	0.166	0.524	2
06125	Arsenic	7440-38-2	6.04	0.175	0.524	2
06126	Barium	7440-39-3	381	0.506	1.05	2
06127	Beryllium	7440-41-7	0.361	0.0299	0.131	2
06128	Cadmium	7440-43-9	2.37	0.0660	0.262	2
06131	Chromium	7440-47-3	44.7	0.437	1.05	2
06132	Cobalt	7440-48-4	4.87	0.0765	0.262	2
06133	Copper	7440-50-8	201	4.69	10.5	2
06135	Lead	7439-92-1	597	0.330	3.93	10
06137	Manganese	7439-96-5	189	0.519	2.62	2
06139	Nickel	7440-02-0	29.0	0.445	1.05	2
06141	Selenium	7782-49-2	0.264 J	0.171	0.524	2
06142	Silver	7440-22-4	0.257	0.0532	0.131	2
06145	Thallium	7440-28-0	~~0.110~~ J	0.0513	0.131 U	2
06148	Vanadium	7440-62-2	43.9	0.112	0.262	2
06149	Zinc	7440-66-6	1,020	1.59	3.93	2
		SW-846 7471B	mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	~~N.D.~~	0.0463 U	0.198	1
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	%	%	%	
00111	Moisture	n.a.	36.9	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A191513AA	06/01/2019 02:57	Patrick T Herres	1.46
08389	GC/MS - LL Encore Prep	SW-846 5035A	1	201914353707	05/23/2019 09:40	Anastasia K Jaynes	n.a.
08389	GC/MS - LL Encore Prep	SW-846 5035A	2	201914353707	05/23/2019 09:40	Anastasia K Jaynes	n.a.
07578	GC/MS-HL Encore Prep-NC	SW-846 5035A	1	201914353707	05/23/2019 09:38	Anastasia K Jaynes	n.a.
10726	SVOA 8270D/E (microwave)	SW-846 8270D	1	19149SLD026	05/31/2019 00:17	Brandon K Cordova	5
10726	SVOA 8270D/E (microwave)	SW-846 8270D	1	19149SLD026	05/31/2019 19:08	Brandon K Cordova	100
10813	BNA Soil Microwave APP IX	SW-846 3546	1	19149SLD026	05/30/2019 07:00	Joshua S Ruth	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	19147B34A	05/28/2019 01:33	Marie D Beamenderfer	43.38

*=This limit was used in the evaluation of the final result

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Sample Description: 19050301 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064212
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 12:35
SDG#: EUR65-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1242	53469-21-9	N.D. D1	3,400	18,000	500
10885	PCB-1248	12672-29-6	N.D. D1	3,400	18,000	500
10885	PCB-1254	11097-69-1	N.D. D1	3,400	18,000	500
10885	PCB-1260	11096-82-5	N.D. D1	5,100	18,000	500
10885	PCB-1262	37324-23-5	N.D. D1	3,400	18,000	500
10885	PCB-1268	11100-14-4	170,000 D1	3,400	18,000	500
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	181,000 JK	81.3	207	10
01650	Calcium	7440-70-2	28,300	16.7	34.4	1
01654	Iron	7439-89-6	55,600	34.4	138	10
01657	Magnesium	7439-95-4	5,210	1.15	6.89	1
01662	Potassium	7440-09-7	1,240	13.6	34.4	1
01667	Sodium	7440-23-5	2,410	31.8	68.9	1
	SW-846 6020A		**mg/kg**	**mg/kg**	**mg/kg**	
06124	Antimony	7440-36-0	2.30 JK	0.0871	0.275	2
06125	Arsenic	7440-38-2	20.1 JH	0.0921	0.275	2
06126	Barium	7440-39-3	197 JK	0.266	0.551	2
06127	Beryllium	7440-41-7	2.06	0.0157	0.0689	2
06128	Cadmium	7440-43-9	5.98 JH JK	0.0347	0.138	2
06131	Chromium	7440-47-3	32.8 JH JK	0.230	0.551	2
06132	Cobalt	7440-48-4	11.9	0.0402	0.138	2
06133	Copper	7440-50-8	1,570 JK	12.3	27.5	10
06135	Lead	7439-92-1	333 JK	0.174	2.07	10
06137	Manganese	7439-96-5	617 JK	0.273	1.38	2
06139	Nickel	7440-02-0	130	0.234	0.551	2
06141	Selenium	7782-49-2	0.922	0.0898	0.275	2
06142	Silver	7440-22-4	1.17	0.0280	0.0689	2
06145	Thallium	7440-28-0	0.0758	0.0270	0.0689	2
06148	Vanadium	7440-62-2	51.0 JH	0.0591	0.138	2
06149	Zinc	7440-66-6	3,670 JK	4.18	10.3	10
	SW-846 7471B		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	N.D.	0.0307 U	0.131	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture	n.a.	3.2	0.50	0.50	1

*=This limit was used in the evaluation of the final result

Sample Description: 19050302 Grab Soil

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064213
ELLE Group #: 2045320
Matrix: Soil

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:43
SDG#: EUR65-05

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1242	53469-21-9	N.D. D1	70	360	20
10885	PCB-1248	12672-29-6	150 JD2	70	360	20
10885	PCB-1254	11097-69-1	N.D. D1	70	360	20
10885	PCB-1260	11096-82-5	N.D. D1	100	360	20
10885	PCB-1262	37324-23-5	N.D. D1	70	360	20
10885	PCB-1268	11100-14-4	920 D2	70	360	20
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	9,700	12.2	31.1	1
01650	Calcium	7440-70-2	1,900	25.2	51.8	1
01654	Iron	7439-89-6	15,700	5.18	20.7	1
01657	Magnesium	7439-95-4	6,320	1.73	10.4	1
01662	Potassium	7440-09-7	1,550	20.5	51.8	1
01667	Sodium	7440-23-5	112	47.8	104	1
	SW-846 6020A		mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	14.1	0.131	0.414	2
06125	Arsenic	7440-38-2	9.88	0.139	0.414	2
06126	Barium	7440-39-3	50.4	0.400	0.828	2
06127	Beryllium	7440-41-7	0.359	0.0236	0.104	2
06128	Cadmium	7440-43-9	0.219	0.0522	0.207	2
06131	Chromium	7440-47-3	10.3	0.346	0.828	2
06132	Cobalt	7440-48-4	3.20	0.0605	0.207	2
06133	Copper	7440-50-8	14.3	3.71	8.28	2
06135	Lead	7439-92-1	21.6	0.0522	0.621	2
06137	Manganese	7439-96-5	214	0.410	2.07	2
06139	Nickel	7440-02-0	10.1	0.352	0.828	2
06141	Selenium	7782-49-2	N.D.	0.135 U	0.414	2
06142	Silver	7440-22-4	0.0568 J	0.0420	0.104	2
06145	Thallium	7440-28-0	0.0961 J	0.0406	0.104 U	2
06148	Vanadium	7440-62-2	16.9	0.0888	0.207	2
06149	Zinc	7440-66-6	170	1.26	3.11	2
	SW-846 7471B		mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	N.D.	0.0309 U	0.132	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	5.3	0.50	0.50	1

*=This limit was used in the evaluation of the final result

7-3-19

Sample Description: 19050701 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064214
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:59
SDG#: EUR65-06

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A Feb 2007 Rev 1**	ug/kg	ug/kg	ug/kg	
10885	PCB-1242	53469-21-9	N.D. D1	17	85	5
10885	PCB-1248	12672-29-6	N.D. D1	17	85	5
10885	PCB-1254	11097-69-1	N.D. D1	17	85	5
10885	PCB-1260	11096-82-5	N.D. D1	25	85	5
10885	PCB-1262	37324-23-5	N.D. D1	17	85	5
10885	PCB-1268	11100-14-4	N.D. D1	17	85	5

Reporting limits were raised due to interference from the sample matrix.

The surrogate data is outside the QC limits due to unresolvable matrix problems evident during the sample preparation.

Metals		**SW-846 6010D Rev.4, July 2014**	mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	363	9.89	25.1	1
01650	Calcium	7440-70-2	305	20.4	41.9	1
01654	Iron	7439-89-6	2,050	4.19	16.8	1
01657	Magnesium	7439-95-4	54.9	1.40	8.38	1
01662	Potassium	7440-09-7	30.1 J	16.6	41.9	1
01667	Sodium	7440-23-5	44.3 J	38.7	83.8	1
		SW-846 6020A	mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	0.117 J	0.106	0.335	2
06125	Arsenic	7440-38-2	0.916	0.112	0.335	2
06126	Barium	7440-39-3	3.13	0.323	0.670	2
06127	Beryllium	7440-41-7	N.D.	0.0191 U	0.0838	2
06128	Cadmium	7440-43-9	0.339	0.0422	0.168	2
06131	Chromium	7440-47-3	0.992	0.280	0.670	2
06132	Cobalt	7440-48-4	0.186	0.0489	0.168	2
06133	Copper	7440-50-8	3.88 J	3.00 U	6.70 U	2
06135	Lead	7439-92-1	6.88	0.0422	0.503	2
06137	Manganese	7439-96-5	18.3	0.332	1.68	2
06139	Nickel	7440-02-0	2.61	0.285	0.670	2
06141	Selenium	7782-49-2	0.123 J	0.109	0.335	2
06142	Silver	7440-22-4	N.D.	0.0340 U	0.0838	2
06145	Thallium	7440-28-0	0.313	0.0328	0.0838	2
06148	Vanadium	7440-62-2	0.766	0.0719	0.168	2
06149	Zinc	7440-66-6	54.5	1.02	2.51	2
		SW-846 7471B	mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	2.55	0.298	1.28	10

*=This limit was used in the evaluation of the final result

MW7-349

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Analysis Report

Sample Description: 19050702 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064215
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 11:35
SDG#: EUR65-07

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	192,000 JK	69.8	178	5
01650	Calcium	7440-70-2	601	28.8	59.2	1
01654	Iron	7439-89-6	344	5.92	23.7	1
01657	Magnesium	7439-95-4	48.7	1.98	11.8	1
01662	Potassium	7440-09-7	33.8 J Q	23.4	59.2	1
01667	Sodium	7440-23-5	1,050	54.7	118	1
		SW-846 6020A	mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	~~N.D.~~	0.150 U	0.473	2
06125	Arsenic	7440-38-2	~~0.173 J Q~~	~~0.158 U~~	0.473 U	2
06126	Barium	7440-39-3	4.83 JK	0.457	0.947	2
06127	Beryllium	7440-41-7	0.323	0.0270	0.118	2
06128	Cadmium	7440-43-9	~~0.0809 J Q~~	~~0.0596 U~~	0.237 U	2
06131	Chromium	7440-47-3	1.11 ~~JH~~ JK	0.395	0.947	2
06132	Cobalt	7440-48-4	~~0.148 J Q~~	~~0.0691 U~~	0.237 U	2
06133	Copper	7440-50-8	~~6.89 J Q~~	~~4.24 U~~	9.47 U	2
06135	Lead	7439-92-1	9.67 JK	0.0596	0.710	2
06137	Manganese	7439-96-5	5.61 JK	0.469	2.37	2
06139	Nickel	7440-02-0	4.46	0.402	0.947	2
06141	Selenium	7782-49-2	N.D.	0.154 U	0.473	2
06142	Silver	7440-22-4	N.D.	0.0480 ↓	0.118	2
06145	Thallium	7440-28-0	N.D. ~~K1~~	0.0464 ↓	0.118	2
06148	Vanadium	7440-62-2	7.31 JH	0.102	0.237	2
06149	Zinc	7440-66-6	13.6 JK	1.44	3.55	2
		SW-846 7471B	mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	~~N.D.~~	0.0443 U	0.189	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	35.0	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

*=This limit was used in the evaluation of the final result

7-31-19

Sample Description: 19050801 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064216
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:15
SDG#: EUR65-08

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A Feb 2007 Rev 1**	**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1242	53469-21-9	N.D. D1	3.3	17	1
10885	PCB-1248	12672-29-6	N.D. D1	3.3	17	1
10885	PCB-1254	11097-69-1	N.D. D1	3.3	17	1
10885	PCB-1260	11096-82-5	N.D. D1	4.9	17	1
10885	PCB-1262	37324-23-5	N.D. D1	3.3	17	1
10885	PCB-1268	11100-14-4	54 D1	3.3	17	1
Metals		**SW-846 6010D Rev.4, July 2014**	**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	42.1	9.44	24.0	1
01650	Calcium	7440-70-2	58.2	19.4	40.0	1
01654	Iron	7439-89-6	74.3	4.00	16.0	1
01657	Magnesium	7439-95-4	6.76 J	1.34	8.00	1
01662	Potassium	7440-09-7	N.D.	15.8	40.0	1
01667	Sodium	7440-23-5	N.D.	37.0	80.0	1
		SW-846 6020A	**mg/kg**	**mg/kg**	**mg/kg**	
06124	Antimony	7440-36-0	0.897	0.101	0.320	2
06125	Arsenic	7440-38-2	N.D.	0.107	0.320	2
06126	Barium	7440-39-3	2.10	0.309	0.640	2
06127	Beryllium	7440-41-7	N.D.	0.0182	0.0800	2
06128	Cadmium	7440-43-9	N.D.	0.0403	0.160	2
06131	Chromium	7440-47-3	0.382 J	0.267	0.640	2
06132	Cobalt	7440-48-4	0.335	0.0467	0.160	2
06133	Copper	7440-50-8	N.D. K4	2.86	6.40	2
06135	Lead	7439-92-1	0.276 J	0.0403	0.480	2
06137	Manganese	7439-96-5	0.881 J	0.317	1.60	2
06139	Nickel	7440-02-0	12.9	0.272	0.640	2
06141	Selenium	7782-49-2	N.D.	0.104	0.320	2
06142	Silver	7440-22-4	N.D.	0.0325	0.0800	2
06145	Thallium	7440-28-0	N.D. K4	0.0314	0.0800	2
06148	Vanadium	7440-62-2	30.8	0.0686	0.160	2
06149	Zinc	7440-66-6	3.30	0.971	2.40	2
		SW-846 7471B	**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	N.D.	0.0288	0.123	1
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	**%**	**%**	**%**	
00111	Moisture	n.a.	N.D.	0.50	0.50	1

*=This limit was used in the evaluation of the final result

7-31-19

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Analysis Report

Sample Description: 19050802 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064217
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:24
SDG#: EUR65-09

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A Feb 2007 Rev 1**	ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	36	170	1
10885	PCB-1221	11104-28-2	N.D. D1	46	170	1
10885	PCB-1232	11141-16-5	N.D. D1	80	170	1
10885	PCB-1242	53469-21-9	N.D. D1	33	170	1
10885	PCB-1248	12672-29-6	N.D. D1	33	170	1
10885	PCB-1254	11097-69-1	N.D. D1	33	170	1
10885	PCB-1260	11096-82-5	N.D. D1	49	170	1
10885	PCB-1262	37324-23-5	N.D. D1	33	170	1
10885	PCB-1268	11100-14-4	N.D. D1	33	170	1
Reporting limits were raised due to interference from the sample matrix.						
Metals		**SW-846 6010D Rev.4, July 2014**	mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	372	7.92	20.1	1
01650	Calcium	7440-70-2	103	16.3	33.6	1
01654	Iron	7439-89-6	354	3.36	13.4	1
01657	Magnesium	7439-95-4	7.04	1.12	6.71	1
01662	Potassium	7440-09-7	N.D.	13.3	33.6	1
01667	Sodium	7440-23-5	489	31.0	67.1	1
		SW-846 6020A	mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	0.671	0.0848	0.268	2
06125	Arsenic	7440-38-2	1.42	0.0898	0.268	2
06126	Barium	7440-39-3	2.01	0.259	0.537	2
06127	Beryllium	7440-41-7	N.D.	0.0153	0.0671	2
06128	Cadmium	7440-43-9	N.D.	0.0338	0.134	2
06131	Chromium	7440-47-3	0.436	0.224	0.537	2
06132	Cobalt	7440-48-4	0.279	0.0392	0.134	2
06133	Copper	7440-50-8	7.98	2.40	5.37	2
06135	Lead	7439-92-1	0.432	0.0338	0.403	2
06137	Manganese	7439-96-5	4.64	0.266	1.34	2
06139	Nickel	7440-02-0	4.36	0.228	0.537	2
06141	Selenium	7782-49-2	N.D.	0.0875	0.268	2
06142	Silver	7440-22-4	N.D.	0.0272	0.0671	2
06145	Thallium	7440-28-0	N.D.	0.0263	0.0671	2
06148	Vanadium	7440-62-2	12.0	0.0576	0.134	2
06149	Zinc	7440-66-6	4.55	0.815	2.01	2
		SW-846 7471B	mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	N.D.	0.0292	0.125	1

*=This limit was used in the evaluation of the final result

7-31-19

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Analysis Report

Sample Description: 19050201 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064220
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 11:55
SDG#: EUR65-12

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A Feb 2007 Rev 1**	ug/kg	ug/kg	ug/kg	
10885	PCB-1242	53469-21-9	N.D. D1	14,000	74,000	200
10885	PCB-1248	12672-29-6	N.D. D1	14,000	74,000	200
10885	PCB-1254	11097-69-1	N.D. D1	14,000	74,000	200
10885	PCB-1260	11096-82-5	N.D. D1	21,000	74,000	200
10885	PCB-1262	37324-23-5	N.D. D1	14,000	74,000	200
10885	PCB-1268	11100-14-4	130,000 D1	14,000	74,000	200
Metals		**SW-846 6010D Rev.4, July 2014**	mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	183,000 JK	94.7	241	5
01650	Calcium	7440-70-2	22,500	39.0	80.3	1
01654	Iron	7439-89-6	36,200	8.03	32.1	1
01657	Magnesium	7439-95-4	4,900	2.68	16.1	1
01662	Potassium	7440-09-7	3,630	31.8	80.3	1
01667	Sodium	7440-23-5	45,700	74.2	161	1
		SW-846 6020A	mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	45.7 JK	0.203	0.642	2
06125	Arsenic	7440-38-2	99.0 JK	0.215	0.642	2
06126	Barium	7440-39-3	814 JK	0.620	1.28	2
06127	Beryllium	7440-41-7	6.15	0.0366	0.161	2
06128	Cadmium	7440-43-9	18.0 JK	0.0809	0.321	2
06131	Chromium	7440-47-3	65.0 JK	0.536	1.28	2
06132	Cobalt	7440-48-4	18.3	0.0938	0.321	2
06133	Copper	7440-50-8	763 JK	5.75	12.8	2
06135	Lead	7439-92-1	771 JK	0.405	4.82	10
06137	Manganese	7439-96-5	184 JK	0.636	3.21	2
06139	Nickel	7440-02-0	1,120	0.546	1.28	2
06141	Selenium	7782-49-2	17.9	0.209	0.642	2
06142	Silver	7440-22-4	0.495	0.0652	0.161	2
06145	Thallium	7440-28-0	0.650	0.0629	0.161	2
06148	Vanadium	7440-62-2	379 JK	0.138	0.321	2
06149	Zinc	7440-66-6	1,210 JK	1.95	4.82	2
		SW-846 7471B	mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	0.248 J	0.0669 U	0.286 U	1
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	%	%	%	
00111	Moisture	n.a.	54.2	0.50	0.50	1

*=This limit was used in the evaluation of the final result

7-31-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 30, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of 11 solid samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Semivolatile Organic Compound (SVOC) analysis (EPA Method 8270) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered:

19050201	19050202	19050203	19050204	19050301	19050302
19050701	19050801	19050802	19050803	19050804	

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The samples were maintained and received within the QC limits of 0°C to 6°C. The samples were collected on May 20, 2019, were extracted by June 3, 2019, and analyzed by June 3, 2019, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

2. **Tuning: Acceptable.**

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. **Initial Calibration: Acceptable.**

All average Relative Response Factors (RRFs) were within the QC limits. All Relative Standard Deviations (RSDs) were within the QC limits.

4. **Continuing Calibration: Acceptable.**

All RRFs were within the QC limits. All % differences were within the QC limits.

5. **Blanks: Acceptable.**

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank.

6. System Monitoring Compounds (SMCs): Satisfactory.

All SMC recoveries were within QC limits except several low outliers in samples 19050804 (all sample results were qualified as estimated quantities with a low bias [JL or UJL]), 1 low outlier in sample 19050803 (no actions were taken based on one SMC outlier per sample), and 1 low and 1 high base/neutral outlier in sample 19050701 (all base/neutral analytes were qualified as estimated quantities with an unknown bias [JK or UJK]).

7. Matrix Spike (MS)/MS Duplicate (MSD) Analysis: Satisfactory.

MS and MSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. Most recoveries were outside QC limits in the spikes of sample 19050204 (all native sample results were qualified as estimated quantities with an unknown bias [JK or UJK]) and most recoveries were low in the spikes of sample 19050802 (results qualified as estimated with a low bias [JL or UJL]) recovery except di-n-octyl phthalate with a high recovery (no qualifiers were as this analyte was not detected in the native sample).

8. Blank Spike (BS) Analysis: Acceptable.

BS and BSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

9. Internal Standards: Satisfactory.

All internal standards (IS) were within $\pm$ 30 seconds of the continuing calibration IS retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts except one low outlier in sample 19050802; no actions were taken as there were no associated positive sample results.

11. Overall Assessment of Data for Use

A total of 788 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. A total of 255 sample results were qualified as estimated quantities based on spike accuracy outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Sample Description: **19050202 Grab Sediment**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: **SW 1064206**
ELLE Group #: **2045320**
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 12:17
SDG#: EUR65-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	16,000	26	130	5
10726	Acenaphthylene	208-96-8	680	26	130	5
10726	Acetophenone	98-86-2	140 J Q	130	380	5
10726	Anthracene	120-12-7	28,000	26	130	5
10726	Atrazine	1912-24-9	N.D.	1,500 U	3,300	5
10726	Benzaldehyde	100-52-7	N.D.	510 U	1,300	5
10726	Benzo(a)anthracene	56-55-3	87,000	510	1,300	50
10726	Benzo(a)pyrene	50-32-8	66,000	260	1,300	50
10726	Benzo(b)fluoranthene	205-99-2	100,000	260	1,300	50
10726	Benzo(g,h,i)perylene	191-24-2	30,000	26	130	5
10726	Benzo(k)fluoranthene	207-08-9	34,000	260	1,300	50
10726	1,1'-Biphenyl	92-52-4	710	130	280	5
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	180 U	380	5
10726	Butylbenzylphthalate	85-68-7	N.D.	510	1,300	5
10726	Di-n-butylphthalate	84-74-2	N.D.	510	1,300	5
10726	Caprolactam	105-60-2	N.D.	260	1,300	5
10726	Carbazole	86-74-8	19,000	130	280	5
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	180 U	380	5
10726	4-Chloroaniline	106-47-8	N.D.	260	1,300	5
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	130	280	5
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	180	380	5
10726	2-Chloronaphthalene	91-58-7	N.D.	51	260	5
10726	2-Chlorophenol	95-57-8	N.D.	130	280	5
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	150	330	5
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	150	330	5
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	100,000	260	1,300	50
10726	Dibenz(a,h)anthracene	53-70-3	11,000	51	130	5
10726	Dibenzofuran	132-64-9	7,400	130	280	5
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	770 U	2,600	5
10726	2,4-Dichlorophenol	120-83-2	N.D.	150	330	5
10726	Diethylphthalate	84-66-2	N.D.	510	1,300	5
10726	2,4-Dimethylphenol	105-67-9	N.D.	230	510	5
10726	Dimethylphthalate	131-11-3	N.D.	510	1,300	5
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	1,800	3,800	5
10726	2,4-Dinitrophenol	51-28-5	N.D.	2,600	7,700	5
10726	2,4-Dinitrotoluene	121-14-2	N.D.	510	1,300	5
10726	2,6-Dinitrotoluene	606-20-2	N.D.	180	380	5
10726	1,4-Dioxane	123-91-1	N.D.	770	2,600	5

*=This limit was used in the evaluation of the final result

7/30/19

Sample Description: 19050202 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064206
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 12:17
SDG#: EUR65-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	510 U	1,300	5
10726	Fluoranthene	206-44-0	210,000	260	1,300	50
10726	Fluorene	86-73-7	9,700	26	130	5
10726	Hexachlorobenzene	118-74-1	N.D.	51 U	130	5
10726	Hexachlorobutadiene	87-68-3	N.D.	280	590	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	1,500	3,800	5
10726	Hexachloroethane	67-72-1	N.D.	260	1,300	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	30,000	26	130	5
10726	Isophorone	78-59-1	N.D.	130 U	280	5
10726	2-Methylnaphthalene	91-57-6	1,900	26	260	5
10726	2-Methylphenol	95-48-7	N.D.	130 U	510	5
10726	4-Methylphenol	106-44-5	N.D.	130	380	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	4,100	51	130	5
10726	2-Nitroaniline	88-74-4	N.D.	130 U	380	5
10726	3-Nitroaniline	99-09-2	N.D.	510	1,300	5
10726	4-Nitroaniline	100-01-6	N.D.	510	1,300	5
10726	Nitrobenzene	98-95-3	N.D.	200	510	5
10726	2-Nitrophenol	88-75-5	N.D.	200	440	5
10726	4-Nitrophenol	100-02-7	N.D.	1,300	3,800	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	180	380	5
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	130	280	5
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	13,000	510	1,300	5
10726	Pentachlorophenol	87-86-5	N.D.	510 U	1,300	5
10726	Phenanthrene	85-01-8	190,000	260	1,300	50
10726	Phenol	108-95-2	160 J	130	280	5
10726	Pyrene	129-00-0	200,000	260	1,300	50
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	130 U	280	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	510	1,300	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	230	510	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	200	440	5
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	11,000	53,000	200
10885	PCB-1221	11104-28-2	N.D. D1	14,000	53,000	200
10885	PCB-1232	11141-16-5	N.D. D1	25,000	53,000	200

*=This limit was used in the evaluation of the final result

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Sample Description: **19050203 Grab Sediment**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: **SW 1064207**
ELLE Group #: **2045320**
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:32
SDG#: EUR65-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
10726	Acenaphthene	83-32-9	37,000	410	2,100	100
10726	Acenaphthylene	208-96-8	1,200	21	100	5
10726	Acetophenone	98-86-2	~~N.D.~~	100 U	310	5
10726	Anthracene	120-12-7	49,000	410	2,100	100
10726	Atrazine	1912-24-9	N.D.	1,200 U	2,700	5
10726	Benzaldehyde	100-52-7	N.D.	410 U	1,000	5
10726	Benzo(a)anthracene	56-55-3	160,000	820	2,100	100
10726	Benzo(a)pyrene	50-32-8	160,000	410	2,100	100
10726	Benzo(b)fluoranthene	205-99-2	190,000	410	2,100	100
10726	Benzo(g,h,i)perylene	191-24-2	95,000	410	2,100	100
10726	Benzo(k)fluoranthene	207-08-9	21,000	21	100	5
10726	1,1'-Biphenyl	92-52-4	1,400	100	230	5
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	140 U	310	5
10726	Butylbenzylphthalate	85-68-7	N.D.	410	1,000	5
10726	Di-n-butylphthalate	84-74-2	N.D.	410	1,000	5
10726	Caprolactam	105-60-2	N.D.	210	1,000	5
10726	Carbazole	86-74-8	42,000	2,100	4,500	100
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	140 U	310	5
10726	4-Chloroaniline	106-47-8	N.D.	210	1,000	5
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	100	230	5
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	140	310	5
10726	2-Chloronaphthalene	91-58-7	N.D.	41	210	5
10726	2-Chlorophenol	95-57-8	N.D.	100	230	5
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	120	270	5
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	120	270	5
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	190,000	410	2,100	100
10726	Dibenz(a,h)anthracene	53-70-3	31,000	820	2,100	100
10726	Dibenzofuran	132-64-9	14,000	100	230	5
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	620 U	2,100	5
10726	2,4-Dichlorophenol	120-83-2	N.D.	120	270	5
10726	Diethylphthalate	84-66-2	N.D.	410	1,000	5
10726	2,4-Dimethylphenol	105-67-9	230 J	190	410	5
10726	Dimethylphthalate	131-11-3	N.D.	410 U	1,000	5
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	1,400	3,100	5
10726	2,4-Dinitrophenol	51-28-5	N.D.	2,100	6,200	5
10726	2,4-Dinitrotoluene	121-14-2	N.D.	410	1,000	5
10726	2,6-Dinitrotoluene	606-20-2	N.D.	140	310	5
10726	1,4-Dioxane	123-91-1	N.D.	620	2,100	5

*=This limit was used in the evaluation of the final result

Sample Description: 19050203 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064207
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:32
SDG#: EUR65-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	410	1,000	5
10726	Fluoranthene	206-44-0	340,000	410	2,100	100
10726	Fluorene	86-73-7	21,000	21	100	5
10726	Hexachlorobenzene	118-74-1	N.D.	41	100	5
10726	Hexachlorobutadiene	87-68-3	N.D.	230	470	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	1,200	3,100	5
10726	Hexachloroethane	67-72-1	N.D.	210	1,000	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	93,000	410	2,100	100
10726	Isophorone	78-59-1	N.D.	100	230	5
10726	2-Methylnaphthalene	91-57-6	5,400	21	210	5
10726	2-Methylphenol	95-48-7	N.D.	100	410	5
10726	4-Methylphenol	106-44-5	500	100	310	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	11,000	41	100	5
10726	2-Nitroaniline	88-74-4	N.D.	100	310	5
10726	3-Nitroaniline	99-09-2	N.D.	410	1,000	5
10726	4-Nitroaniline	100-01-6	N.D.	410	1,000	5
10726	Nitrobenzene	98-95-3	N.D.	160	410	5
10726	2-Nitrophenol	88-75-5	N.D.	160	350	5
10726	4-Nitrophenol	100-02-7	N.D.	1,000	3,100	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	140	310	5
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	100	230	5
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	410	1,000	5
10726	Pentachlorophenol	87-86-5	N.D.	410	1,000	5
10726	Phenanthrene	85-01-8	300,000	410	2,100	100
10726	Phenol	108-95-2	280	100	230	5
10726	Pyrene	129-00-0	330,000	410	2,100	100
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	100	230	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	410	1,000	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	190	410	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	160	350	5
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	220	1,100	50
10885	PCB-1221	11104-28-2	N.D. D1	290	1,100	50
10885	PCB-1232	11141-16-5	N.D. D1	500	1,100	50

*=This limit was used in the evaluation of the final result

Sample Description: 19050204 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064208
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:50
SDG#: EUR65-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Toluene	108-88-3	4 J	1	12	1.46
11995	1,2,3-Trichlorobenzene	87-61-6	N.D.	12	23	1.46
11995	1,2,4-Trichlorobenzene	120-82-1	N.D.	12	23	1.46
11995	1,1,1-Trichloroethane	71-55-6	N.D.	1	12	1.46
11995	1,1,2-Trichloroethane	79-00-5	N.D.	1	12	1.46
11995	Trichloroethene	79-01-6	N.D.	1	12	1.46
11995	Trichlorofluoromethane	75-69-4	N.D.	2	12	1.46
11995	Vinyl Chloride	75-01-4	N.D.	1	12	1.46
11995	m+p-Xylene	179601-23-1	4 J	2	12	1.46
11995	o-Xylene	95-47-6	3 J	0.9	12	1.46

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken: Similar results were obtained for the internal standard in the background, matrix spike and matrix spike duplicate indicating a matrix effect.

GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	170,000	260	1,300	5
10726	Acenaphthylene	208-96-8	7,200	260	1,300	5
10726	Acetophenone	98-86-2	N.D.	1,300	3,900	5
10726	Anthracene	120-12-7	230,000	260	1,300	5
10726	Atrazine	1912-24-9	N.D.	16,000	34,000	5
10726	Benzaldehyde	100-52-7	N.D.	5,200	13,000	5
10726	Benzo(a)anthracene	56-55-3	510,000	10,000	26,000	100
10726	Benzo(a)pyrene	50-32-8	470,000	5,200	26,000	100
10726	Benzo(b)fluoranthene	205-99-2	610,000	5,200	26,000	100
10726	Benzo(g,h,i)perylene	191-24-2	240,000	260	1,300	5
10726	Benzo(k)fluoranthene	207-08-9	270,000	260	1,300	5
10726	1,1'-Biphenyl	92-52-4	8,200	1,300	2,900	5
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	1,800	3,900	5
10726	Butylbenzylphthalate	85-68-7	N.D.	5,200	13,000	5
10726	Di-n-butylphthalate	84-74-2	N.D.	5,200	13,000	5
10726	Caprolactam	105-60-2	N.D.	2,600	13,000	5
10726	Carbazole	86-74-8	190,000	1,300	2,900	5
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	1,800	3,900	5
10726	4-Chloroaniline	106-47-8	N.D.	2,600	13,000	5
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	1,300	2,900	5
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	1,800	3,900	5
10726	2-Chloronaphthalene	91-58-7	N.D.	520	2,600	5
10726	2-Chlorophenol	95-57-8	N.D.	1,300	2,900	5
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	1,600	3,400	5
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	1,600	3,400	5

*=This limit was used in the evaluation of the final result

Sample Description: **19050204 Grab Sediment**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: **SW 1064208**
ELLE Group #: **2045320**
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:50
SDG#: EUR65-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	710,000 JK	5,200	26,000	100
10726	Dibenz(a,h)anthracene	53-70-3	73,000	520	1,300	5
10726	Dibenzofuran	132-64-9	81,000	1,300	2,900	5
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	7,800 UJK	26,000	5
10726	2,4-Dichlorophenol	120-83-2	N.D.	1,600	3,400	5
10726	Diethylphthalate	84-66-2	N.D.	5,200	13,000	5
10726	2,4-Dimethylphenol	105-67-9	N.D.	2,400	5,200	5
10726	Dimethylphthalate	131-11-3	N.D.	5,200	13,000	5
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	18,000	39,000	5
10726	2,4-Dinitrophenol	51-28-5	N.D.	26,000	78,000	5
10726	2,4-Dinitrotoluene	121-14-2	N.D.	5,200	13,000	5
10726	2,6-Dinitrotoluene	606-20-2	N.D.	1,800	3,900	5
10726	1,4-Dioxane	123-91-1	N.D.	7,800	26,000	5
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	5,200	13,000	5
10726	Fluoranthene	206-44-0	1,500,000 JK	5,200	26,000	100
10726	Fluorene	86-73-7	98,000 JK	260	1,300	5
10726	Hexachlorobenzene	118-74-1	N.D.	520 UJK	1,300	5
10726	Hexachlorobutadiene	87-68-3	N.D.	2,900	6,000	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	16,000	39,000	5
10726	Hexachloroethane	67-72-1	N.D.	2,600	13,000	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	250,000 JK	260	1,300	5
10726	Isophorone	78-59-1	N.D.	1,300 UJK	2,900	5
10726	2-Methylnaphthalene	91-57-6	30,000 JK	260	2,600	5
10726	2-Methylphenol	95-48-7	N.D.	1,300 UJK	5,200	5
10726	4-Methylphenol	106-44-5	3,200 J Q	1,300	3,900	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	63,000 JK	520	1,300	5
10726	2-Nitroaniline	88-74-4	N.D.	1,300 UJK	3,900	5
10726	3-Nitroaniline	99-09-2	N.D.	5,200	13,000	5
10726	4-Nitroaniline	100-01-6	N.D.	5,200	13,000	5
10726	Nitrobenzene	98-95-3	N.D.	2,100	5,200	5
10726	2-Nitrophenol	88-75-5	N.D.	2,100	4,400	5
10726	4-Nitrophenol	100-02-7	N.D.	13,000	39,000	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	1,800	3,900	5
10726	N-Nitrosodiphenylamine	86-30-6	3,700 JK	1,300	2,900	5

*=This limit was used in the evaluation of the final result

Sample Description: 19050204 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064208
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:50
SDG#: EUR65-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	5,200	13,000	5
10726	Pentachlorophenol	87-86-5	N.D.	5,200	13,000	5
10726	Phenanthrene	85-01-8	1,500,000	5,200	26,000	100
10726	Phenol	108-95-2	1,900 J	1,300	2,900	5
10726	Pyrene	129-00-0	1,400,000	5,200	26,000	100
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	1,300	2,900	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	5,200	13,000	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	2,400	5,200	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	2,100	4,400	5
	Reporting limits were raised due to interference from the sample matrix.					
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	5.9 J	0.6	14	43.38
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	11,000	54,000	200
10885	PCB-1221	11104-28-2	N.D. D1	15,000	54,000	200
10885	PCB-1232	11141-16-5	N.D. D1	25,000	54,000	200
10885	PCB-1242	53469-21-9	N.D. D1	10,000	54,000	200
10885	PCB-1248	12672-29-6	N.D. D1	10,000	54,000	200
10885	PCB-1254	11097-69-1	N.D. D1	10,000	54,000	200
10885	PCB-1260	11096-82-5	N.D. D1	16,000	54,000	200
10885	PCB-1262	37324-23-5	N.D. D1	10,000	54,000	200
10885	PCB-1268	11100-14-4	70,000 D1	10,000	54,000	200
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	23,000	630	1,600	50
08272	Heavy Range Organics C24-C40	n.a.	32,000	1,600	4,800	50
	Reporting limits were raised due to interference from the sample matrix.					
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	11,800	15.5	39.3	1
01650	Calcium	7440-70-2	3,840	31.8	65.5	1
01654	Iron	7439-89-6	21,300	6.55	26.2	1
01657	Magnesium	7439-95-4	3,800	2.19	13.1	1
01662	Potassium	7440-09-7	1,450	25.9	65.5	1
01667	Sodium	7440-23-5	291	60.5	131	1

*=This limit was used in the evaluation of the final result

Sample Description: 19050301 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064212
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 12:35
SDG#: EUR65-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	3,600	17	85	5
10726	Acenaphthylene	208-96-8	210	17	85	5
10726	Acetophenone	98-86-2	110 J Q	85	260	5
10726	Anthracene	120-12-7	5,500	17	85	5
10726	Atrazine	1912-24-9	N.D.	1,000 U	2,200	5
10726	Benzaldehyde	100-52-7	N.D.	340 U	850	5
10726	Benzo(a)anthracene	56-55-3	17,000	34	85	5
10726	Benzo(a)pyrene	50-32-8	17,000	17	85	5
10726	Benzo(b)fluoranthene	205-99-2	25,000	170	850	50
10726	Benzo(g,h,i)perylene	191-24-2	9,900	17	85	5
10726	Benzo(k)fluoranthene	207-08-9	9,400	17	85	5
10726	1,1'-Biphenyl	92-52-4	160 J Q	85	190	5
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	120 U	260	5
10726	Butylbenzylphthalate	85-68-7	N.D.	340 U	850	5
10726	Di-n-butylphthalate	84-74-2	N.D.	340 U	850	5
10726	Caprolactam	105-60-2	N.D.	170 U	850	5
10726	Carbazole	86-74-8	5,000	85	190	5
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	120 U	260	5
10726	4-Chloroaniline	106-47-8	N.D.	170 U	850	5
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	85 U	190	5
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	120 U	260	5
10726	2-Chloronaphthalene	91-58-7	N.D.	34 U	170	5
10726	2-Chlorophenol	95-57-8	N.D.	85 U	190	5
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	100 U	220	5
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	100 U	220	5
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	25,000	170	850	50
10726	Dibenz(a,h)anthracene	53-70-3	3,300	34	85	5
10726	Dibenzofuran	132-64-9	1,700	85	190	5
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	510 U	1,700	5
10726	2,4-Dichlorophenol	120-83-2	N.D.	100 U	220	5
10726	Diethylphthalate	84-66-2	N.D.	340 U	850	5
10726	2,4-Dimethylphenol	105-67-9	N.D.	150 U	340	5
10726	Dimethylphthalate	131-11-3	N.D.	340 U	850	5
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	1,200 U	2,600	5
10726	2,4-Dinitrophenol	51-28-5	N.D.	1,700 U	5,100	5
10726	2,4-Dinitrotoluene	121-14-2	N.D.	340 U	850	5
10726	2,6-Dinitrotoluene	606-20-2	N.D.	120 U	260	5
10726	1,4-Dioxane	123-91-1	N.D.	510 U	1,700	5

*=This limit was used in the evaluation of the final result

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Sample Description: 19050301 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064212
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 12:35
SDG#: EUR65-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	~~N.D.~~	340 U	850	5
10726	Fluoranthene	206-44-0	46,000	170	850	50
10726	Fluorene	86-73-7	2,300	17	85	5
10726	Hexachlorobenzene	118-74-1	N.D.	34 U	85	5
10726	Hexachlorobutadiene	87-68-3	N.D.	190	390	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	1,000	2,600	5
10726	Hexachloroethane	67-72-1	N.D.	170	850	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	9,400	17	85	5
10726	Isophorone	78-59-1	~~N.D.~~	85 U	190	5
10726	2-Methylnaphthalene	91-57-6	490	17	170	5
10726	2-Methylphenol	95-48-7	N.D.	85 U	340	5
10726	4-Methylphenol	106-44-5	N.D.	85	260	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	1,800	34	85	5
10726	2-Nitroaniline	88-74-4	N.D.	85	260	5
10726	3-Nitroaniline	99-09-2	N.D.	340	850	5
10726	4-Nitroaniline	100-01-6	N.D.	340	850	5
10726	Nitrobenzene	98-95-3	N.D.	140	340	5
10726	2-Nitrophenol	88-75-5	N.D.	140	290	5
10726	4-Nitrophenol	100-02-7	N.D.	850	2,600	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	260	5
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	85	190	5
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	340 U	850	5
10726	Pentachlorophenol	87-86-5	N.D.	340 U	850	5
10726	Phenanthrene	85-01-8	40,000	170 U	850	50
10726	Phenol	108-95-2	~~N.D.~~	85 U	190	5
10726	Pyrene	129-00-0	45,000	170	850	50
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	85 U	190	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	340	850	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	340	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	140	290	5
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	3,700	18,000	500
10885	PCB-1221	11104-28-2	N.D. D1	4,800	18,000	500
10885	PCB-1232	11141-16-5	N.D. D1	8,300	18,000	500

*=This limit was used in the evaluation of the final result

Sample Description: 19050302 Grab Soil

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064213
ELLE Group #: 2045320
Matrix: Soil

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:43
SDG#: EUR65-05

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	200,000	3,500	18,000	100
10726	Acenaphthylene	208-96-8	9,600	180	880	5
10726	Acetophenone	98-86-2	~~N.D.~~	880 U	2,600	5
10726	Anthracene	120-12-7	220,000	3,500	18,000	100
10726	Atrazine	1912-24-9	N.D.	11,000 U	23,000	5
10726	Benzaldehyde	100-52-7	N.D.	3,500 U	8,800	5
10726	Benzo(a)anthracene	56-55-3	560,000	7,000	18,000	100
10726	Benzo(a)pyrene	50-32-8	480,000	3,500	18,000	100
10726	Benzo(b)fluoranthene	205-99-2	620,000	3,500	18,000	100
10726	Benzo(g,h,i)perylene	191-24-2	230,000	3,500	18,000	100
10726	Benzo(k)fluoranthene	207-08-9	210,000	180	880	5
10726	1,1'-Biphenyl	92-52-4	12,000	880	1,900	5
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	1,200 U	2,600	5
10726	Butylbenzylphthalate	85-68-7	N.D.	3,500 U	8,800	5
10726	Di-n-butylphthalate	84-74-2	N.D.	3,500 U	8,800	5
10726	Caprolactam	105-60-2	N.D.	1,800 U	8,800	5
10726	Carbazole	86-74-8	200,000	18,000	39,000	100
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	1,200 U	2,600	5
10726	4-Chloroaniline	106-47-8	N.D.	1,800 U	8,800	5
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	880 U	1,900	5
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	1,200 U	2,600	5
10726	2-Chloronaphthalene	91-58-7	N.D.	350 U	1,800	5
10726	2-Chlorophenol	95-57-8	N.D.	880 U	1,900	5
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	1,100 U	2,300	5
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	1,100 U	2,300	5
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	790,000	3,500	18,000	100
10726	Dibenz(a,h)anthracene	53-70-3	90,000	350	880	5
10726	Dibenzofuran	132-64-9	120,000	880	1,900	5
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	5,300 U	18,000	5
10726	2,4-Dichlorophenol	120-83-2	N.D.	1,100 U	2,300	5
10726	Diethylphthalate	84-66-2	N.D.	3,500 U	8,800	5
10726	2,4-Dimethylphenol	105-67-9	1,800 JQ	1,600	3,500	5
10726	Dimethylphthalate	131-11-3	N.D.	3,500 U	8,800	5
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	12,000 U	26,000	5
10726	2,4-Dinitrophenol	51-28-5	N.D.	18,000 U	53,000	5
10726	2,4-Dinitrotoluene	121-14-2	N.D.	3,500 U	8,800	5
10726	2,6-Dinitrotoluene	606-20-2	N.D.	1,200 U	2,600	5
10726	1,4-Dioxane	123-91-1	N.D.	5,300 U	18,000	5

*=This limit was used in the evaluation of the final result

Sample Description: 19050302 Grab Soil

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064213
ELLE Group #: 2045320
Matrix: Soil

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:43
SDG#: EUR65-05

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	~~N.D.~~	3,500 U	8,800	5
10726	Fluoranthene	206-44-0	1,700,000	3,500	18,000	100
10726	Fluorene	86-73-7	120,000	180	880	5
10726	Hexachlorobenzene	118-74-1	N.D.	350 U	880	5
10726	Hexachlorobutadiene	87-68-3	N.D.	1,900	4,000	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	11,000	26,000	5
10726	Hexachloroethane	67-72-1	N.D.	1,800	8,800	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	230,000	3,500	18,000	100
10726	Isophorone	78-59-1	~~N.D.~~	880 U	1,900	5
10726	2-Methylnaphthalene	91-57-6	44,000	180	1,800	5
10726	2-Methylphenol	95-48-7	~~N.D.~~	880 U	3,500	5
10726	4-Methylphenol	106-44-5	3,100	880	2,600	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	96,000	350	880	5
10726	2-Nitroaniline	88-74-4	N.D.	880	2,600	5
10726	3-Nitroaniline	99-09-2	N.D.	3,500	8,800	5
10726	4-Nitroaniline	100-01-6	N.D.	3,500	8,800	5
10726	Nitrobenzene	98-95-3	N.D.	1,400	3,500	5
10726	2-Nitrophenol	88-75-5	N.D.	1,400	3,000	5
10726	4-Nitrophenol	100-02-7	N.D.	8,800	26,000	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	1,200	2,600	5
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	880	1,900	5
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	3,500 U	8,800	5
10726	Pentachlorophenol	87-86-5	N.D.	3,500 U	8,800	5
10726	Phenanthrene	85-01-8	1,800,000	3,500	18,000	100
10726	Phenol	108-95-2	1,700 J	880	1,900	5
10726	Pyrene	129-00-0	1,500,000	3,500	18,000	100
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	880 U	1,900	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	3,500	8,800	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	1,600	3,500	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	1,400	3,000	5
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	76	360	20
10885	PCB-1221	11104-28-2	N.D. D1	97	360	20
10885	PCB-1232	11141-16-5	N.D. D1	170	360	20

*=This limit was used in the evaluation of the final result

Sample Description: **19050701 Grab Product**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: **SW 1064214**
ELLE Group #: **2045320**
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:59
SDG#: EUR65-06

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	210,000 JK	1,700	8,400	10
10726	Acenaphthylene	208-96-8	3,300 JQ	1,700	8,400	10
10726	Acetophenone	98-86-2	~~N.D.~~ UJK	8,400	25,000	10
10726	Anthracene	120-12-7	470,000 JK	1,700	8,400	10
10726	Atrazine	1912-24-9	N.D.	100,000 UJK	220,000	10
10726	Benzaldehyde	100-52-7	N.D.	33,000 UJK	84,000	10
10726	Benzo(a)anthracene	56-55-3	2,600,000 JK	67,000	170,000	200
10726	Benzo(a)pyrene	50-32-8	3,400,000	33,000	170,000	200
10726	Benzo(b)fluoranthene	205-99-2	4,500,000	33,000	170,000	200
10726	Benzo(g,h,i)perylene	191-24-2	1,900,000	1,700	8,400	10
10726	Benzo(k)fluoranthene	207-08-9	1,300,000	1,700	8,400	10
10726	1,1'-Biphenyl	92-52-4	N.D.	8,400 UJK	18,000	10
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	12,000	25,000	10
10726	Butylbenzylphthalate	85-68-7	N.D.	33,000	84,000	10
10726	Di-n-butylphthalate	84-74-2	N.D.	33,000	84,000	10
10726	Caprolactam	105-60-2	N.D.	17,000	84,000	10
10726	Carbazole	86-74-8	710,000 JK	8,400	18,000	10
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	12,000 UJK	25,000	10
10726	4-Chloroaniline	106-47-8	N.D.	17,000	84,000	10
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	8,400	18,000	10
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	12,000	25,000	10
10726	2-Chloronaphthalene	91-58-7	N.D.	3,300	17,000	10
10726	2-Chlorophenol	95-57-8	N.D.	8,400	18,000	10
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	10,000	22,000	10
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	10,000 UJK	22,000	10
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	2,800,000 JK	33,000	170,000	200
10726	Dibenz(a,h)anthracene	53-70-3	480,000	3,300	8,400	10
10726	Dibenzofuran	132-64-9	94,000	8,400	18,000	10
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	50,000 UJK	170,000	10
10726	2,4-Dichlorophenol	120-83-2	N.D.	10,000	22,000	10
10726	Diethylphthalate	84-66-2	N.D.	33,000 JK	84,000	10
10726	2,4-Dimethylphenol	105-67-9	N.D.	15,000	33,000	10
10726	Dimethylphthalate	131-11-3	N.D.	33,000 JK	84,000	10
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	120,000	250,000	10
10726	2,4-Dinitrophenol	51-28-5	N.D.	170,000	500,000	10
10726	2,4-Dinitrotoluene	121-14-2	N.D.	33,000 JK	84,000	10
10726	2,6-Dinitrotoluene	606-20-2	N.D.	12,000	25,000	10
10726	1,4-Dioxane	123-91-1	N.D.	50,000	170,000	10

*=This limit was used in the evaluation of the final result

Sample Description: **19050701 Grab Product**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: **SW 1064214**
ELLE Group #: **2045320**
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:59
SDG#: EUR65-06

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	~~N.D.~~	33,000 UJK	84,000	10
10726	Fluoranthene	206-44-0	4,600,000 JK	33,000	170,000	200
10726	Fluorene	86-73-7	210,000 JK	1,700	8,400	10
10726	Hexachlorobenzene	118-74-1	N.D.	3,300 UJK	8,400	10
10726	Hexachlorobutadiene	87-68-3	N.D.	18,000	38,000	10
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	100,000	250,000	10
10726	Hexachloroethane	67-72-1	N.D.	17,000	84,000	10
10726	Indeno(1,2,3-cd)pyrene	193-39-5	1,700,000 JK	1,700	8,400	10
10726	Isophorone	78-59-1	~~N.D.~~	8,400 UJK	18,000	10
10726	2-Methylnaphthalene	91-57-6	11,000 J Q	1,700	17,000	10
10726	2-Methylphenol	95-48-7	N.D.	8,400 U	33,000	10
10726	4-Methylphenol	106-44-5	N.D.	8,400 U	25,000	10
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	14,000 JK	3,300	8,400	10
10726	2-Nitroaniline	88-74-4	N.D.	8,400 UJK	25,000	10
10726	3-Nitroaniline	99-09-2	N.D.	33,000	84,000	10
10726	4-Nitroaniline	100-01-6	N.D.	33,000	84,000	10
10726	Nitrobenzene	98-95-3	N.D.	13,000	33,000	10
10726	2-Nitrophenol	88-75-5	N.D.	13,000	28,000	10
10726	4-Nitrophenol	100-02-7	N.D.	84,000	250,000	10
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	12,000 UJK	25,000	10
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	8,400 UJK	18,000	10
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	33,000 UJK	84,000	10
10726	Pentachlorophenol	87-86-5	N.D.	33,000 U	84,000	10
10726	Phenanthrene	85-01-8	2,500,000 JK	33,000	170,000	200
10726	Phenol	108-95-2	~~N.D.~~	8,400 U	18,000	10
10726	Pyrene	129-00-0	4,000,000 JK	33,000	170,000	200
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	8,400 UJK	18,000	10
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	33,000	84,000	10
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	15,000	33,000	10
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	13,000	28,000	10
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	18	85	5
10885	PCB-1221	11104-28-2	N.D. D1	23	85	5
10885	PCB-1232	11141-16-5	N.D. D1	40	85	5

*=This limit was used in the evaluation of the final result

Sample Description: 19050801 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064216
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:15
SDG#: EUR65-08

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	170	3	16	1
10726	Acenaphthylene	208-96-8	27	3	16	1
10726	Acetophenone	98-86-2	~~N.D.~~	16 U	49	1
10726	Anthracene	120-12-7	280	3	16	1
10726	Atrazine	1912-24-9	~~N.D.~~	200 U	430	1
10726	Benzaldehyde	100-52-7	160 J Q	66	160	1
10726	Benzo(a)anthracene	56-55-3	2,100	7	16	1
10726	Benzo(a)pyrene	50-32-8	3,000	3	16	1
10726	Benzo(b)fluoranthene	205-99-2	3,000	3	16	1
10726	Benzo(g,h,i)perylene	191-24-2	2,800	3	16	1
10726	Benzo(k)fluoranthene	207-08-9	1,100	3	16	1
10726	1,1'-Biphenyl	92-52-4	70	16	36	1
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	23 U	49	1
10726	Butylbenzylphthalate	85-68-7	N.D.	66	160	1
10726	Di-n-butylphthalate	84-74-2	N.D.	66	160	1
10726	Caprolactam	105-60-2	N.D.	33	160	1
10726	Carbazole	86-74-8	240	16	36	1
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	23 U	49	1
10726	4-Chloroaniline	106-47-8	N.D.	33	160	1
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	16	36	1
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	23	49	1
10726	2-Chloronaphthalene	91-58-7	N.D.	7	33	1
10726	2-Chlorophenol	95-57-8	N.D.	16	36	1
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	20	43	1
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	20	43	1
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	3,000	3	16	1
10726	Dibenz(a,h)anthracene	53-70-3	980	7	16	1
10726	Dibenzofuran	132-64-9	210	16	36	1
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	99 U	330	1
10726	2,4-Dichlorophenol	120-83-2	N.D.	20	43	1
10726	Diethylphthalate	84-66-2	N.D.	66	160	1
10726	2,4-Dimethylphenol	105-67-9	N.D.	30	66	1
10726	Dimethylphthalate	131-11-3	N.D.	66	160	1
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	230	490	1
10726	2,4-Dinitrophenol	51-28-5	N.D.	330	990	1
10726	2,4-Dinitrotoluene	121-14-2	N.D.	66	160	1
10726	2,6-Dinitrotoluene	606-20-2	N.D.	23	49	1
10726	1,4-Dioxane	123-91-1	N.D.	99	330	1

*=This limit was used in the evaluation of the final result

Sample Description: 19050801 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064216
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:15
SDG#: EUR65-08

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	66	160	1
10726	Fluoranthene	206-44-0	2,400	3	16	1
10726	Fluorene	86-73-7	100	3	16	1
10726	Hexachlorobenzene	118-74-1	N.D.	7	16	1
10726	Hexachlorobutadiene	87-68-3	N.D.	36	76	1
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	200	490	1
10726	Hexachloroethane	67-72-1	N.D.	33	160	1
10726	Indeno(1,2,3-cd)pyrene	193-39-5	1,400	3	16	1
10726	Isophorone	78-59-1	N.D.	16	36	1
10726	2-Methylnaphthalene	91-57-6	490	3	33	1
10726	2-Methylphenol	95-48-7	N.D.	16	66	1
10726	4-Methylphenol	106-44-5	N.D.	16	49	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	400	7	16	1
10726	2-Nitroaniline	88-74-4	N.D.	16	49	1
10726	3-Nitroaniline	99-09-2	N.D.	66	160	1
10726	4-Nitroaniline	100-01-6	N.D.	66	160	1
10726	Nitrobenzene	98-95-3	N.D.	26	66	1
10726	2-Nitrophenol	88-75-5	N.D.	26	56	1
10726	4-Nitrophenol	100-02-7	N.D.	160	490	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	23	49	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	16	36	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	66	160	1
10726	Pentachlorophenol	87-86-5	N.D.	66	160	1
10726	Phenanthrene	85-01-8	1,500	3	16	1
10726	Phenol	108-95-2	34 J	16	36	1
10726	Pyrene	129-00-0	3,100	3	16	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	16	36	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	66	160	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	30	66	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	26	56	1
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	3.6	17	1
10885	PCB-1221	11104-28-2	N.D. D1	4.6	17	1
10885	PCB-1232	11141-16-5	N.D. D1	8.0	17	1

*=This limit was used in the evaluation of the final result

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Sample Description: 19050802 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064217
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:24
SDG#: EUR65-09

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	81 J Q	20 UJL	98	1
10726	Acenaphthylene	208-96-8	N.D.	20 UJL	98	1
10726	Acetophenone	98-86-2	N.D.	98 UJL	290	1
10726	Anthracene	120-12-7	68 J Q	20	98	1
10726	Atrazine	1912-24-9	N.D.	1,200 UJL	2,500	1
10726	Benzaldehyde	100-52-7	N.D.	390	980	1
10726	Benzo(a)anthracene	56-55-3	N.D.	39	98	1
10726	Benzo(a)pyrene	50-32-8	N.D.	20	98	1
10726	Benzo(b)fluoranthene	205-99-2	N.D.	20	98	1
10726	Benzo(g,h,i)perylene	191-24-2	N.D.	20	98	1
10726	Benzo(k)fluoranthene	207-08-9	N.D.	20	98	1
10726	1,1'-Biphenyl	92-52-4	130 J Q	98 UJL	220	1
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	140	290	1
10726	Butylbenzylphthalate	85-68-7	N.D.	390	980	1
10726	Di-n-butylphthalate	84-74-2	N.D.	390	980	1
10726	Caprolactam	105-60-2	N.D.	200	980	1
10726	Carbazole	86-74-8	N.D.	98	220	1
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	140	290	1
10726	4-Chloroaniline	106-47-8	N.D.	200	980	1
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	98	220	1
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	140	290	1
10726	2-Chloronaphthalene	91-58-7	N.D.	39	200	1
10726	2-Chlorophenol	95-57-8	N.D.	98	220	1
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	120	250	1
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	120	250	1
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	48 J Q	20	98	1
10726	Dibenz(a,h)anthracene	53-70-3	N.D.	39 UJL	98	1
10726	Dibenzofuran	132-64-9	100 J Q	98	220	1
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	590 UJL	2,000	1
10726	2,4-Dichlorophenol	120-83-2	N.D.	120	250	1
10726	Diethylphthalate	84-66-2	N.D.	390	980	1
10726	2,4-Dimethylphenol	105-67-9	N.D.	180	390	1
10726	Dimethylphthalate	131-11-3	N.D.	390	980	1
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	1,400	2,900	1
10726	2,4-Dinitrophenol	51-28-5	N.D.	2,000	5,900	1
10726	2,4-Dinitrotoluene	121-14-2	N.D.	390	980	1
10726	2,6-Dinitrotoluene	606-20-2	N.D.	140	290	1
10726	1,4-Dioxane	123-91-1	N.D.	590	2,000	1

*=This limit was used in the evaluation of the final result

Sample Description: 19050802 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064217
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:24
SDG#: EUR65-09

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	~~N.D.~~	390 U JL	980	1
10726	Fluoranthene	206-44-0	350 JL	20	98	1
10726	Fluorene	86-73-7	N.D.	20 UJL	98	1
10726	Hexachlorobenzene	118-74-1	N.D.	39	98	1
10726	Hexachlorobutadiene	87-68-3	N.D.	220	450	1
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	1,200	2,900	1
10726	Hexachloroethane	67-72-1	N.D.	200	980	1
10726	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	20	98	1
10726	Isophorone	78-59-1	N.D.	98	220	1
10726	2-Methylnaphthalene	91-57-6	1,000 JL	20	200	1
10726	2-Methylphenol	95-48-7	N.D.	98 UJL	390	1
10726	4-Methylphenol	106-44-5	N.D.	98 UJL	290	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	2,200 JL	39	98	1
10726	2-Nitroaniline	88-74-4	N.D.	98 UJL	290	1
10726	3-Nitroaniline	99-09-2	N.D.	390	980	1
10726	4-Nitroaniline	100-01-6	N.D.	390	980	1
10726	Nitrobenzene	98-95-3	N.D.	160	390	1
10726	2-Nitrophenol	88-75-5	N.D.	160	330	1
10726	4-Nitrophenol	100-02-7	N.D.	980	2,900	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	140	290	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	98	220	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	390 U JL	980	1
10726	Pentachlorophenol	87-86-5	N.D.	390 UJL	980	1
10726	Phenanthrene	85-01-8	540 JL	20	98	1
10726	Phenol	108-95-2	~~N.D.~~	98 UJL	220	1
10726	Pyrene	129-00-0	400 JL	20	98	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	98 UJL	220	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	390	980	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	180	390	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	160	330	1

The GC/MS semivolatile internal standard peak areas were outside of QC limits. The matrix spike and matrix spike duplicate samples were analyzed and internal standard peak areas were again outside of QC limits, indicating a matrix effect.

Reporting limits were raised due to interference from the sample matrix.

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: 19050803 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064218
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:34
SDG#: EUR65-10

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	68 J Q	17	83	5
10726	Acenaphthylene	208-96-8	N.D.	17 U	83	5
10726	Acetophenone	98-86-2	N.D. MW	83 U	250	5
10726	Anthracene	120-12-7	64 J Q	17	83	5
10726	Atrazine	1912-24-9	N.D.	1,000 U	2,200	5
10726	Benzaldehyde	100-52-7	N.D. MW	330 U	830	5
10726	Benzo(a)anthracene	56-55-3	170	33	83	5
10726	Benzo(a)pyrene	50-32-8	74 J Q	17	83	5
10726	Benzo(b)fluoranthene	205-99-2	97	17	83	5
10726	Benzo(g,h,i)perylene	191-24-2	N.D. MW	17 U	83	5
10726	Benzo(k)fluoranthene	207-08-9	66 J Q	17	83	5
10726	1,1'-Biphenyl	92-52-4	N.D.	83 U	180	5
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	120	250	5
10726	Butylbenzylphthalate	85-68-7	N.D.	330	830	5
10726	Di-n-butylphthalate	84-74-2	N.D.	330	830	5
10726	Caprolactam	105-60-2	N.D.	170	830	5
10726	Carbazole	86-74-8	N.D.	83	180	5
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	120	250	5
10726	4-Chloroaniline	106-47-8	N.D.	170	830	5
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	83	180	5
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	120	250	5
10726	2-Chloronaphthalene	91-58-7	N.D.	33	170	5
10726	2-Chlorophenol	95-57-8	N.D.	83	180	5
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	100	220	5
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D. MW	100	220	5
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	180	17	83	5
10726	Dibenz(a,h)anthracene	53-70-3	N.D.	33 U	83	5
10726	Dibenzofuran	132-64-9	N.D.	83	180	5
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	500	1,700	5
10726	2,4-Dichlorophenol	120-83-2	N.D.	100	220	5
10726	Diethylphthalate	84-66-2	N.D.	330	830	5
10726	2,4-Dimethylphenol	105-67-9	N.D.	150	330	5
10726	Dimethylphthalate	131-11-3	N.D.	330	830	5
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	1,200	2,500	5
10726	2,4-Dinitrophenol	51-28-5	N.D.	1,700	5,000	5
10726	2,4-Dinitrotoluene	121-14-2	N.D.	330	830	5
10726	2,6-Dinitrotoluene	606-20-2	N.D.	120	250	5
10726	1,4-Dioxane	123-91-1	N.D. MW	500	1,700	5

*=This limit was used in the evaluation of the final result

Sample Description: 19050803 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064218
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:34
SDG#: EUR65-10

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	~~N.D.~~	330 U	830	5
10726	Fluoranthene	206-44-0	460	17	83	5
10726	Fluorene	86-73-7	55 J Q	17	83	5
10726	Hexachlorobenzene	118-74-1	N.D.	33 U	83	5
10726	Hexachlorobutadiene	87-68-3	N.D.	180	380	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	1,000	2,500	5
10726	Hexachloroethane	67-72-1	N.D.	170	830	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	35 J Q	17	83	5
10726	Isophorone	78-59-1	~~N.D.~~	83 U	180	5
10726	2-Methylnaphthalene	91-57-6	19 J Q	17	170	5
10726	2-Methylphenol	95-48-7	N.D.	83 U	330	5
10726	4-Methylphenol	106-44-5	N.D.	83 U	250	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	60 J Q	33 U	83	5
10726	2-Nitroaniline	88-74-4	N.D.	83	250	5
10726	3-Nitroaniline	99-09-2	N.D.	330	830	5
10726	4-Nitroaniline	100-01-6	N.D.	330	830	5
10726	Nitrobenzene	98-95-3	N.D.	130	330	5
10726	2-Nitrophenol	88-75-5	N.D.	130	280	5
10726	4-Nitrophenol	100-02-7	N.D.	830	2,500	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	250	5
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	83	180	5
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	330 U	830	5
10726	Pentachlorophenol	87-86-5	N.D.	330 U	830	5
10726	Phenanthrene	85-01-8	470	17	83	5
10726	Phenol	108-95-2	~~N.D.~~	83 U	180	5
10726	Pyrene	129-00-0	430	17	83	5
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	83 U	180	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	330	830	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	330	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	130	280	5
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	18	85	5
10885	PCB-1221	11104-28-2	N.D. D1	23	85	5
10885	PCB-1232	11141-16-5	N.D. D1	40	85	5

*=This limit was used in the evaluation of the final result

Sample Description: 19050804 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064219
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:43
SDG#: EUR65-11

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	22,000 JL	33	170	10
10726	Acenaphthylene	208-96-8	290 JL	33	170	10
10726	Acetophenone	98-86-2	~~N.D.~~	170 UJL	500	10
10726	Anthracene	120-12-7	71,000 JL	330	1,700	100
10726	Atrazine	1912-24-9	N.D.	2,000 UJL	4,300	10
10726	Benzaldehyde	100-52-7	N.D.	660 UJL	1,700	10
10726	Benzo(a)anthracene	56-55-3	430,000 JL	6,600	17,000	1000
10726	Benzo(a)pyrene	50-32-8	560,000	3,300	17,000	1000
10726	Benzo(b)fluoranthene	205-99-2	720,000	3,300	17,000	1000
10726	Benzo(g,h,i)perylene	191-24-2	380,000	330	1,700	100
10726	Benzo(k)fluoranthene	207-08-9	320,000	330	1,700	100
10726	1,1'-Biphenyl	92-52-4	190 J Q	170	360	10
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	230 UJL	500	10
10726	Butylbenzylphthalate	85-68-7	N.D.	660	1,700	10
10726	Di-n-butylphthalate	84-74-2	N.D.	660	1,700	10
10726	Caprolactam	105-60-2	N.D.	330	1,700	10
10726	Carbazole	86-74-8	95,000 JL	1,700	3,600	100
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	230 UJL	500	10
10726	4-Chloroaniline	106-47-8	N.D.	330	1,700	10
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	170	360	10
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	230	500	10
10726	2-Chloronaphthalene	91-58-7	N.D.	66	330	10
10726	2-Chlorophenol	95-57-8	N.D.	170	360	10
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	200	430	10
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	200	430	10
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	500,000 JL	3,300	17,000	1000
10726	Dibenz(a,h)anthracene	53-70-3	92,000	660	1,700	100
10726	Dibenzofuran	132-64-9	10,000	170	360	10
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	990 UJL	3,300	10
10726	2,4-Dichlorophenol	120-83-2	N.D.	200	430	10
10726	Diethylphthalate	84-66-2	N.D.	660	1,700	10
10726	2,4-Dimethylphenol	105-67-9	N.D.	300	660	10
10726	Dimethylphthalate	131-11-3	N.D.	660	1,700	10
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	2,300	5,000	10
10726	2,4-Dinitrophenol	51-28-5	N.D.	3,300	9,900	10
10726	2,4-Dinitrotoluene	121-14-2	N.D.	660	1,700	10
10726	2,6-Dinitrotoluene	606-20-2	N.D.	230	500	10
10726	1,4-Dioxane	123-91-1	N.D.	990	3,300	10

*=This limit was used in the evaluation of the final result

Sample Description: 19050804 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064219
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:43
SDG#: EUR65-11

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	660	1,700	10
10726	Fluoranthene	206-44-0	750,000 JL	3,300	17,000	1000
10726	Fluorene	86-73-7	21,000 JL	33	170	10
10726	Hexachlorobenzene	118-74-1	N.D.	66	170	10
10726	Hexachlorobutadiene	87-68-3	N.D.	360	760	10
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	2,000	5,000	10
10726	Hexachloroethane	67-72-1	N.D.	330	1,700	10
10726	Indeno(1,2,3-cd)pyrene	193-39-5	350,000 JL	330	1,700	100
10726	Isophorone	78-59-1	N.D.	170	360	10
10726	2-Methylnaphthalene	91-57-6	1,100 JL	33	330	10
10726	2-Methylphenol	95-48-7	N.D.	170	660	10
10726	4-Methylphenol	106-44-5	N.D.	170	500	10
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	1,300 JL	66	170	10
10726	2-Nitroaniline	88-74-4	N.D.	170	500	10
10726	3-Nitroaniline	99-09-2	N.D.	660	1,700	10
10726	4-Nitroaniline	100-01-6	N.D.	660	1,700	10
10726	Nitrobenzene	98-95-3	N.D.	260	660	10
10726	2-Nitrophenol	88-75-5	N.D.	260	560	10
10726	4-Nitrophenol	100-02-7	N.D.	1,700	5,000	10
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	230	500	10
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	170	360	10
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	660	1,700	10
10726	Pentachlorophenol	87-86-5	N.D.	660	1,700	10
10726	Phenanthrene	85-01-8	400,000 JL	330	1,700	100
10726	Phenol	108-95-2	N.D.	170	360	10
10726	Pyrene	129-00-0	650,000 JL	3,300	17,000	1000
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	170	360	10
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	660	1,700	10
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	300	660	10
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	260	560	10
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	180	850	5
10885	PCB-1221	11104-28-2	N.D. D1	230	850	5
10885	PCB-1232	11141-16-5	N.D. D1	400	850	5

*=This limit was used in the evaluation of the final result

Sample Description: **19050201 Grab Sediment**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: **SW 1064220**
ELLE Group #: **2045320**
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 11:55
SDG#: EUR65-12

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	88 J Q	36	180	5
10726	Acenaphthylene	208-96-8	48 J Q	36	180	5
10726	Acetophenone	98-86-2	N.D.	180 U	540	5
10726	Anthracene	120-12-7	570	36	180	5
10726	Atrazine	1912-24-9	N.D.	2,200 U	4,700	5
10726	Benzaldehyde	100-52-7	N.D.	720 U	1,800	5
10726	Benzo(a)anthracene	56-55-3	2,100	72	180	5
10726	Benzo(a)pyrene	50-32-8	1,800	36	180	5
10726	Benzo(b)fluoranthene	205-99-2	5,400	36	180	5
10726	Benzo(g,h,i)perylene	191-24-2	1,600	36	180	5
10726	Benzo(k)fluoranthene	207-08-9	1,400	36	180	5
10726	1,1'-Biphenyl	92-52-4	N.D.	180 U	400	5
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	250 U	540	5
10726	Butylbenzylphthalate	85-68-7	N.D.	720 U	1,800	5
10726	Di-n-butylphthalate	84-74-2	N.D.	720 U	1,800	5
10726	Caprolactam	105-60-2	N.D.	360 U	1,800	5
10726	Carbazole	86-74-8	530	180	400	5
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	250 U	540	5
10726	4-Chloroaniline	106-47-8	N.D.	360 U	1,800	5
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	180 U	400	5
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	250 U	540	5
10726	2-Chloronaphthalene	91-58-7	N.D.	72 U	360	5
10726	2-Chlorophenol	95-57-8	N.D.	180 U	400	5
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	220 U	470	5
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	220 U	470	5
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
10726	Chrysene	218-01-9	4,500	36	180	5
10726	Dibenz(a,h)anthracene	53-70-3	450	72	180	5
10726	Dibenzofuran	132-64-9	260 J Q	180	400	5
10726	3,3'-Dichlorobenzidine	91-94-1	N.D.	1,100 U	3,600	5
10726	2,4-Dichlorophenol	120-83-2	N.D.	220 U	470	5
10726	Diethylphthalate	84-66-2	N.D.	720 U	1,800	5
10726	2,4-Dimethylphenol	105-67-9	N.D.	330 U	720	5
10726	Dimethylphthalate	131-11-3	N.D.	720 U	1,800	5
10726	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	2,500 U	5,400	5
10726	2,4-Dinitrophenol	51-28-5	N.D.	3,600 U	11,000	5
10726	2,4-Dinitrotoluene	121-14-2	N.D.	720 U	1,800	5
10726	2,6-Dinitrotoluene	606-20-2	N.D.	250 U	540	5
10726	1,4-Dioxane	123-91-1	N.D.	1,100 U	3,600	5

*=This limit was used in the evaluation of the final result

Sample Description: 19050201 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064220
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 11:55
SDG#: EUR65-12

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg		ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	2,100		720	1,800	5
10726	Fluoranthene	206-44-0	7,200		36	180	5
10726	Fluorene	86-73-7	170	J	36	180	5
10726	Hexachlorobenzene	118-74-1	N.D.		72	180	5
10726	Hexachlorobutadiene	87-68-3	N.D.		400	830	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.		2,200	5,400	5
10726	Hexachloroethane	67-72-1	N.D.		360	1,800	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	1,300		36	180	5
10726	Isophorone	78-59-1	N.D.		180	400	5
10726	2-Methylnaphthalene	91-57-6	48	J	36	360	5
10726	2-Methylphenol	95-48-7	N.D.		180	720	5
10726	4-Methylphenol	106-44-5	N.D.		180	540	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.						
10726	Naphthalene	91-20-3	N.D.		72	180	5
10726	2-Nitroaniline	88-74-4	N.D.		180	540	5
10726	3-Nitroaniline	99-09-2	N.D.		720	1,800	5
10726	4-Nitroaniline	100-01-6	N.D.		720	1,800	5
10726	Nitrobenzene	98-95-3	N.D.		290	720	5
10726	2-Nitrophenol	88-75-5	N.D.		290	610	5
10726	4-Nitrophenol	100-02-7	N.D.		1,800	5,400	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.		250	540	5
10726	N-Nitrosodiphenylamine	86-30-6	N.D.		180	400	5
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.						
10726	Di-n-octylphthalate	117-84-0	N.D.		720	1,800	5
10726	Pentachlorophenol	87-86-5	N.D.		720	1,800	5
10726	Phenanthrene	85-01-8	4,400		36	180	5
10726	Phenol	108-95-2	N.D.		180	400	5
10726	Pyrene	129-00-0	4,000		36	180	5
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.		180	400	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.		720	1,800	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.		330	720	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.		290	610	5
	Reporting limits were raised due to interference from the sample matrix.						
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg		ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D.	D1	16,000	74,000	200
10885	PCB-1221	11104-28-2	N.D.	D1	20,000	74,000	200
10885	PCB-1232	11141-16-5	N.D.	D1	35,000	74,000	200

*=This limit was used in the evaluation of the final result

ecology and environment, inc
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 30, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one solid sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for pH (EPA method 9045D) and total carbon (Standard Method 5310B) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B Data Validation Manual Process (S2BVM).

The samples were numbered: 19050803

Data Qualifications:

The sample was maintained at < 6°C. The sample was collected on May 21, 2019, and was analyzed on May 31, 2019 for pH, and June 6, 2019, for total carbon. pH analyses should be performed as soon as possible; the associated pH result was qualified as an estimated quantity with an unknown bias (JK). The sample were analyzed within QC holding time limits of less than 14 days between collection and total carbon analysis.

The pH buffer and laboratory control sample results were within QC limits. All total carbon laboratory control standard, duplicate, and matrix spike results were within QC limits. There were no detections in the total carbon method blank.

In the reviewers' professional judgment, all sample results were acceptable except as noted.

A total of two results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), and the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, 2012. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Analysis Report

Sample Description: 19050803 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064218
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:34
SDG#: EUR65-10

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**SW-846 9045D Nov 2004**		Std. Units	Std. Units	Std. Units	
00394	pH	n.a.	3.04 J	0.0100	0.0100	1
	The pH was measured in water at 20.1 C.					
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	N.D.	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10726	SVOA 8270D/E (microwave)	SW-846 8270D	1	19149SLD026	05/31/2019 03:35	Brandon K Cordova	5
10813	BNA Soil Microwave APP IX	SW-846 3546	1	19149SLD026	05/30/2019 07:00	Joshua S Ruth	1
10885	PCBs 8082A/3546	SW-846 8082A Feb 2007 Rev 1	1	191580020A	06/10/2019 16:39	Covenant Mutuku	5
10497	PCB Microwave Soil Extraction	SW-846 3546	2	191580020A	06/07/2019 19:10	Elizabeth E Donovan	1
01643	Aluminum	SW-846 6010D Rev.4, July 2014	1	191441404901	05/27/2019 18:45	Elaine F Stoltzfus	1
01650	Calcium	SW-846 6010D Rev.4, July 2014	1	191441404901	05/27/2019 18:45	Elaine F Stoltzfus	1
01654	Iron	SW-846 6010D Rev.4, July 2014	1	191441404901	05/27/2019 18:45	Elaine F Stoltzfus	1
01657	Magnesium	SW-846 6010D Rev.4, July 2014	1	191441404901	05/27/2019 18:45	Elaine F Stoltzfus	1
01662	Potassium	SW-846 6010D Rev.4, July 2014	1	191441404901	05/30/2019 04:22	Lisa J Cooke	1
01667	Sodium	SW-846 6010D Rev.4, July 2014	1	191441404901	05/27/2019 18:45	Elaine F Stoltzfus	1
12003	Sulfur	SW-846 6010D Rev.4, July 2014	1	191441404901	05/27/2019 18:45	Elaine F Stoltzfus	1
06124	Antimony	SW-846 6020A	1	191441404901A	06/04/2019 09:41	Patrick J Engle	2
06125	Arsenic	SW-846 6020A	1	191441404901A	05/28/2019 07:17	Choon Y Tian	2
06126	Barium	SW-846 6020A	1	191441404901A	05/28/2019 07:17	Choon Y Tian	2
06127	Beryllium	SW-846 6020A	1	191441404901A	05/28/2019 07:17	Choon Y Tian	2
06128	Cadmium	SW-846 6020A	1	191441404901A	05/28/2019 07:17	Choon Y Tian	2
06131	Chromium	SW-846 6020A	1	191441404901A	05/28/2019 07:17	Choon Y Tian	2
06132	Cobalt	SW-846 6020A	1	191441404901A	06/04/2019 09:41	Patrick J Engle	2
06133	Copper	SW-846 6020A	1	191441404901A	05/28/2019 07:17	Choon Y Tian	2
06135	Lead	SW-846 6020A	1	191441404901A	06/04/2019 09:41	Patrick J Engle	2
06137	Manganese	SW-846 6020A	1	191441404901A	05/28/2019 07:17	Choon Y Tian	2

*=This limit was used in the evaluation of the final result

7-30-19

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Analysis Report

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Sample Description: 19050803 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064218
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:34
SDG#: EUR65-10

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1242	53469-21-9	N.D. D1	17	85	5
10885	PCB-1248	12672-29-6	N.D. D1	17	85	5
10885	PCB-1254	11097-69-1	N.D. D1	17	85	5
10885	PCB-1260	11096-82-5	N.D. D1	25	85	5
10885	PCB-1262	37324-23-5	N.D. D1	17	85	5
10885	PCB-1268	11100-14-4	N.D. D1	17	85	5
Reporting limits were raised due to interference from the sample matrix.						
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	51.1	9.67	24.6	1
01650	Calcium	7440-70-2	35.1 J	19.9	41.0	1
01654	Iron	7439-89-6	176	4.10	16.4	1
01657	Magnesium	7439-95-4	10.3	1.37	8.20	1
01662	Potassium	7440-09-7	N.D.	16.2	41.0	1
01667	Sodium	7440-23-5	99.2	37.9	82.0	1
12003	Sulfur	7704-34-9	274	9.84	41.0	1
	SW-846 6020A		**mg/kg**	**mg/kg**	**mg/kg**	
06124	Antimony	7440-36-0	N.D.	0.104	0.328	2
06125	Arsenic	7440-38-2	0.173 J	0.110	0.328	2
06126	Barium	7440-39-3	2.44	0.316	0.656	2
06127	Beryllium	7440-41-7	N.D.	0.0187	0.0820	2
06128	Cadmium	7440-43-9	0.0526 J	0.0413	0.164	2
06131	Chromium	7440-47-3	1.08	0.274	0.656	2
06132	Cobalt	7440-48-4	0.171	0.0479	0.164	2
06133	Copper	7440-50-8	N.D. K4	2.93	6.56	2
06135	Lead	7439-92-1	2.33	0.0413	0.492	2
06137	Manganese	7439-96-5	1.56 J	0.325	1.64	2
06139	Nickel	7440-02-0	28.9	0.279	0.656	2
06141	Selenium	7782-49-2	N.D.	0.107	0.328	2
06142	Silver	7440-22-4	N.D.	0.0333	0.0820	2
06145	Thallium	7440-28-0	N.D. K1	0.0321	0.0820	2
06148	Vanadium	7440-62-2	38.5	0.0703	0.164	2
06149	Zinc	7440-66-6	8.63	0.995	2.46	2
	SW-846 7471B		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	N.D.	0.0307	0.131	1
Wet Chemistry	**SM 5310 B 2011**		**mg/kg**	**mg/kg**	**mg/kg**	
10065	Total Carbon in Soil	n.a.	940,000	77,300	227,000	1

*=This limit was used in the evaluation of the final result

7-30-19

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720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 30, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one water sample and one solid sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Gx) analyses was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050204 19051002

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The samples were maintained and received within the QC limits of 4°C ± 2°C. The samples were collected on May 20, 2019, and were analyzed by May 28, 2019, therefore meeting QC criteria of less than 14 days between collection and analysis for soil and preserved water samples.

2. **Initial Calibration: Acceptable.**

Calculations were verified as correct. All relative percent differences (RPDs) were less than or equal to the laboratory control limits.

3. **Continuing Calibration: Acceptable.**

Calculations were verified as correct. All percent differences were less than or equal to the laboratory control limits.

4. **Blanks: Acceptable.**

A method blank was analyzed at the required frequency of every 12 hours for each matrix, preparation technique, and analysis system. Gasoline-range TPHs were not detected in the method blank.

5. **System Monitoring Compounds (SMC): Acceptable.**

All recoveries of the SMCs were greater than 10% and within QC limits.

6. **Matrix Spike (MS) and MS Duplicate (MSD) Analyses: Acceptable.**

MS and MSD results were within laboratory QC limits.

7. **Blank Spikes (BS) Analyses: Acceptable.**

BS results were within laboratory QC limits.

8. **Duplicates: Acceptable.**

All spike duplicate results were within laboratory QC limits.

8. **Quantitation and Quantitation Limits: Acceptable.**

Sample quantitation and sample quantitation limits were correctly calculated.

9. **Laboratory Contact: Not Required.**

No laboratory contact was required.

10. **Overall Assessment of Data for Use**

The net soil sample weight for the soil sample was lower than requirements; the sample result was already qualified as an estimated quantity; therefore, no additional actions were taken. A total of two results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050204 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064208
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:50
SDG#: EUR65-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	5,200	13,000	5
10726	Pentachlorophenol	87-86-5	N.D.	5,200	13,000	5
10726	Phenanthrene	85-01-8	1,500,000	5,200	26,000	100
10726	Phenol	108-95-2	1,900 J	1,300	2,900	5
10726	Pyrene	129-00-0	1,400,000	5,200	26,000	100
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	1,300	2,900	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	5,200	13,000	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	2,400	5,200	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	2,100	4,400	5
	Reporting limits were raised due to interference from the sample matrix.					
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	5.9 J Q	0.6	14	43.38
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	11,000	54,000	200
10885	PCB-1221	11104-28-2	N.D. D1	15,000	54,000	200
10885	PCB-1232	11141-16-5	N.D. D1	25,000	54,000	200
10885	PCB-1242	53469-21-9	N.D. D1	10,000	54,000	200
10885	PCB-1248	12672-29-6	N.D. D1	10,000	54,000	200
10885	PCB-1254	11097-69-1	N.D. D1	10,000	54,000	200
10885	PCB-1260	11096-82-5	N.D. D1	16,000	54,000	200
10885	PCB-1262	37324-23-5	N.D. D1	10,000	54,000	200
10885	PCB-1268	11100-14-4	70,000 D1	10,000	54,000	200
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	23,000	630	1,600	50
08272	Heavy Range Organics C24-C40	n.a.	32,000	1,600	4,800	50
	Reporting limits were raised due to interference from the sample matrix.					
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	11,800	15.5	39.3	1
01650	Calcium	7440-70-2	3,840	31.8	65.5	1
01654	Iron	7439-89-6	21,300	6.55	26.2	1
01657	Magnesium	7439-95-4	3,800	2.19	13.1	1
01662	Potassium	7440-09-7	1,450	25.9	65.5	1
01667	Sodium	7440-23-5	291	60.5	131	1

*=This limit was used in the evaluation of the final result

7-30-19

Sample Description: **19051002 Water**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: **WW 1064221**
ELLE Group #: **2045320**
Matrix: Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 08:30
SDG#: EUR65-13TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

GC Volatiles	**ECY 97-602 NWTPH-Gx**		**ug/l**	**ug/l**	**ug/l**	
08273	NWTPH-Gx water C7-C12	n.a.	N.D.	19 U	250	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/30/2019 20:46	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/30/2019 20:45	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/27/2019 23:20	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/27/2019 23:19	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

7-30-19

ecology and environment, inc
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 30, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one solid sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050204

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained at 4°C ± 2°C. The sample was collected on May 20, 2019, extracted on June 1, 2019, and analyzed by June 6, 2019, therefore meeting QC criteria of less than 14 days between collection and extraction for soil samples and less than 40 days between extraction and analysis.

2. **Initial Calibration: Acceptable.**

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. **Continuing Calibration: Acceptable.**

Calculations were verified as correct. All percent differences (%Ds) were within the laboratory control limits.

4. **Blanks: Acceptable.**

A method blank was analyzed for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in the method blank.

5. **System Monitoring Compounds (SMC): Satisfactory.**

All recoveries of the SMCs were greater than 10% and within QC limits except when the sample was diluted; no actions were taken based on these outliers.

6. Matrix Spike (MS) and MS Duplicate (MSD): Satisfactory.

MS and MSD results were above QC limits for diesel range organics; no actions were taken as the unspiked sample results were greater than four times the amount of spike added.

7. Blank Spike (BS): Acceptable.

BS recoveries were within QC limits.

8. Duplicates: Not Applicable.

Spike duplicate results were not applicable as noted above.

9. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

10. Laboratory Contact: Not Required.

No laboratory contact was required.

11. Overall Assessment of Data for Use

A total of two results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050204 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064208
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:50
SDG#: EUR65-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	5,200	13,000	5
10726	Pentachlorophenol	87-86-5	N.D.	5,200	13,000	5
10726	Phenanthrene	85-01-8	1,500,000	5,200	26,000	100
10726	Phenol	108-95-2	1,900 J	1,300	2,900	5
10726	Pyrene	129-00-0	1,400,000	5,200	26,000	100
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	1,300	2,900	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	5,200	13,000	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	2,400	5,200	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	2,100	4,400	5
	Reporting limits were raised due to interference from the sample matrix.					
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	5.9 J	0.6	14	43.38
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	11,000	54,000	200
10885	PCB-1221	11104-28-2	N.D. D1	15,000	54,000	200
10885	PCB-1232	11141-16-5	N.D. D1	25,000	54,000	200
10885	PCB-1242	53469-21-9	N.D. D1	10,000	54,000	200
10885	PCB-1248	12672-29-6	N.D. D1	10,000	54,000	200
10885	PCB-1254	11097-69-1	N.D. D1	10,000	54,000	200
10885	PCB-1260	11096-82-5	N.D. D1	16,000	54,000	200
10885	PCB-1262	37324-23-5	N.D. D1	10,000	54,000	200
10885	PCB-1268	11100-14-4	70,000 D1	10,000	54,000	200
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	23,000 J	630	1,600	50
08272	Heavy Range Organics C24-C40	n.a.	32,000	1,600	4,800	50
	Reporting limits were raised due to interference from the sample matrix.					
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	11,800	15.5	39.3	1
01650	Calcium	7440-70-2	3,840	31.8	65.5	1
01654	Iron	7439-89-6	21,300	6.55	26.2	1
01657	Magnesium	7439-95-4	3,800	2.19	13.1	1
01662	Potassium	7440-09-7	1,450	25.9	65.5	1
01667	Sodium	7440-23-5	291	60.5	131	1

*=This limit was used in the evaluation of the final result

7-30-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832 **MEMORANDUM**

DATE: July 29, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, WA

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one water sample and one solid sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Volatile Organic Compound (VOC) analysis (EPA Method 8260) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample were numbered: 19050204 19051002

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The samples were maintained and received within the QC limits of 4°C ± 2°C. The samples were collected on May 20, 2019, were received at the laboratory on May 22, 2019, and were analyzed by June 1, 2019, therefore meeting QC criteria of less than 14 days between collection and analysis for soil and preserved water samples.

2. **Tuning: Acceptable.**

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. **Initial Calibration: Acceptable.**

All average Relative Response Factors (RRFs) were within the QC limits. All Relative Standard Deviations (RSDs) and/or correlation coefficients were within the QC limits.

4. **Continuing Calibration: Satisfactory.**

All RRFs were within the QC limits. All applicable % differences were within the QC limits except trichlorofluoromethane with a low recovery associated with the water sample; the associated sample quantitation limit was qualified as an estimated quantity with a low bias (UJL).

5. **Blanks: Acceptable.**

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank. There were no detections in the trip blank (sample 19051002).

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS)/BS Duplicate (BSD) Analysis: Acceptable.

BS and BSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. Matrix Spike (MS)/MS Duplicate (MSD) Analysis: Satisfactory.

MS and MSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits except low recoveries for carbon disulfide, methylcyclohexane, m&p-xylene, 1,2,3- and 1,2,4-trichlorobenzene, and 1,2-, 1,3-, and 1,4-dichlorobenzene (associated results were qualified as estimated quantities with a low bias [JL or UJL]) and high recoveries for methyl acetate, 1,1,2-trichloroethane, 2-hexanone, and 1,1,2,2-tetrachloroethane (associated positive results were qualified as estimated quantities with a high bias [JH]) associated with the soil sample.

9. Duplicate Analysis: Satisfactory.

Duplicate and spike duplicate analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate and spike duplicate results were within QC limits except acetone, methyl acetate, and 2-hexanone; no additional actions were taken based on these outliers.

10. Internal Standards: Satisfactory.

All internal standards were within $\pm$ 30 seconds of the continuing calibration internal standard retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts except in sample 19050204 (1,4-dichlorobenzene-d4) with a low recovery; no actions were taken as this analyte was not detected in this sample.

11. Overall Assessment of Data for Use

A total of 102 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. A total of 9 sample results were qualified based on spike accuracy outliers, No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

eurofins | Lancaster Laboratories Environmental

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Analysis Report

Sample Description: **19051002 Water**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: **WW 1064221**
ELLE Group #: **2045320**
Matrix: Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 08:30
SDG#: EUR65-13TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Acetone	67-64-1	N.D.	0.7	20	1
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Bromochloromethane	74-97-5	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	0.2	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	2-Butanone	78-93-3	N.D.	0.3	10	1
11997	Carbon Disulfide	75-15-0	N.D.	0.2	5	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	Cyclohexane	110-82-7	N.D.	0.2	5	1
11997	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.3	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	1,2-Dibromoethane	106-93-4	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	cis-1,2-Dichloroethene	156-59-2	N.D.	0.2	1	1
11997	trans-1,2-Dichloroethene	156-60-5	N.D.	0.2	1	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	2-Hexanone	591-78-6	N.D.	0.3	10	1
11997	Isopropylbenzene	98-82-8	N.D.	0.2	5	1
11997	Methyl Acetate	79-20-9	N.D.	0.2	5	1
11997	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.2	1	1
11997	4-Methyl-2-pentanone	108-10-1	N.D.	0.5	10	1
11997	Methylcyclohexane	108-87-2	N.D.	0.2	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	Styrene	100-42-5	N.D.	0.2	5	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1

*=This limit was used in the evaluation of the final result

7-30-19

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Analysis Report

Sample Description: 19051002 Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1064221
ELLE Group #: 2045320
Matrix: Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 08:30
SDG#: EUR65-13TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	N.D.	19	250	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/30/2019 20:46	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/30/2019 20:45	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/27/2019 23:20	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/27/2019 23:19	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

7-30-19

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Analysis Report

Sample Description: 19050204 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064208
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:50
SDG#: EUR65-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Acetone	67-64-1	210	14	46	1.46
11995	Benzene	71-43-2	N.D.	1 U	12	1.46
11995	Bromochloromethane	74-97-5	N.D.	1	12	1.46
11995	Bromodichloromethane	75-27-4	N.D.	0.9	12	1.46
11995	Bromoform	75-25-2	N.D.	12	23	1.46
11995	Bromomethane	74-83-9	N.D.	2	12	1.46
11995	2-Butanone	78-93-3	40	2	23	1.46
11995	Carbon Disulfide	75-15-0	54 JL	1	12	1.46
11995	Carbon Tetrachloride	56-23-5	N.D.	1 U	12	1.46
11995	Chlorobenzene	108-90-7	N.D.	1	12	1.46
11995	Chloroethane	75-00-3	N.D.	2	12	1.46
11995	Chloroform	67-66-3	N.D.	1	12	1.46
11995	Chloromethane	74-87-3	N.D.	1	12	1.46
11995	Cyclohexane	110-82-7	N.D.	1	12	1.46
11995	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.9	12	1.46
11995	Dibromochloromethane	124-48-1	N.D.	0.9	12	1.46
11995	1,2-Dibromoethane	106-93-4	N.D.	0.9	12	1.46
11995	1,2-Dichlorobenzene	95-50-1	N.D.	1	12	1.46
11995	1,3-Dichlorobenzene	541-73-1	N.D.	1	12	1.46
11995	1,4-Dichlorobenzene	106-46-7	N.D.	0.9	12	1.46
11995	Dichlorodifluoromethane	75-71-8	N.D.	1	12	1.46
11995	1,1-Dichloroethane	75-34-3	N.D.	1	12	1.46
11995	1,2-Dichloroethane	107-06-2	N.D.	1	12	1.46
11995	1,1-Dichloroethene	75-35-4	N.D.	1	12	1.46
11995	cis-1,2-Dichloroethene	156-59-2	N.D.	1	12	1.46
11995	trans-1,2-Dichloroethene	156-60-5	N.D.	1	12	1.46
11995	1,2-Dichloropropane	78-87-5	N.D.	1	12	1.46
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.9	12	1.46
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.7	12	1.46
11995	Ethylbenzene	100-41-4	2 J Q	0.9	12	1.46
11995	Freon 113	76-13-1	N.D.	1 U	23	1.46
11995	2-Hexanone	591-78-6	N.D.	2	23	1.46
11995	Isopropylbenzene	98-82-8	N.D.	0.9	12	1.46
11995	Methyl Acetate	79-20-9	N.D.	2	12	1.46
11995	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	1	12	1.46
11995	4-Methyl-2-pentanone	108-10-1	N.D.	2	23	1.46
11995	Methylcyclohexane	108-87-2	N.D.	1 JL	12	1.46
11995	Methylene Chloride	75-09-2	6 J Q	5	12	1.46
11995	Styrene	100-42-5	N.D.	0.7 U	12	1.46
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.9	12	1.46
11995	Tetrachloroethene	127-18-4	N.D.	1	12	1.46

*=This limit was used in the evaluation of the final result

MW 7-30-19

Sample Description: 19050204 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064208
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:50
SDG#: EUR65-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/kg	ug/kg	ug/kg	
11995	Toluene	108-88-3	4 J Q	1	12	1.46
11995	1,2,3-Trichlorobenzene	87-61-6	N.D.	12 U	23	1.46
11995	1,2,4-Trichlorobenzene	120-82-1	N.D.	12	23	1.46
11995	1,1,1-Trichloroethane	71-55-6	N.D.	1	12	1.46
11995	1,1,2-Trichloroethane	79-00-5	N.D.	1	12	1.46
11995	Trichloroethene	79-01-6	N.D.	1	12	1.46
11995	Trichlorofluoromethane	75-69-4	N.D.	2	12	1.46
11995	Vinyl Chloride	75-01-4	N.D. #u	1	12	1.46
11995	m+p-Xylene	179601-23-1	4 J Q	2 Mw	12	1.46
11995	o-Xylene	95-47-6	3 J Q	0.9	12	1.46

The recovery for the sample internal standard is outside the QC acceptance limits. The following corrective action was taken: Similar results were obtained for the internal standard in the background, matrix spike and matrix spike duplicate indicating a matrix effect.

GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	Acenaphthene	83-32-9	170,000	260	1,300	5
10726	Acenaphthylene	208-96-8	7,200	260	1,300	5
10726	Acetophenone	98-86-2	N.D.	1,300	3,900	5
10726	Anthracene	120-12-7	230,000	260	1,300	5
10726	Atrazine	1912-24-9	N.D.	16,000	34,000	5
10726	Benzaldehyde	100-52-7	N.D.	5,200	13,000	5
10726	Benzo(a)anthracene	56-55-3	510,000	10,000	26,000	100
10726	Benzo(a)pyrene	50-32-8	470,000	5,200	26,000	100
10726	Benzo(b)fluoranthene	205-99-2	610,000	5,200	26,000	100
10726	Benzo(g,h,i)perylene	191-24-2	240,000	260	1,300	5
10726	Benzo(k)fluoranthene	207-08-9	270,000	260	1,300	5
10726	1,1'-Biphenyl	92-52-4	8,200	1,300	2,900	5
10726	4-Bromophenyl-phenylether	101-55-3	N.D.	1,800	3,900	5
10726	Butylbenzylphthalate	85-68-7	N.D.	5,200	13,000	5
10726	Di-n-butylphthalate	84-74-2	N.D.	5,200	13,000	5
10726	Caprolactam	105-60-2	N.D.	2,600	13,000	5
10726	Carbazole	86-74-8	190,000	1,300	2,900	5
10726	4-Chloro-3-methylphenol	59-50-7	N.D.	1,800	3,900	5
10726	4-Chloroaniline	106-47-8	N.D.	2,600	13,000	5
10726	bis(2-Chloroethoxy)methane	111-91-1	N.D.	1,300	2,900	5
10726	bis(2-Chloroethyl)ether	111-44-4	N.D.	1,800	3,900	5
10726	2-Chloronaphthalene	91-58-7	N.D.	520	2,600	5
10726	2-Chlorophenol	95-57-8	N.D.	1,300	2,900	5
10726	4-Chlorophenyl-phenylether	7005-72-3	N.D.	1,600	3,400	5
10726	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	1,600	3,400	5

*=This limit was used in the evaluation of the final result

MW 7-30-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 30, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of 11 solid samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analyses for Polychlorinated Biphenyls (PCBs - EPA Method 8082) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered:

19050201	19050202	19050203	19050204	19050301	19050302
19050701	19050801	19050802	19050803	19050804	

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The samples were maintained at 0°C to 6°C. The samples were collected on May 20, 2019, extracted by June 7, 2019, and were analyzed by June 20, 2019. There are no holding time limits for Method 8082 PCB analyses.

2. **Instrument Performance: Acceptable.**

The surrogate retention time percent difference between the initial calibration standards and the remaining standards and samples was within QC limits.

3. **Initial and Continuing Calibration: Acceptable.**

All initial calibration relative standard deviations (RSDs) were within QC limits. All applicable continuing calibration % differences (% D) were within QC limits.

4. **Blanks: Satisfactory.**

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each analytical system. No target analytes were detected in the laboratory blanks except PCB-1268 at 6.6 ug/kg

in PBLK 42150; no qualifications were applied as the result in the blank was less than the quantitation limit and associated sample results were greater than the quantitation limit.

5. System Monitoring Compounds (SMCs): Satisfactory.

All recoveries of the SMCs were within the established control limits except when diluted due to analyte concentrations and/or matrix interference; no actions were taken based on these outliers.

6. Matrix Spike (MS) and MS Duplicate (MSD) Analyses: Satisfactory.

MS and MSD recoveries were outside QC limits; the native sample had a high PCB-1268 concentration and likely interfered with the spiked analytes; no actions were taken based on these outliers.

7. Blank Spike (BS) and BS Duplicate (BSD) Analyses: Acceptable.

BS and BSD recoveries were within QC limits.

8. Duplicates: Acceptable.

Relative Percent Differences (RPDs) of all the blank spiked analytes were within QC limits.

9. Compound Identification: Acceptable.

All positive sample results were dual-column confirmed with differences between the columns < 40%.

10. Target Compound Quantitation and Quantitation Limits: Acceptable.

Sample results and quantitation limits were correctly calculated.

11. Laboratory Contact

No laboratory contact was required.

12. Overall Assessment

A total of 99 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050202 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064206
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 12:17
SDG#: EUR65-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	510	1,300	5
10726	Fluoranthene	206-44-0	210,000	260	1,300	50
10726	Fluorene	86-73-7	9,700	26	130	5
10726	Hexachlorobenzene	118-74-1	N.D.	51	130	5
10726	Hexachlorobutadiene	87-68-3	N.D.	280	590	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	1,500	3,800	5
10726	Hexachloroethane	67-72-1	N.D.	260	1,300	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	30,000	26	130	5
10726	Isophorone	78-59-1	N.D.	130	280	5
10726	2-Methylnaphthalene	91-57-6	1,900	26	260	5
10726	2-Methylphenol	95-48-7	N.D.	130	510	5
10726	4-Methylphenol	106-44-5	N.D.	130	380	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	4,100	51	130	5
10726	2-Nitroaniline	88-74-4	N.D.	130	380	5
10726	3-Nitroaniline	99-09-2	N.D.	510	1,300	5
10726	4-Nitroaniline	100-01-6	N.D.	510	1,300	5
10726	Nitrobenzene	98-95-3	N.D.	200	510	5
10726	2-Nitrophenol	88-75-5	N.D.	200	440	5
10726	4-Nitrophenol	100-02-7	N.D.	1,300	3,800	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	180	380	5
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	130	280	5
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	13,000	510	1,300	5
10726	Pentachlorophenol	87-86-5	N.D.	510	1,300	5
10726	Phenanthrene	85-01-8	190,000	260	1,300	50
10726	Phenol	108-95-2	160 J	130	280	5
10726	Pyrene	129-00-0	200,000	260	1,300	50
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	130	280	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	510	1,300	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	230	510	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	200	440	5
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	11,000	53,000	200
10885	PCB-1221	11104-28-2	N.D. D1	14,000	53,000	200
10885	PCB-1232	11141-16-5	N.D. D1	25,000	53,000	200

*=This limit was used in the evaluation of the final result

MW 7-30-19

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Analysis Report

Sample Description: 19050202 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064206
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 12:17
SDG#: EUR65-01

CAT No.	Analysis Name		CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1242		53469-21-9	N.D. D1	10,000	53,000	200
10885	PCB-1248		12672-29-6	N.D. D1	10,000	53,000	200
10885	PCB-1254		11097-69-1	N.D. D1	10,000	53,000	200
10885	PCB-1260		11096-82-5	N.D. D1	15,000	53,000	200
10885	PCB-1262		37324-23-5	N.D. D1	10,000	53,000	200
10885	PCB-1268		11100-14-4	220,000 D1	10,000	53,000	200
Metals		**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum		7429-90-5	136,000	62.2	158	5
01650	Calcium		7440-70-2	18,300	25.6	52.7	1
01654	Iron		7439-89-6	65,400	26.4	105	5
01657	Magnesium		7439-95-4	3,920	1.76	10.5	1
01662	Potassium		7440-09-7	1,240	20.9	52.7	1
01667	Sodium		7440-23-5	3,440	48.7	105	1
		SW-846 6020A		**mg/kg**	**mg/kg**	**mg/kg**	
06124	Antimony		7440-36-0	5.96	0.133	0.422	2
06125	Arsenic		7440-38-2	51.0	0.141	0.422	2
06126	Barium		7440-39-3	372	0.407	0.844	2
06127	Beryllium		7440-41-7	3.78	0.0240	0.105	2
06128	Cadmium		7440-43-9	7.37	0.0532	0.211	2
06131	Chromium		7440-47-3	67.0	0.352	0.844	2
06132	Cobalt		7440-48-4	15.1	0.0616	0.211	2
06133	Copper		7440-50-8	1,830	18.9	42.2	10
06135	Lead		7439-92-1	381	0.266	3.16	10
06137	Manganese		7439-96-5	582	0.418	2.11	2
06139	Nickel		7440-02-0	376	0.359	0.844	2
06141	Selenium		7782-49-2	2.63	0.138	0.422	2
06142	Silver		7440-22-4	0.802	0.0428	0.105	2
06145	Thallium		7440-28-0	N.D.	0.207	0.527	10
06148	Vanadium		7440-62-2	96.0	0.0905	0.211	2
06149	Zinc		7440-66-6	1,310	1.28	3.16	2
		SW-846 7471B		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury		7439-97-6	0.0921 J	0.0468	0.200	1
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture		n.a.	35.5	0.50	0.50	1

*=This limit was used in the evaluation of the final result

7-30-19

Sample Description: 19050203 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064207
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:32
SDG#: EUR65-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	410	1,000	5
10726	Fluoranthene	206-44-0	340,000	410	2,100	100
10726	Fluorene	86-73-7	21,000	21	100	5
10726	Hexachlorobenzene	118-74-1	N.D.	41	100	5
10726	Hexachlorobutadiene	87-68-3	N.D.	230	470	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	1,200	3,100	5
10726	Hexachloroethane	67-72-1	N.D.	210	1,000	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	93,000	410	2,100	100
10726	Isophorone	78-59-1	N.D.	100	230	5
10726	2-Methylnaphthalene	91-57-6	5,400	21	210	5
10726	2-Methylphenol	95-48-7	N.D.	100	410	5
10726	4-Methylphenol	106-44-5	500	100	310	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	11,000	41	100	5
10726	2-Nitroaniline	88-74-4	N.D.	100	310	5
10726	3-Nitroaniline	99-09-2	N.D.	410	1,000	5
10726	4-Nitroaniline	100-01-6	N.D.	410	1,000	5
10726	Nitrobenzene	98-95-3	N.D.	160	410	5
10726	2-Nitrophenol	88-75-5	N.D.	160	350	5
10726	4-Nitrophenol	100-02-7	N.D.	1,000	3,100	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	140	310	5
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	100	230	5
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	410	1,000	5
10726	Pentachlorophenol	87-86-5	N.D.	410	1,000	5
10726	Phenanthrene	85-01-8	300,000	410	2,100	100
10726	Phenol	108-95-2	280	100	230	5
10726	Pyrene	129-00-0	330,000	410	2,100	100
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	100	230	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	410	1,000	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	190	410	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	160	350	5
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	220	1,100	50
10885	PCB-1221	11104-28-2	N.D. D1	290	1,100	50
10885	PCB-1232	11141-16-5	N.D. D1	500	1,100	50

*=This limit was used in the evaluation of the final result

7/30/19

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Analysis Report

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Sample Description: 19050203 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064207
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:32
SDG#: EUR65-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1242	53469-21-9	N.D. D1*	200 U	1,100	50
10885	PCB-1248	12672-29-6	400 JD1	200	1,100	50
10885	PCB-1254	11097-69-1	N.D. D1	200 U	1,100	50
10885	PCB-1260	11096-82-5	N.D. D1	300	1,100	50
10885	PCB-1262	37324-23-5	N.D. D1	200	1,100	50
10885	PCB-1268	11100-14-4	3,500 D2	200	1,100	50
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	29,100	12.5	31.8	1
01650	Calcium	7440-70-2	3,300	25.7	53.0	1
01654	Iron	7439-89-6	15,300	5.30	21.2	1
01657	Magnesium	7439-95-4	5,300	1.77	10.6	1
01662	Potassium	7440-09-7	1,970	21.0	53.0	1
01667	Sodium	7440-23-5	264	48.9	106	1
	SW-846 6020A		**mg/kg**	**mg/kg**	**mg/kg**	
06124	Antimony	7440-36-0	0.411 J	0.134	0.424	2
06125	Arsenic	7440-38-2	12.3	0.142	0.424	2
06126	Barium	7440-39-3	79.5	0.409	0.847	2
06127	Beryllium	7440-41-7	0.998	0.0241	0.106	2
06128	Cadmium	7440-43-9	0.718	0.0534	0.212	2
06131	Chromium	7440-47-3	15.6	0.354	0.847	2
06132	Cobalt	7440-48-4	4.83	0.0619	0.212	2
06133	Copper	7440-50-8	140	3.79	8.47	2
06135	Lead	7439-92-1	34.0	0.0534	0.635	2
06137	Manganese	7439-96-5	340	0.419	2.12	2
06139	Nickel	7440-02-0	31.5	0.360	0.847	2
06141	Selenium	7782-49-2	0.161 J	0.138	0.424	2
06142	Silver	7440-22-4	0.169	0.0430	0.106	2
06145	Thallium	7440-28-0	0.150	0.0415	0.106	2
06148	Vanadium	7440-62-2	37.5	0.0909	0.212	2
06149	Zinc	7440-66-6	271	1.29	3.18	2
	SW-846 7471B		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	N.D.	0.0386	0.165	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture	n.a.	19.3	0.50	0.50	1

*=This limit was used in the evaluation of the final result

7-30-19

Sample Description: 19050204 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064208
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:50
SDG#: EUR65-03BKG

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	5,200	13,000	5
10726	Pentachlorophenol	87-86-5	N.D.	5,200	13,000	5
10726	Phenanthrene	85-01-8	1,500,000	5,200	26,000	100
10726	Phenol	108-95-2	1,900 J	1,300	2,900	5
10726	Pyrene	129-00-0	1,400,000	5,200	26,000	100
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	1,300	2,900	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	5,200	13,000	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	2,400	5,200	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	2,100	4,400	5
	Reporting limits were raised due to interference from the sample matrix.					
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	5.9 J	0.6	14	43.38
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	11,000	54,000	200
10885	PCB-1221	11104-28-2	N.D. D1	15,000	54,000	200
10885	PCB-1232	11141-16-5	N.D. D1	25,000	54,000	200
10885	PCB-1242	53469-21-9	N.D. D1	10,000	54,000	200
10885	PCB-1248	12672-29-6	N.D. D1	10,000	54,000	200
10885	PCB-1254	11097-69-1	N.D. D1	10,000	54,000	200
10885	PCB-1260	11096-82-5	N.D. D1	16,000	54,000	200
10885	PCB-1262	37324-23-5	N.D. D1	10,000	54,000	200
10885	PCB-1268	11100-14-4	70,000 D1	10,000	54,000	200
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	23,000	630	1,600	50
08272	Heavy Range Organics C24-C40	n.a.	32,000	1,600	4,800	50
	Reporting limits were raised due to interference from the sample matrix.					
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	11,800	15.5	39.3	1
01650	Calcium	7440-70-2	3,840	31.8	65.5	1
01654	Iron	7439-89-6	21,300	6.55	26.2	1
01657	Magnesium	7439-95-4	3,800	2.19	13.1	1
01662	Potassium	7440-09-7	1,450	25.9	65.5	1
01667	Sodium	7440-23-5	291	60.5	131	1

*=This limit was used in the evaluation of the final result

MW 7-30-19

Sample Description: 19050301 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064212
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 12:35
SDG#: EUR65-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	340	850	5
10726	Fluoranthene	206-44-0	46,000	170	850	50
10726	Fluorene	86-73-7	2,300	17	85	5
10726	Hexachlorobenzene	118-74-1	N.D.	34	85	5
10726	Hexachlorobutadiene	87-68-3	N.D.	190	390	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	1,000	2,600	5
10726	Hexachloroethane	67-72-1	N.D.	170	850	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	9,400	17	85	5
10726	Isophorone	78-59-1	N.D.	85	190	5
10726	2-Methylnaphthalene	91-57-6	490	17	170	5
10726	2-Methylphenol	95-48-7	N.D.	85	340	5
10726	4-Methylphenol	106-44-5	N.D.	85	260	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	1,800	34	85	5
10726	2-Nitroaniline	88-74-4	N.D.	85	260	5
10726	3-Nitroaniline	99-09-2	N.D.	340	850	5
10726	4-Nitroaniline	100-01-6	N.D.	340	850	5
10726	Nitrobenzene	98-95-3	N.D.	140	340	5
10726	2-Nitrophenol	88-75-5	N.D.	140	290	5
10726	4-Nitrophenol	100-02-7	N.D.	850	2,600	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	260	5
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	85	190	5
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	340	850	5
10726	Pentachlorophenol	87-86-5	N.D.	340	850	5
10726	Phenanthrene	85-01-8	40,000	170	850	50
10726	Phenol	108-95-2	N.D.	85	190	5
10726	Pyrene	129-00-0	45,000	170	850	50
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	85	190	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	340	850	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	340	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	140	290	5
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	3,700	18,000	500
10885	PCB-1221	11104-28-2	N.D. D1	4,800	18,000	500
10885	PCB-1232	11141-16-5	N.D. D1	8,300	18,000	500

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: 19050301 Grab Sediment

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064212
ELLE Group #: 2045320
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 12:35
SDG#: EUR65-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1242	53469-21-9	N.D. D1	3,400 U	18,000	500
10885	PCB-1248	12672-29-6	N.D. D1	3,400	18,000	500
10885	PCB-1254	11097-69-1	N.D. D1	3,400	18,000	500
10885	PCB-1260	11096-82-5	N.D. D1	5,100	18,000	500
10885	PCB-1262	37324-23-5	N.D. D1	3,400	18,000	500
10885	PCB-1268	11100-14-4	170,000 D1	3,400	18,000	500
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	181,000	81.3	207	10
01650	Calcium	7440-70-2	28,300	16.7	34.4	1
01654	Iron	7439-89-6	55,600	34.4	138	10
01657	Magnesium	7439-95-4	5,210	1.15	6.89	1
01662	Potassium	7440-09-7	1,240	13.6	34.4	1
01667	Sodium	7440-23-5	2,410	31.8	68.9	1
	SW-846 6020A		mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	2.30	0.0871	0.275	2
06125	Arsenic	7440-38-2	20.1	0.0921	0.275	2
06126	Barium	7440-39-3	197	0.266	0.551	2
06127	Beryllium	7440-41-7	2.06	0.0157	0.0689	2
06128	Cadmium	7440-43-9	5.98	0.0347	0.138	2
06131	Chromium	7440-47-3	32.8	0.230	0.551	2
06132	Cobalt	7440-48-4	11.9	0.0402	0.138	2
06133	Copper	7440-50-8	1,570	12.3	27.5	10
06135	Lead	7439-92-1	333	0.174	2.07	10
06137	Manganese	7439-96-5	617	0.273	1.38	2
06139	Nickel	7440-02-0	130	0.234	0.551	2
06141	Selenium	7782-49-2	0.922	0.0898	0.275	2
06142	Silver	7440-22-4	1.17	0.0280	0.0689	2
06145	Thallium	7440-28-0	0.0758	0.0270	0.0689	2
06148	Vanadium	7440-62-2	51.0	0.0591	0.138	2
06149	Zinc	7440-66-6	3,670	4.18	10.3	10
	SW-846 7471B		mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	N.D.	0.0307	0.131	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	3.2	0.50	0.50	1

*=This limit was used in the evaluation of the final result

MW 7-30-19

Sample Description: 19050302 Grab Soil

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064213
ELLE Group #: 2045320
Matrix: Soil

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:43
SDG#: EUR65-05

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	3,500	8,800	5
10726	Fluoranthene	206-44-0	1,700,000	3,500	18,000	100
10726	Fluorene	86-73-7	120,000	180	880	5
10726	Hexachlorobenzene	118-74-1	N.D.	350	880	5
10726	Hexachlorobutadiene	87-68-3	N.D.	1,900	4,000	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	11,000	26,000	5
10726	Hexachloroethane	67-72-1	N.D.	1,800	8,800	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	230,000	3,500	18,000	100
10726	Isophorone	78-59-1	N.D.	880	1,900	5
10726	2-Methylnaphthalene	91-57-6	44,000	180	1,800	5
10726	2-Methylphenol	95-48-7	N.D.	880	3,500	5
10726	4-Methylphenol	106-44-5	3,100	880	2,600	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	96,000	350	880	5
10726	2-Nitroaniline	88-74-4	N.D.	880	2,600	5
10726	3-Nitroaniline	99-09-2	N.D.	3,500	8,800	5
10726	4-Nitroaniline	100-01-6	N.D.	3,500	8,800	5
10726	Nitrobenzene	98-95-3	N.D.	1,400	3,500	5
10726	2-Nitrophenol	88-75-5	N.D.	1,400	3,000	5
10726	4-Nitrophenol	100-02-7	N.D.	8,800	26,000	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	1,200	2,600	5
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	880	1,900	5
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	3,500	8,800	5
10726	Pentachlorophenol	87-86-5	N.D.	3,500	8,800	5
10726	Phenanthrene	85-01-8	1,800,000	3,500	18,000	100
10726	Phenol	108-95-2	1,700 J	880	1,900	5
10726	Pyrene	129-00-0	1,500,000	3,500	18,000	100
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	880	1,900	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	3,500	8,800	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	1,600	3,500	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	1,400	3,000	5
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	76	360	20
10885	PCB-1221	11104-28-2	N.D. D1	97	360	20
10885	PCB-1232	11141-16-5	N.D. D1	170	360	20

*=This limit was used in the evaluation of the final result

MW 7-30-19

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Analysis Report

Sample Description: 19050302 Grab Soil

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064213
ELLE Group #: 2045320
Matrix: Soil

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 13:43
SDG#: EUR65-05

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1242	53469-21-9	N.D. D1	70	360	20
10885	PCB-1248	12672-29-6	150 JD2	70	360	20
10885	PCB-1254	11097-69-1	N.D. D1	70	360	20
10885	PCB-1260	11096-82-5	N.D. D1	100	360	20
10885	PCB-1262	37324-23-5	N.D. D1	70	360	20
10885	PCB-1268	11100-14-4	920 D2	70	360	20
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	9,700	12.2	31.1	1
01650	Calcium	7440-70-2	1,900	25.2	51.8	1
01654	Iron	7439-89-6	15,700	5.18	20.7	1
01657	Magnesium	7439-95-4	6,320	1.73	10.4	1
01662	Potassium	7440-09-7	1,550	20.5	51.8	1
01667	Sodium	7440-23-5	112	47.8	104	1
	SW-846 6020A		**mg/kg**	**mg/kg**	**mg/kg**	
06124	Antimony	7440-36-0	14.1	0.131	0.414	2
06125	Arsenic	7440-38-2	9.88	0.139	0.414	2
06126	Barium	7440-39-3	50.4	0.400	0.828	2
06127	Beryllium	7440-41-7	0.359	0.0236	0.104	2
06128	Cadmium	7440-43-9	0.219	0.0522	0.207	2
06131	Chromium	7440-47-3	10.3	0.346	0.828	2
06132	Cobalt	7440-48-4	3.20	0.0605	0.207	2
06133	Copper	7440-50-8	14.3	3.71	8.28	2
06135	Lead	7439-92-1	21.6	0.0522	0.621	2
06137	Manganese	7439-96-5	214	0.410	2.07	2
06139	Nickel	7440-02-0	10.1	0.352	0.828	2
06141	Selenium	7782-49-2	N.D.	0.135	0.414	2
06142	Silver	7440-22-4	0.0568 J	0.0420	0.104	2
06145	Thallium	7440-28-0	0.0961 J	0.0406	0.104	2
06148	Vanadium	7440-62-2	16.9	0.0888	0.207	2
06149	Zinc	7440-66-6	170	1.26	3.11	2
	SW-846 7471B		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	N.D.	0.0309	0.132	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture	n.a.	5.3	0.50	0.50	1

*=This limit was used in the evaluation of the final result

Sample Description: 19050701 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064214
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:59
SDG#: EUR65-06

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	33,000	84,000	10
10726	Fluoranthene	206-44-0	4,600,000	33,000	170,000	200
10726	Fluorene	86-73-7	210,000	1,700	8,400	10
10726	Hexachlorobenzene	118-74-1	N.D.	3,300	8,400	10
10726	Hexachlorobutadiene	87-68-3	N.D.	18,000	38,000	10
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	100,000	250,000	10
10726	Hexachloroethane	67-72-1	N.D.	17,000	84,000	10
10726	Indeno(1,2,3-cd)pyrene	193-39-5	1,700,000	1,700	8,400	10
10726	Isophorone	78-59-1	N.D.	8,400	18,000	10
10726	2-Methylnaphthalene	91-57-6	11,000 J	1,700	17,000	10
10726	2-Methylphenol	95-48-7	N.D.	8,400	33,000	10
10726	4-Methylphenol	106-44-5	N.D.	8,400	25,000	10
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	14,000	3,300	8,400	10
10726	2-Nitroaniline	88-74-4	N.D.	8,400	25,000	10
10726	3-Nitroaniline	99-09-2	N.D.	33,000	84,000	10
10726	4-Nitroaniline	100-01-6	N.D.	33,000	84,000	10
10726	Nitrobenzene	98-95-3	N.D.	13,000	33,000	10
10726	2-Nitrophenol	88-75-5	N.D.	13,000	28,000	10
10726	4-Nitrophenol	100-02-7	N.D.	84,000	250,000	10
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	12,000	25,000	10
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	8,400	18,000	10
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	33,000	84,000	10
10726	Pentachlorophenol	87-86-5	N.D.	33,000	84,000	10
10726	Phenanthrene	85-01-8	2,500,000	33,000	170,000	200
10726	Phenol	108-95-2	N.D.	8,400	18,000	10
10726	Pyrene	129-00-0	4,000,000	33,000	170,000	200
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	8,400	18,000	10
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	33,000	84,000	10
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	15,000	33,000	10
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	13,000	28,000	10
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	18	85	5
10885	PCB-1221	11104-28-2	N.D. D1	23	85	5
10885	PCB-1232	11141-16-5	N.D. D1	40	85	5

*=This limit was used in the evaluation of the final result

MW 7-30-19

Sample Description: **19050701 Grab Product**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: **SW 1064214**
ELLE Group #: **2045320**
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:59
SDG#: EUR65-06

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1242	53469-21-9	N.D. D1	17	85	5
10885	PCB-1248	12672-29-6	N.D. D1	17	85	5
10885	PCB-1254	11097-69-1	N.D. D1	17	85	5
10885	PCB-1260	11096-82-5	N.D. D1	25	85	5
10885	PCB-1262	37324-23-5	N.D. D1	17	85	5
10885	PCB-1268	11100-14-4	N.D. D1	17	85	5

Reporting limits were raised due to interference from the sample matrix.

The surrogate data is outside the QC limits due to unresolvable matrix problems evident during the sample preparation.

Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	363	9.89	25.1	1
01650	Calcium	7440-70-2	305	20.4	41.9	1
01654	Iron	7439-89-6	2,050	4.19	16.8	1
01657	Magnesium	7439-95-4	54.9	1.40	8.38	1
01662	Potassium	7440-09-7	30.1 J	16.6	41.9	1
01667	Sodium	7440-23-5	44.3 J	38.7	83.8	1
	SW-846 6020A		**mg/kg**	**mg/kg**	**mg/kg**	
06124	Antimony	7440-36-0	0.117 J	0.106	0.335	2
06125	Arsenic	7440-38-2	0.916	0.112	0.335	2
06126	Barium	7440-39-3	3.13	0.323	0.670	2
06127	Beryllium	7440-41-7	N.D.	0.0191	0.0838	2
06128	Cadmium	7440-43-9	0.339	0.0422	0.168	2
06131	Chromium	7440-47-3	0.992	0.280	0.670	2
06132	Cobalt	7440-48-4	0.186	0.0489	0.168	2
06133	Copper	7440-50-8	3.88 J	3.00	6.70	2
06135	Lead	7439-92-1	6.88	0.0422	0.503	2
06137	Manganese	7439-96-5	18.3	0.332	1.68	2
06139	Nickel	7440-02-0	2.61	0.285	0.670	2
06141	Selenium	7782-49-2	0.123 J	0.109	0.335	2
06142	Silver	7440-22-4	N.D.	0.0340	0.0838	2
06145	Thallium	7440-28-0	0.313	0.0328	0.0838	2
06148	Vanadium	7440-62-2	0.766	0.0719	0.168	2
06149	Zinc	7440-66-6	54.5	1.02	2.51	2
	SW-846 7471B		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	2.55	0.298	1.28	10

*=This limit was used in the evaluation of the final result

Sample Description: 19050801 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064216
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:15
SDG#: EUR65-08

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	66	160	1
10726	Fluoranthene	206-44-0	2,400	3	16	1
10726	Fluorene	86-73-7	100	3	16	1
10726	Hexachlorobenzene	118-74-1	N.D.	7	16	1
10726	Hexachlorobutadiene	87-68-3	N.D.	36	76	1
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	200	490	1
10726	Hexachloroethane	67-72-1	N.D.	33	160	1
10726	Indeno(1,2,3-cd)pyrene	193-39-5	1,400	3	16	1
10726	Isophorone	78-59-1	N.D.	16	36	1
10726	2-Methylnaphthalene	91-57-6	490	3	33	1
10726	2-Methylphenol	95-48-7	N.D.	16	66	1
10726	4-Methylphenol	106-44-5	N.D.	16	49	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	400	7	16	1
10726	2-Nitroaniline	88-74-4	N.D.	16	49	1
10726	3-Nitroaniline	99-09-2	N.D.	66	160	1
10726	4-Nitroaniline	100-01-6	N.D.	66	160	1
10726	Nitrobenzene	98-95-3	N.D.	26	66	1
10726	2-Nitrophenol	88-75-5	N.D.	26	56	1
10726	4-Nitrophenol	100-02-7	N.D.	160	490	1
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	23	49	1
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	16	36	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	66	160	1
10726	Pentachlorophenol	87-86-5	N.D.	66	160	1
10726	Phenanthrene	85-01-8	1,500	3	16	1
10726	Phenol	108-95-2	34 J	16	36	1
10726	Pyrene	129-00-0	3,100	3	16	1
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	16	36	1
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	66	160	1
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	30	66	1
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	26	56	1
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	3.6	17	1
10885	PCB-1221	11104-28-2	N.D. D1	4.6	17	1
10885	PCB-1232	11141-16-5	N.D. D1	8.0	17	1

*=This limit was used in the evaluation of the final result

MW 7-30-19

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Analysis Report

Sample Description: 19050801 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064216
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:15
SDG#: EUR65-08

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1242	53469-21-9	N.D. D1	3.3	17	1
10885	PCB-1248	12672-29-6	N.D. D1	3.3	17	1
10885	PCB-1254	11097-69-1	N.D. D1	3.3	17	1
10885	PCB-1260	11096-82-5	N.D. D1	4.9	17	1
10885	PCB-1262	37324-23-5	N.D. D1	3.3	17	1
10885	PCB-1268	11100-14-4	54 D1	3.3	17	1
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	42.1	9.44	24.0	1
01650	Calcium	7440-70-2	58.2	19.4	40.0	1
01654	Iron	7439-89-6	74.3	4.00	16.0	1
01657	Magnesium	7439-95-4	6.76 J	1.34	8.00	1
01662	Potassium	7440-09-7	N.D.	15.8	40.0	1
01667	Sodium	7440-23-5	N.D.	37.0	80.0	1
	SW-846 6020A		mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	0.897	0.101	0.320	2
06125	Arsenic	7440-38-2	N.D.	0.107	0.320	2
06126	Barium	7440-39-3	2.10	0.309	0.640	2
06127	Beryllium	7440-41-7	N.D.	0.0182	0.0800	2
06128	Cadmium	7440-43-9	N.D.	0.0403	0.160	2
06131	Chromium	7440-47-3	0.382 J	0.267	0.640	2
06132	Cobalt	7440-48-4	0.335	0.0467	0.160	2
06133	Copper	7440-50-8	N.D. K4	2.86	6.40	2
06135	Lead	7439-92-1	0.276 J	0.0403	0.480	2
06137	Manganese	7439-96-5	0.881 J	0.317	1.60	2
06139	Nickel	7440-02-0	12.9	0.272	0.640	2
06141	Selenium	7782-49-2	N.D.	0.104	0.320	2
06142	Silver	7440-22-4	N.D.	0.0325	0.0800	2
06145	Thallium	7440-28-0	N.D. K1	0.0314	0.0800	2
06148	Vanadium	7440-62-2	30.8	0.0686	0.160	2
06149	Zinc	7440-66-6	3.30	0.971	2.40	2
	SW-846 7471B		mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	N.D.	0.0288	0.123	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	N.D.	0.50	0.50	1

*=This limit was used in the evaluation of the final result

MW 7-30-19

Sample Description: 19050802 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064217
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:24
SDG#: EUR65-09

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	36 U	170	1
10885	PCB-1221	11104-28-2	N.D. D1	46	170	1
10885	PCB-1232	11141-16-5	N.D. D1	80	170	1
10885	PCB-1242	53469-21-9	N.D. D1	33	170	1
10885	PCB-1248	12672-29-6	N.D. D1	33	170	1
10885	PCB-1254	11097-69-1	N.D. D1	33	170	1
10885	PCB-1260	11096-82-5	N.D. D1	49	170	1
10885	PCB-1262	37324-23-5	N.D. D1	33	170	1
10885	PCB-1268	11100-14-4	N.D. D1	33	170	1
Reporting limits were raised due to interference from the sample matrix.						
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	372	7.92	20.1	1
01650	Calcium	7440-70-2	103	16.3	33.6	1
01654	Iron	7439-89-6	354	3.36	13.4	1
01657	Magnesium	7439-95-4	7.04	1.12	6.71	1
01662	Potassium	7440-09-7	N.D.	13.3	33.6	1
01667	Sodium	7440-23-5	489	31.0	67.1	1
	SW-846 6020A		mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	0.671	0.0848	0.268	2
06125	Arsenic	7440-38-2	1.42	0.0898	0.268	2
06126	Barium	7440-39-3	2.01	0.259	0.537	2
06127	Beryllium	7440-41-7	N.D.	0.0153	0.0671	2
06128	Cadmium	7440-43-9	N.D.	0.0338	0.134	2
06131	Chromium	7440-47-3	0.436 J	0.224	0.537	2
06132	Cobalt	7440-48-4	0.279	0.0392	0.134	2
06133	Copper	7440-50-8	7.98	2.40	5.37	2
06135	Lead	7439-92-1	0.432	0.0338	0.403	2
06137	Manganese	7439-96-5	4.64	0.266	1.34	2
06139	Nickel	7440-02-0	4.36	0.228	0.537	2
06141	Selenium	7782-49-2	N.D.	0.0875	0.268	2
06142	Silver	7440-22-4	N.D.	0.0272	0.0671	2
06145	Thallium	7440-28-0	N.D. K1	0.0263	0.0671	2
06148	Vanadium	7440-62-2	12.0	0.0576	0.134	2
06149	Zinc	7440-66-6	4.55	0.815	2.01	2
	SW-846 7471B		mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	N.D.	0.0292	0.125	1

*=This limit was used in the evaluation of the final result

7/30/19

Sample Description: 19050803 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064218
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:34
SDG#: EUR65-10

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	330	830	5
10726	Fluoranthene	206-44-0	460	17	83	5
10726	Fluorene	86-73-7	55 J	17	83	5
10726	Hexachlorobenzene	118-74-1	N.D.	33	83	5
10726	Hexachlorobutadiene	87-68-3	N.D.	180	380	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	1,000	2,500	5
10726	Hexachloroethane	67-72-1	N.D.	170	830	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	35 J	17	83	5
10726	Isophorone	78-59-1	N.D.	83	180	5
10726	2-Methylnaphthalene	91-57-6	19 J	17	170	5
10726	2-Methylphenol	95-48-7	N.D.	83	330	5
10726	4-Methylphenol	106-44-5	N.D.	83	250	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	60 J	33	83	5
10726	2-Nitroaniline	88-74-4	N.D.	83	250	5
10726	3-Nitroaniline	99-09-2	N.D.	330	830	5
10726	4-Nitroaniline	100-01-6	N.D.	330	830	5
10726	Nitrobenzene	98-95-3	N.D.	130	330	5
10726	2-Nitrophenol	88-75-5	N.D.	130	280	5
10726	4-Nitrophenol	100-02-7	N.D.	830	2,500	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	120	250	5
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	83	180	5
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	330	830	5
10726	Pentachlorophenol	87-86-5	N.D.	330	830	5
10726	Phenanthrene	85-01-8	470	17	83	5
10726	Phenol	108-95-2	N.D.	83	180	5
10726	Pyrene	129-00-0	430	17	83	5
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	83	180	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	330	830	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	150	330	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	130	280	5
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	18	85	5
10885	PCB-1221	11104-28-2	N.D. D1	23	85	5
10885	PCB-1232	11141-16-5	N.D. D1	40	85	5

*=This limit was used in the evaluation of the final result

MW 7-30-19

Sample Description: 19050803 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064218
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:34
SDG#: EUR65-10

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1242	53469-21-9	N.D. D1	17	85	5
10885	PCB-1248	12672-29-6	N.D. D1	17	85	5
10885	PCB-1254	11097-69-1	N.D. D1	17	85	5
10885	PCB-1260	11096-82-5	N.D. D1	25	85	5
10885	PCB-1262	37324-23-5	N.D. D1	17	85	5
10885	PCB-1268	11100-14-4	N.D. D1	17	85	5
	Reporting limits were raised due to interference from the sample matrix.					
Metals	**SW-846 6010D Rev.4, July 2014**		mg/kg	mg/kg	mg/kg	
01643	Aluminum	7429-90-5	51.1	9.67	24.6	1
01650	Calcium	7440-70-2	35.1 J	19.9	41.0	1
01654	Iron	7439-89-6	176	4.10	16.4	1
01657	Magnesium	7439-95-4	10.3	1.37	8.20	1
01662	Potassium	7440-09-7	N.D.	16.2	41.0	1
01667	Sodium	7440-23-5	99.2	37.9	82.0	1
12003	Sulfur	7704-34-9	274	9.84	41.0	1
	SW-846 6020A		mg/kg	mg/kg	mg/kg	
06124	Antimony	7440-36-0	N.D.	0.104	0.328	2
06125	Arsenic	7440-38-2	0.173 J	0.110	0.328	2
06126	Barium	7440-39-3	2.44	0.316	0.656	2
06127	Beryllium	7440-41-7	N.D.	0.0187	0.0820	2
06128	Cadmium	7440-43-9	0.0526 J	0.0413	0.164	2
06131	Chromium	7440-47-3	1.08	0.274	0.656	2
06132	Cobalt	7440-48-4	0.171	0.0479	0.164	2
06133	Copper	7440-50-8	N.D. K4	2.93	6.56	2
06135	Lead	7439-92-1	2.33	0.0413	0.492	2
06137	Manganese	7439-96-5	1.56 J	0.325	1.64	2
06139	Nickel	7440-02-0	28.9	0.279	0.656	2
06141	Selenium	7782-49-2	N.D.	0.107	0.328	2
06142	Silver	7440-22-4	N.D.	0.0333	0.0820	2
06145	Thallium	7440-28-0	N.D. K1	0.0321	0.0820	2
06148	Vanadium	7440-62-2	38.5	0.0703	0.164	2
06149	Zinc	7440-66-6	8.63	0.995	2.46	2
	SW-846 7471B		mg/kg	mg/kg	mg/kg	
00159	Mercury	7439-97-6	N.D.	0.0307	0.131	1
Wet Chemistry	**SM 5310 B 2011**		mg/kg	mg/kg	mg/kg	
10065	Total Carbon in Soil	n.a.	940,000	77,300	227,000	1

*=This limit was used in the evaluation of the final result

7-30-19

Sample Description: 19050804 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064219
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:43
SDG#: EUR65-11

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		ug/kg	ug/kg	ug/kg	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	660	1,700	10
10726	Fluoranthene	206-44-0	750,000	3,300	17,000	1000
10726	Fluorene	86-73-7	21,000	33	170	10
10726	Hexachlorobenzene	118-74-1	N.D.	66	170	10
10726	Hexachlorobutadiene	87-68-3	N.D.	360	760	10
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	2,000	5,000	10
10726	Hexachloroethane	67-72-1	N.D.	330	1,700	10
10726	Indeno(1,2,3-cd)pyrene	193-39-5	350,000	330	1,700	100
10726	Isophorone	78-59-1	N.D.	170	360	10
10726	2-Methylnaphthalene	91-57-6	1,100	33	330	10
10726	2-Methylphenol	95-48-7	N.D.	170	660	10
10726	4-Methylphenol	106-44-5	N.D.	170	500	10
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	1,300	66	170	10
10726	2-Nitroaniline	88-74-4	N.D.	170	500	10
10726	3-Nitroaniline	99-09-2	N.D.	660	1,700	10
10726	4-Nitroaniline	100-01-6	N.D.	660	1,700	10
10726	Nitrobenzene	98-95-3	N.D.	260	660	10
10726	2-Nitrophenol	88-75-5	N.D.	260	560	10
10726	4-Nitrophenol	100-02-7	N.D.	1,700	5,000	10
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	230	500	10
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	170	360	10
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	660	1,700	10
10726	Pentachlorophenol	87-86-5	N.D.	660	1,700	10
10726	Phenanthrene	85-01-8	400,000	330	1,700	100
10726	Phenol	108-95-2	N.D.	170	360	10
10726	Pyrene	129-00-0	650,000	3,300	17,000	1000
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	170	360	10
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	660	1,700	10
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	300	660	10
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	260	560	10
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	180	850	5
10885	PCB-1221	11104-28-2	N.D. D1	230	850	5
10885	PCB-1232	11141-16-5	N.D. D1	400	850	5

*=This limit was used in the evaluation of the final result

MW 7310

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Analysis Report

Sample Description: 19050804 Grab Product

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064219
ELLE Group #: 2045320
Matrix: Product

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 14:43
SDG#: EUR65-11

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A Feb 2007 Rev 1**	**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1242	53469-21-9	N.D. D1	170	850	5
10885	PCB-1248	12672-29-6	N.D. D1	170	850	5
10885	PCB-1254	11097-69-1	N.D. D1	170	850	5
10885	PCB-1260	11096-82-5	N.D. D1	250	850	5
10885	PCB-1262	37324-23-5	N.D. D1	170	850	5
10885	PCB-1268	11100-14-4	N.D. D1	170	850	5
Reporting limits were raised due to interference from the sample matrix.						
Metals		**SW-846 6010D Rev.4, July 2014**	**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	3,390	10.6	27.0	1
01650	Calcium	7440-70-2	343	21.9	45.0	1
01654	Iron	7439-89-6	1,460	4.50	18.0	1
01657	Magnesium	7439-95-4	85.2	1.50	9.01	1
01662	Potassium	7440-09-7	99.1	17.8	45.0	1
01667	Sodium	7440-23-5	1,500	41.6	90.1	1
		SW-846 6020A	**mg/kg**	**mg/kg**	**mg/kg**	
06124	Antimony	7440-36-0	0.446	0.114	0.360	2
06125	Arsenic	7440-38-2	1.39	0.121	0.360	2
06126	Barium	7440-39-3	12.8	0.348	0.721	2
06127	Beryllium	7440-41-7	0.167	0.0205	0.0901	2
06128	Cadmium	7440-43-9	1.46	0.0454	0.180	2
06131	Chromium	7440-47-3	3.71	0.301	0.721	2
06132	Cobalt	7440-48-4	0.348	0.0526	0.180	2
06133	Copper	7440-50-8	11.5	3.23	7.21	2
06135	Lead	7439-92-1	18.7	0.0454	0.541	2
06137	Manganese	7439-96-5	16.1	0.357	1.80	2
06139	Nickel	7440-02-0	18.8	0.306	0.721	2
06141	Selenium	7782-49-2	0.453	0.117	0.360	2
06142	Silver	7440-22-4	0.0491 J	0.0366	0.0901	2
06145	Thallium	7440-28-0	0.0920	0.0353	0.0901	2
06148	Vanadium	7440-62-2	33.1	0.0773	0.180	2
06149	Zinc	7440-66-6	91.4	1.09	2.70	2
		SW-846 7471B	**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	N.D.	0.0302	0.129	1
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	**%**	**%**	**%**	
00111	Moisture	n.a.	N.D.	0.50	0.50	1

*=This limit was used in the evaluation of the final result

MW 7-30-19

Sample Description: **19050201 Grab Sediment**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: **SW 1064220**
ELLE Group #: **2045320**
Matrix: Sediment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 11:55
SDG#: EUR65-12

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/kg**	**ug/kg**	**ug/kg**	
10726	bis(2-Ethylhexyl)phthalate	117-81-7	2,100	720	1,800	5
10726	Fluoranthene	206-44-0	7,200	36	180	5
10726	Fluorene	86-73-7	170 J	36	180	5
10726	Hexachlorobenzene	118-74-1	N.D.	72	180	5
10726	Hexachlorobutadiene	87-68-3	N.D.	400	830	5
10726	Hexachlorocyclopentadiene	77-47-4	N.D.	2,200	5,400	5
10726	Hexachloroethane	67-72-1	N.D.	360	1,800	5
10726	Indeno(1,2,3-cd)pyrene	193-39-5	1,300	36	180	5
10726	Isophorone	78-59-1	N.D.	180	400	5
10726	2-Methylnaphthalene	91-57-6	48 J	36	360	5
10726	2-Methylphenol	95-48-7	N.D.	180	720	5
10726	4-Methylphenol	106-44-5	N.D.	180	540	5
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
10726	Naphthalene	91-20-3	N.D.	72	180	5
10726	2-Nitroaniline	88-74-4	N.D.	180	540	5
10726	3-Nitroaniline	99-09-2	N.D.	720	1,800	5
10726	4-Nitroaniline	100-01-6	N.D.	720	1,800	5
10726	Nitrobenzene	98-95-3	N.D.	290	720	5
10726	2-Nitrophenol	88-75-5	N.D.	290	610	5
10726	4-Nitrophenol	100-02-7	N.D.	1,800	5,400	5
10726	N-Nitroso-di-n-propylamine	621-64-7	N.D.	250	540	5
10726	N-Nitrosodiphenylamine	86-30-6	N.D.	180	400	5
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
10726	Di-n-octylphthalate	117-84-0	N.D.	720	1,800	5
10726	Pentachlorophenol	87-86-5	N.D.	720	1,800	5
10726	Phenanthrene	85-01-8	4,400	36	180	5
10726	Phenol	108-95-2	N.D.	180	400	5
10726	Pyrene	129-00-0	4,000	36	180	5
10726	1,2,4,5-Tetrachlorobenzene	95-94-3	N.D.	180	400	5
10726	2,3,4,6-Tetrachlorophenol	58-90-2	N.D.	720	1,800	5
10726	2,4,5-Trichlorophenol	95-95-4	N.D.	330	720	5
10726	2,4,6-Trichlorophenol	88-06-2	N.D.	290	610	5
	Reporting limits were raised due to interference from the sample matrix.					
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D. D1	16,000	74,000	200
10885	PCB-1221	11104-28-2	N.D. D1	20,000	74,000	200
10885	PCB-1232	11141-16-5	N.D. D1	35,000	74,000	200

*=This limit was used in the evaluation of the final result

7-30-19

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Analysis Report

Sample Description: 19050201 Grab Sediment

Project Name: Ecology & Environment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/21/2019 11:55
SDG#: EUR65-12

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1064220
ELLE Group #: 2045320
Matrix: Sediment

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		**ug/kg**	**ug/kg**	**ug/kg**	
10885	PCB-1242	53469-21-9	N.D. D1	14,000 U	74,000	200
10885	PCB-1248	12672-29-6	N.D. D1	14,000	74,000	200
10885	PCB-1254	11097-69-1	N.D. D1	14,000	74,000	200
10885	PCB-1260	11096-82-5	N.D. D1	21,000	74,000	200
10885	PCB-1262	37324-23-5	N.D. D1	14,000	74,000	200
10885	PCB-1268	11100-14-4	130,000 D1	14,000	74,000	200
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/kg**	**mg/kg**	**mg/kg**	
01643	Aluminum	7429-90-5	183,000	94.7	241	5
01650	Calcium	7440-70-2	22,500	39.0	80.3	1
01654	Iron	7439-89-6	36,200	8.03	32.1	1
01657	Magnesium	7439-95-4	4,900	2.68	16.1	1
01662	Potassium	7440-09-7	3,630	31.8	80.3	1
01667	Sodium	7440-23-5	45,700	74.2	161	1
	SW-846 6020A		**mg/kg**	**mg/kg**	**mg/kg**	
06124	Antimony	7440-36-0	45.7	0.203	0.642	2
06125	Arsenic	7440-38-2	99.0	0.215	0.642	2
06126	Barium	7440-39-3	814	0.620	1.28	2
06127	Beryllium	7440-41-7	6.15	0.0366	0.161	2
06128	Cadmium	7440-43-9	18.0	0.0809	0.321	2
06131	Chromium	7440-47-3	65.0	0.536	1.28	2
06132	Cobalt	7440-48-4	18.3	0.0938	0.321	2
06133	Copper	7440-50-8	763	5.75	12.8	2
06135	Lead	7439-92-1	771	0.405	4.82	10
06137	Manganese	7439-96-5	184	0.636	3.21	2
06139	Nickel	7440-02-0	1,120	0.546	1.28	2
06141	Selenium	7782-49-2	17.9	0.209	0.642	2
06142	Silver	7440-22-4	0.495	0.0652	0.161	2
06145	Thallium	7440-28-0	0.650	0.0629	0.161	2
06148	Vanadium	7440-62-2	379	0.138	0.321	2
06149	Zinc	7440-66-6	1,210	1.95	4.82	2
	SW-846 7471B		**mg/kg**	**mg/kg**	**mg/kg**	
00159	Mercury	7439-97-6	0.248 J	0.0669	0.286	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture	n.a.	54.2	0.50	0.50	1

*=This limit was used in the evaluation of the final result

7-30-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 8, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of one surface water sample collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The sample was numbered: 19050601

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The sample was maintained at 4°C ± 2°C. The sample was collected on May 20, 2019, extracted on May 24, 2019, and analyzed by May 28, 2019, therefore meeting QC criteria of less than 14 days between collection and extraction for preserved water samples and less than 40 days between extraction and analysis.

2. **Initial Calibration: Acceptable.**

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. **Continuing Calibration: Acceptable.**

Calculations were verified as correct. All percent differences (%Ds) were within the laboratory control limits.

4. **Blanks: Acceptable.**

A method blank was analyzed for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in the method blank.

5. **System Monitoring Compounds (SMC): Acceptable.**

All recoveries of the SMCs were greater than 10% and within QC limits.

6. **Blank Spike (BS), Matrix Spike (MS), and MS Duplicate (MSD): Acceptable.**

BS, MS, and MSD recoveries were within QC limits.

7. **Duplicates: Acceptable.**

All spike duplicate results were within QC limits.

8. **Quantitation and Quantitation Limits: Acceptable.**

Sample concentrations were correctly calculated.

9. **Laboratory Contact: Not Required.**

No laboratory contact was required.

10. **Overall Assessment of Data for Use**

A total of two results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Analysis Report

Sample Description: 19050601 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065016
ELLE Group #: 2045475
Matrix: Surface Water

Submittal Date/Time: 05/23/2019 10:00
Collection Date/Time: 05/20/2019 09:02
SDG#: EUR66-01BKG

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		ug/l	ug/l	ug/l	
08271	Diesel Range Organics C12-C24	n.a.	N.D.	33 U	110	1
08271	Heavy Range Organics C24-C40	n.a.	N.D.	75 U	270	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08271	NWTPH-Dx water	ECY 97-602 NWTPH-Dx modified	1	191440009A	05/28/2019 21:48	Nicholas R Rossi	1
11197	WA DRO NW DX Ext (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	191440009A	05/24/2019 17:35	Christine E Gleim	1

MW 7-8-19

*=This limit was used in the evaluation of the final result

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, WA

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of six water samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Volatile Organic Compound (VOC) analysis (EPA Method 8260) was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered:

19050601	19050602	19050603	19050604	19050605	19051001

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of $4^{\circ}C \pm 2^{\circ}C$. The samples were collected on May 20, 2019, and were analyzed by May 31, 2019, therefore meeting QC criteria of less than 14 days between collection and analysis for preserved water samples.

2. Tuning: Acceptable.

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. Initial Calibration: Acceptable.

All average Relative Response Factors (RRFs) were within the QC limits. All Relative Standard Deviations (RSDs) and/or correlation coefficients were within the QC limits.

4. Continuing Calibration: Satisfactory.

All RRFs were within the QC limits. All % differences were within the QC limits except trichlorofluoromethane with a low recovery associated with all field samples; associated sample detection limits were qualified as estimated quantities with a low bias (UJL).

5. Blanks: Acceptable.

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank. There were no detections in the trip blank (sample 19051001).

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS) Analysis: Acceptable.

BS analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. Matrix Spike (MS)/MS Duplicate (MSD) Analysis: Acceptable.

MS and MSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

9. Duplicate Analysis: Acceptable.

Spike duplicate analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All spike duplicate results were within QC limits.

10. Internal Standards: Acceptable.

All internal standards were within $\pm$ 30 seconds of the continuing calibration internal standard retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts.

11. Overall Assessment of Data for Use

A total of 306 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

Sample Description: 19050601 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065027
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:02
SDG#: EUR67-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Acetone	67-64-1	0.8 J Q	0.7 U	20	1
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Bromochloromethane	74-97-5	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	0.2	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	2-Butanone	78-93-3	N.D.	0.3	10	1
11997	Carbon Disulfide	75-15-0	N.D.	0.2	5	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	Cyclohexane	110-82-7	N.D.	0.2	5	1
11997	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.3	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	1,2-Dibromoethane	106-93-4	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	cis-1,2-Dichloroethene	156-59-2	N.D.	0.2	1	1
11997	trans-1,2-Dichloroethene	156-60-5	N.D.	0.2	1	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	2-Hexanone	591-78-6	N.D.	0.3	10	1
11997	Isopropylbenzene	98-82-8	N.D.	0.2	5	1
11997	Methyl Acetate	79-20-9	N.D.	0.2	5	1
11997	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.2	1	1
11997	4-Methyl-2-pentanone	108-10-1	N.D.	0.5	10	1
11997	Methylcyclohexane	108-87-2	N.D.	0.2	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	Styrene	100-42-5	N.D.	0.2	5	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1

*=This limit was used in the evaluation of the final result

7-27-19

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Analysis Report

Sample Description: 19050601 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065027
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:02
SDG#: EUR67-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	N.D.	19	250	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/31/2019 02:28	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/31/2019 02:27	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/27/2019 23:48	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/27/2019 23:47	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050602 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065028
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:48
SDG#: EUR67-02

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Acetone	67-64-1	4 J Q	0.7	20	1
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Bromochloromethane	74-97-5	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	0.2	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	2-Butanone	78-93-3	N.D.	0.3	10	1
11997	Carbon Disulfide	75-15-0	N.D.	0.2	5	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	Cyclohexane	110-82-7	N.D.	0.2	5	1
11997	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.3	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	1,2-Dibromoethane	106-93-4	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	cis-1,2-Dichloroethene	156-59-2	N.D.	0.2	1	1
11997	trans-1,2-Dichloroethene	156-60-5	N.D.	0.2	1	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	2-Hexanone	591-78-6	N.D.	0.3	10	1
11997	Isopropylbenzene	98-82-8	N.D.	0.2	5	1
11997	Methyl Acetate	79-20-9	N.D.	0.2	5	1
11997	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.2	1	1
11997	4-Methyl-2-pentanone	108-10-1	N.D.	0.5	10	1
11997	Methylcyclohexane	108-87-2	N.D.	0.2	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	Styrene	100-42-5	N.D.	0.2	5	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1

*=This limit was used in the evaluation of the final result

MW 7-27-19

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Analysis Report

Sample Description: 19050602 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065028
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:48
SDG#: EUR67-02

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	N.D.	19	250	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/31/2019 02:51	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/31/2019 02:50	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/28/2019 00:15	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/28/2019 00:14	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

7-22-19

Sample Description: 19050603 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065029
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 11:54
SDG#: EUR67-03

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Acetone	67-64-1	0.9 J Q	0.7	20	1
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Bromochloromethane	74-97-5	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	0.2	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	2-Butanone	78-93-3	N.D.	0.3	10	1
11997	Carbon Disulfide	75-15-0	N.D.	0.2	5	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	Cyclohexane	110-82-7	N.D.	0.2	5	1
11997	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.3	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	1,2-Dibromoethane	106-93-4	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	cis-1,2-Dichloroethene	156-59-2	N.D.	0.2	1	1
11997	trans-1,2-Dichloroethene	156-60-5	N.D.	0.2	1	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	2-Hexanone	591-78-6	N.D.	0.3	10	1
11997	Isopropylbenzene	98-82-8	N.D.	0.2	5	1
11997	Methyl Acetate	79-20-9	N.D.	0.2	5	1
11997	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.2	1	1
11997	4-Methyl-2-pentanone	108-10-1	N.D.	0.5	10	1
11997	Methylcyclohexane	108-87-2	N.D.	0.2	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	Styrene	100-42-5	N.D.	0.2	5	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1

*=This limit was used in the evaluation of the final result

MW 7-27-19

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Analysis Report

Sample Description: 19050603 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065029
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 11:54
SDG#: EUR67-03

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	N.D.	19	250	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/31/2019 03:14	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/31/2019 03:13	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/28/2019 00:43	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/28/2019 00:42	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

Sample Description: 19050604 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065030
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:19
SDG#: EUR67-04BKG

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Acetone	67-64-1	5 J Q	0.7	20	1
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Bromochloromethane	74-97-5	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	0.2	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	2-Butanone	78-93-3	N.D.	0.3	10	1
11997	Carbon Disulfide	75-15-0	N.D.	0.2	5	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	Cyclohexane	110-82-7	N.D.	0.2	5	1
11997	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.3	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	1,2-Dibromoethane	106-93-4	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	cis-1,2-Dichloroethene	156-59-2	N.D.	0.2	1	1
11997	trans-1,2-Dichloroethene	156-60-5	N.D.	0.2	1	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	2-Hexanone	591-78-6	N.D.	0.3	10	1
11997	Isopropylbenzene	98-82-8	N.D.	0.2	5	1
11997	Methyl Acetate	79-20-9	N.D.	0.2	5	1
11997	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.2	1	1
11997	4-Methyl-2-pentanone	108-10-1	N.D.	0.5	10	1
11997	Methylcyclohexane	108-87-2	N.D.	0.2	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	Styrene	100-42-5	N.D.	0.2	5	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1

*=This limit was used in the evaluation of the final result

MW 7-27-19

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Analysis Report

Sample Description: 19050604 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065030
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:19
SDG#: EUR67-04BKG

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	N.D.	19	250	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/30/2019 21:54	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/30/2019 21:53	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/28/2019 01:10	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/28/2019 01:09	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

7-27-19

Sample Description: 19050605 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065033
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:39
SDG#: EUR67-05

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Acetone	67-64-1	6 J	0.7	20	1
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Bromochloromethane	74-97-5	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	0.2	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	2-Butanone	78-93-3	N.D.	0.3	10	1
11997	Carbon Disulfide	75-15-0	N.D.	0.2	5	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	Cyclohexane	110-82-7	N.D.	0.2	5	1
11997	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.3	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	1,2-Dibromoethane	106-93-4	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	cis-1,2-Dichloroethene	156-59-2	N.D.	0.2	1	1
11997	trans-1,2-Dichloroethene	156-60-5	N.D.	0.2	1	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	2-Hexanone	591-78-6	N.D.	0.3	10	1
11997	Isopropylbenzene	98-82-8	N.D.	0.2	5	1
11997	Methyl Acetate	79-20-9	N.D.	0.2	5	1
11997	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.2	1	1
11997	4-Methyl-2-pentanone	108-10-1	N.D.	0.5	10	1
11997	Methylcyclohexane	108-87-2	N.D.	0.2	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	Styrene	100-42-5	N.D.	0.2	5	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: 19050605 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065033
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:39
SDG#: EUR67-05

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	N.D.	19	250	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/31/2019 03:36	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/31/2019 03:35	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/28/2019 02:33	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/28/2019 02:32	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

Sample Description: 19051001 Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065034
ELLE Group #: 2045480
Matrix: Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 14:30
SDG#: EUR67-06TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Acetone	67-64-1	N.D.	0.7	20	1
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Bromochloromethane	74-97-5	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	0.2	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	2-Butanone	78-93-3	N.D.	0.3	10	1
11997	Carbon Disulfide	75-15-0	N.D.	0.2	5	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	Cyclohexane	110-82-7	N.D.	0.2	5	1
11997	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.3	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	1,2-Dibromoethane	106-93-4	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	cis-1,2-Dichloroethene	156-59-2	N.D.	0.2	1	1
11997	trans-1,2-Dichloroethene	156-60-5	N.D.	0.2	1	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	2-Hexanone	591-78-6	N.D.	0.3	10	1
11997	Isopropylbenzene	98-82-8	N.D.	0.2	5	1
11997	Methyl Acetate	79-20-9	N.D.	0.2	5	1
11997	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.2	1	1
11997	4-Methyl-2-pentanone	108-10-1	N.D.	0.5	10	1
11997	Methylcyclohexane	108-87-2	N.D.	0.2	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	Styrene	100-42-5	N.D.	0.2	5	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1

*=This limit was used in the evaluation of the final result

MW 7-27-19

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Analysis Report

Sample Description: 19051001 Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065034
ELLE Group #: 2045480
Matrix: Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 14:30
SDG#: EUR67-06TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	N.D.	19	250	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/30/2019 21:09	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/30/2019 21:08	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/27/2019 22:52	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/27/2019 22:51	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

MW72719

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 27, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of six water samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Gx) analyses was performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered:

19050601	19050602	19050603	19050604	19050605	19051001

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of 4°C ± 2°C. The samples were collected on May 20, 2019, and were analyzed by May 28, 2019, therefore meeting QC criteria of less than 14 days between collection and analysis for preserved water samples.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. All relative percent differences (RPDs) were less than or equal to the laboratory control limits.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences were within the laboratory control limits.

4. Blanks: Acceptable.

A method blank was analyzed at the required frequency of every 12 hours for each matrix, preparation technique, and analysis system. Gasoline-range TPHs were not detected in the method blank, or in the trip blank (sample 19051001).

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5. **System Monitoring Compounds (SMC): Acceptable.**

All recoveries of the SMCs were within QC limits.

6. **Matrix Spike (MS) and MS Duplicate (MSD) Analyses: Acceptable.**

MS and MSD results were within laboratory QC limits.

7. **Blank Spikes (BS) Analyses: Acceptable.**

BS and BSD results were within laboratory QC limits.

8. **Duplicates: Acceptable.**

All spike duplicate results were within laboratory QC limits.

9. **Quantitation and Quantitation Limits: Acceptable.**

Sample quantitation and sample quantitation limits were correctly calculated.

10. **Laboratory Contact: Not Required.**

No laboratory contact was required.

11. **Overall Assessment of Data for Use**

A total of six results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Analysis Report

Sample Description: 19050601 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065027
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 09:02
SDG#: EUR67-01

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	N.D.	19 U	250	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/31/2019 02:28	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/31/2019 02:27	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/27/2019 23:48	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/27/2019 23:47	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

7-27-19

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Analysis Report

Sample Description: 19050602 Grab Surface Water

Project Name: Ecology & Environment

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 10:48
SDG#: EUR67-02

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065028
ELLE Group #: 2045480
Matrix: Surface Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	N.D.	19 U	250	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/31/2019 02:51	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/31/2019 02:50	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/28/2019 00:15	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/28/2019 00:14	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

7-22-19

Sample Description: 19050603 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065029
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 11:54
SDG#: EUR67-03

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	N.D.	19	250	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/31/2019 03:14	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/31/2019 03:13	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/28/2019 00:43	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/28/2019 00:42	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: 19050604 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065030
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:19
SDG#: EUR67-04BKG

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	N.D.	19 U	250	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/30/2019 21:54	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/30/2019 21:53	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/28/2019 01:10	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/28/2019 01:09	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

7-22-19

Sample Description: 19050605 Grab Surface Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065033
ELLE Group #: 2045480
Matrix: Surface Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 12:39
SDG#: EUR67-05

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	~~N.D.~~	19 V	250	1

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/31/2019 03:36	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/31/2019 03:35	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/28/2019 02:33	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/28/2019 02:32	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

MW 7/2/19

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Analysis Report

Sample Description: 19051001 Water

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: WW 1065034
ELLE Group #: 2045480
Matrix: Water

Submittal Date/Time: 05/22/2019 10:10
Collection Date/Time: 05/20/2019 14:30
SDG#: EUR67-06TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,2,3-Trichlorobenzene	87-61-6	N.D.	0.4	5	1
11997	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.3	5	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	m+p-Xylene	179601-23-1	N.D.	1	5	1
11997	o-Xylene	95-47-6	N.D.	0.4	1	1
GC Volatiles	**ECY 97-602 NWTPH-Gx**		ug/l	ug/l	ug/l	
08273	NWTPH-Gx water C7-C12	n.a.	~~N.D.~~	19 U	250	1

A Method Detection Limit (MDL) standard is analyzed to confirm sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The MDL standard shows adequate sensitivity at or below the reporting limit.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	VOCs- 5ml Water by 8260C/D	SW-846 8260C	1	4191502AA	05/30/2019 21:09	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	4191502AA	05/30/2019 21:08	Don V Viray	1
08273	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	19147D20A	05/27/2019 22:52	Jeremy C Giffin	1
01146	GC VOA Water Prep	SW-846 5030C	1	19147D20A	05/27/2019 22:51	Jeremy C Giffin	1

*=This limit was used in the evaluation of the final result

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 1, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of six solid samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analyses for Polychlorinated Biphenyls (PCBs - EPA Method 8082) were performed by Eurofins Lancaster, Inc., Lancaster, Pennsylvania. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered:

19050101 19050102 19050104 19050105 19050106 19050107

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained at 0°C to 6°C. The samples were collected on May 22, 2019, extracted on June 6, 2019, and were analyzed by June 17, 2019. There are no holding time limits for Method 8082 PCB analyses.

2. Instrument Performance: Acceptable.

The resolutions and window defining mix results were within QC limits.

3. Initial and Continuing Calibration: Acceptable.

All initial calibration relative standard deviations (RSDs) were within QC limits. All continuing calibration % differences (% D) were within QC limits.

4. Blanks: Satisfactory.

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each analytical system. PCB 1268 was detected at 220 ug/kg; no actions were taken as all sample results were greater than 10 times the blank result.

5. System Monitoring Compounds (SMCs): Satisfactory.

All recoveries of the SMCs were within QC limits except when diluted out due to high analyte concentrations in the native sample; no actions were taken based on these outliers.

6. Matrix Spike (MS)/MS Duplicate (MSD) Analyses: Satisfactory.

MS/MSD recoveries were 0%; no actions were taken as the native sample had elevated concentrations of PCB-1268 that required a 100,000-fold dilution.

7. Sample Results and Reporting Limit Calculations: Acceptable.

Sample results and reporting limits were correctly calculated.

8. Compound Identification: Acceptable.

All positive sample results were dual-column confirmed with differences between the columns less than 40%.

9. Laboratory Contact

No laboratory contact was required.

10. Overall Assessment

A total of 63 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, positive blank results, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

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Analysis Report

Sample Description: 19050101 Solid

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1068125
ELLE Group #: 2046151
Matrix: Solid

Submittal Date/Time: 05/24/2019 10:00
Collection Date/Time: 05/22/2019
SDG#: EUR68-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs	**SW-846 8082A Feb 2007 Rev 1**		ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	3,600,000	17,000,000	100000
10885	PCB-1221	11104-28-2	N.D. D1	4,600,000	17,000,000	100000
10885	PCB-1232	11141-16-5	N.D. D1	7,900,000	17,000,000	100000
10885	PCB-1242	53469-21-9	N.D. D1	3,300,000	17,000,000	100000
10885	PCB-1248	12672-29-6	N.D. D1	3,300,000	17,000,000	100000
10885	PCB-1254	11097-69-1	N.D. D1	3,300,000	17,000,000	100000
10885	PCB-1260	11096-82-5	N.D. D1	4,900,000	17,000,000	100000
10885	PCB-1262	37324-23-5	N.D. D1	3,300,000	17,000,000	100000
10885	PCB-1268	11100-14-4	27,000,000 D2	3,300,000	17,000,000	100000
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		%	%	%	
00111	Moisture	n.a.	2.3	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10885	PCBs 8082A/3546	SW-846 8082A Feb 2007 Rev 1	1	191570004A	06/17/2019 16:28	Covenant Mutuku	100000
10497	PCB Microwave Soil Extraction	SW-846 3546	2	191570004A	06/06/2019 10:10	Shawn J McMullen	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19150820001A	05/30/2019 21:08	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

MW 7/19

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Analysis Report

Sample Description: 19050102 Solid

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1068126
ELLE Group #: 2046151
Matrix: Solid

Submittal Date/Time: 05/24/2019 10:00
Collection Date/Time: 05/22/2019
SDG#: EUR68-02

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A Feb 2007 Rev 1**	ug/kg		ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D.	D1	18,000	84,000	500
10885	PCB-1221	11104-28-2	N.D.	D1	23,000	84,000	500
10885	PCB-1232	11141-16-5	N.D.	D1	39,000	84,000	500
10885	PCB-1242	53469-21-9	N.D.	D1	16,000	84,000	500
10885	PCB-1248	12672-29-6	N.D.	D1	16,000	84,000	500
10885	PCB-1254	11097-69-1	N.D.	D1	16,000	84,000	500
10885	PCB-1260	11096-82-5	N.D.	D1	24,000	84,000	500
10885	PCB-1262	37324-23-5	N.D.	D1	16,000	84,000	500
10885	PCB-1268	11100-14-4	70,000	JD2	16,000	84,000	500
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	%		%	%	
00111	Moisture	n.a.	4.9		0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10885	PCBs 8082A/3546	SW-846 8082A Feb 2007 Rev 1	1	191570004A	06/17/2019 16:49	Covenant Mutuku	500
10497	PCB Microwave Soil Extraction	SW-846 3546	2	191570004A	06/06/2019 10:10	Shawn J McMullen	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19150820001A	05/30/2019 21:08	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

MW 7-19

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Analysis Report

Sample Description: 19050104 Solid

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1068127
ELLE Group #: 2046151
Matrix: Solid

Submittal Date/Time: 05/24/2019 10:00
Collection Date/Time: 05/22/2019
SDG#: EUR68-03

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A Feb 2007 Rev 1**	ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	5,100,000 U	24,000,000	100000
10885	PCB-1221	11104-28-2	N.D. D1	6,500,000	24,000,000	100000
10885	PCB-1232	11141-16-5	N.D. D1	11,000,000	24,000,000	100000
10885	PCB-1242	53469-21-9	N.D. D1	4,700,000	24,000,000	100000
10885	PCB-1248	12672-29-6	N.D. D1	4,700,000	24,000,000	100000
10885	PCB-1254	11097-69-1	N.D. D1	4,700,000	24,000,000	100000
10885	PCB-1260	11096-82-5	N.D. D1	7,000,000	24,000,000	100000
10885	PCB-1262	37324-23-5	N.D. D1	4,700,000	24,000,000	100000
10885	PCB-1268	11100-14-4	22,000,000 JD1 Q	4,700,000	24,000,000	100000
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	%	%	%	
00111	Moisture	n.a.	4.1	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10885	PCBs 8082A/3546	SW-846 8082A Feb 2007 Rev 1	1	191570004A	06/17/2019 17:00	Covenant Mutuku	100000
10497	PCB Microwave Soil Extraction	SW-846 3546	2	191570004A	06/06/2019 10:10	Shawn J McMullen	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19150820001A	05/30/2019 21:08	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

MW 7-19

Sample Description: 19050105 Solid

Project Name: Ecology & Environment

Eurofins Air Toxics, Inc.
ELLE Sample #: SW 1068128
ELLE Group #: 2046151
Matrix: Solid

Submittal Date/Time: 05/24/2019 10:00
Collection Date/Time: 05/22/2019
SDG#: EUR68-04

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A Feb 2007 Rev 1**	ug/kg		ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D.	D1	3,500,000	16,000,000	100000
10885	PCB-1221	11104-28-2	N.D.	D1	4,500,000	16,000,000	100000
10885	PCB-1232	11141-16-5	N.D.	D1	7,700,000	16,000,000	100000
10885	PCB-1242	53469-21-9	N.D.	D1	3,200,000	16,000,000	100000
10885	PCB-1248	12672-29-6	N.D.	D1	3,200,000	16,000,000	100000
10885	PCB-1254	11097-69-1	N.D.	D1	3,200,000	16,000,000	100000
10885	PCB-1260	11096-82-5	N.D.	D1	4,700,000	16,000,000	100000
10885	PCB-1262	37324-23-5	N.D.	D1	3,200,000	16,000,000	100000
10885	PCB-1268	11100-14-4	39,000,000	D2	3,200,000	16,000,000	100000
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	%		%	%	
00111	Moisture	n.a.	N.D.		0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10885	PCBs 8082A/3546	SW-846 8082A Feb 2007 Rev 1	1	191570004A	06/17/2019 17:10	Covenant Mutuku	100000
10497	PCB Microwave Soil Extraction	SW-846 3546	2	191570004A	06/06/2019 10:10	Shawn J McMullen	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19150820001A	05/30/2019 21:08	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: **19050106 Solid**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: **SW 1068129**
ELLE Group #: **2046151**
Matrix: Solid

Submittal Date/Time: 05/24/2019 10:00
Collection Date/Time: 05/22/2019
SDG#: EUR68-05

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A Feb 2007 Rev 1**	ug/kg	ug/kg	ug/kg	
10885	PCB-1016	12674-11-2	N.D. D1	7,500,000 U	35,000,000	200000
10885	PCB-1221	11104-28-2	N.D. D1	9,600,000	35,000,000	200000
10885	PCB-1232	11141-16-5	N.D. D1	17,000,000	35,000,000	200000
10885	PCB-1242	53469-21-9	N.D. D1	6,900,000	35,000,000	200000
10885	PCB-1248	12672-29-6	N.D. D1	6,900,000	35,000,000	200000
10885	PCB-1254	11097-69-1	N.D. D1	6,900,000	35,000,000	200000
10885	PCB-1260	11096-82-5	N.D. D1	10,000,000	35,000,000	200000
10885	PCB-1262	37324-23-5	N.D. D1	6,900,000	35,000,000	200000
10885	PCB-1268	11100-14-4	25,000,000 JD2 Q	6,900,000	35,000,000	200000
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	%	%	%	
00111	Moisture	n.a.	6.9	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10885	PCBs 8082A/3546	SW-846 8082A Feb 2007 Rev 1	1	191570004A	06/17/2019 18:13	Covenant Mutuku	200000
10497	PCB Microwave Soil Extraction	SW-846 3546	2	191570004A	06/06/2019 10:10	Shawn J McMullen	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19150820001A	05/30/2019 21:08	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

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Sample Description: **19050107 Solid**

Project Name: **Ecology & Environment**

Eurofins Air Toxics, Inc.
ELLE Sample #: **SW 1068130**
ELLE Group #: **2046151**
Matrix: Solid

Submittal Date/Time: 05/24/2019 10:00
Collection Date/Time: 05/22/2019
SDG#: EUR68-06

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
PCBs		**SW-846 8082A Feb 2007 Rev 1**	**ug/kg**		**ug/kg**	**ug/kg**	
10885	PCB-1016	12674-11-2	N.D.	D1	3,300,000 U	16,000,000	100000
10885	PCB-1221	11104-28-2	N.D.	D1	4,200,000	16,000,000	100000
10885	PCB-1232	11141-16-5	N.D.	D1	7,400,000	16,000,000	100000
10885	PCB-1242	53469-21-9	N.D.	D1	3,000,000	16,000,000	100000
10885	PCB-1248	12672-29-6	N.D.	D1	3,000,000	16,000,000	100000
10885	PCB-1254	11097-69-1	N.D.	D1	3,000,000	16,000,000	100000
10885	PCB-1260	11096-82-5	N.D.	D1	4,500,000	16,000,000	100000
10885	PCB-1262	37324-23-5	N.D.	D1	3,000,000	16,000,000	100000
10885	PCB-1268	11100-14-4	22,000,000	D2	3,000,000	16,000,000	100000
Wet Chemistry		**SM 2540 G-2011 %Moisture Calc**	**%**		**%**	**%**	
00111	Moisture	n.a.	1.1		0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Washington Lab Certification No. C457

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10885	PCBs 8082A/3546	SW-846 8082A Feb 2007 Rev 1	1	191570004A	06/17/2019 18:24	Covenant Mutuku	100000
10497	PCB Microwave Soil Extraction	SW-846 3546	2	191570004A	06/06/2019 10:10	Shawn J McMullen	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19150820001A	05/30/2019 21:08	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: August 22, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of six solid/waste samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington. has been completed. Analyses for Polychlorinated Biphenyls (PCBs - EPA Method 8082A) were performed by Eurofins Test America, Inc., Tacoma, Washington. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM). The report was revised to include PCBs -1262 and -1268.

The samples were numbered:

19050901	19050902	19050903	19050807	19050806	19050805

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained at 0°C to 6°C. The samples were collected on May 22 and 23, 2019, extracted by May 31, 2019, and were analyzed by June 11, 2019. There are no holding time limits for Method 8082 PCB analyses.

2. Instrument Performance: Acceptable.

The surrogate retention time percent difference between the initial calibration standards and the remaining standards and samples was within QC limits.

3. Initial and Continuing Calibration: Satisfactory.

All initial calibration relative standard deviations (RSDs) were within QC limits. All continuing calibration % differences (% D) were within QC limits except a few outliers on one column only (no actions were taken as these analytes were not detected in the associated samples). The SMC DCB was outside limits on the confirmation column only; therefore, no qualifiers were applied.

4. Blanks: Acceptable.

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each

analytical system. No target analytes were detected in the laboratory blanks.

5. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

6. System Monitoring Compounds (SMCs): Satisfactory.

All recoveries of the SMCs were within the established control limits except in sample 19050806; no actions were taken as evidence of matrix interference is present.

7. Matrix Spike (MS) and MS Duplicate (MSD) Analyses: Satisfactory.

MS and MSD recoveries were within QC limits except PCB 1260 with high recoveries in the spikes of sample 19050806; no actions were taken as PCB 1260 was not detected in this sample.

8. Blank Spike (BS) Analysis: Acceptable.

BS recoveries were within QC limits.

9. Duplicates: Satisfactory.

Relative Percent Differences (RPDs) of all spiked analytes were within QC limits except PCB 1260; no actions were taken based on this outlier alone.

10. Compound Identification: Satisfactory.

All results were dual-column confirmed with differences between the columns less than 40% except PCBs in samples 19050806, 19050807, and 19050901; the lower values were reported, and the sample results were qualified as estimated quantities with an unknown bias (JK).

The PCB-1268 result in sample 19050806 was outside of the upper tier of the instrument's calibration. The result was qualified as an estimated quantity with a high bias (JH).

11. Target Compound Quantitation and Quantitation Limits: Acceptable.

Sample results and quantitation limits were correctly calculated.

12. Laboratory Contact

No laboratory contact was required.

13. Overall Assessment

A total of 54 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of

Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050807 Lab Sample ID: 580-86493-1

Matrix: Solid Lab File ID: 35F061019a012.d

Analysis Method: 8082A Date Collected: 05/23/2019 12:50

Extraction Method: 3546 Date Extracted: 05/30/2019 08:48

Sample wt/vol: 10.598(g) Date Analyzed: 06/10/2019 15:49

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-CLPest-1 ID: 0.25(mm)

% Moisture: 23.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302762 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
11104-28-2	PCB-1221	ND		0.025	0.0052
11141-16-5	PCB-1232	ND		0.025	0.0061
53469-21-9	PCB-1242	ND		0.025	0.0043
12672-29-6	PCB-1248	ND		0.025	0.0036
11097-69-1	PCB-1254	ND		0.025	0.0046
11096-82-5	PCB-1260	ND		0.025	0.0091
37324-23-5	PCB-1262	ND		0.025	0.0058
11100-14-4	PCB-1268	0.19		0.025	0.0031

CAS NO.	SURROGATE	%REC	Q	LIMITS
2051-24-3	DCB Decachlorobiphenyl	70		39-142
877-09-8	Tetrachloro-m-xylene	79		35-129

MW 8-22-19

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050807 DL Lab Sample ID: 580-86493-1 DL

Matrix: Solid Lab File ID: 35F061119a015.d

Analysis Method: 8082A Date Collected: 05/23/2019 12:50

Extraction Method: 3546 Date Extracted: 05/30/2019 08:48

Sample wt/vol: 10.598(g) Date Analyzed: 06/11/2019 12:34

Con. Extract Vol.: 10(mL) Dilution Factor: 10

Injection Volume: 1(uL) GC Column: ZB-CLPest-1 ID: 0.25(mm)

% Moisture: 23.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302814 Units: mg/Kg

CAS NO.	SURROGATE	%REC	Q	LIMITS
2051-24-3	DCB Decachlorobiphenyl	68		39-142
877-09-8	Tetrachloro-m-xylene	129		35-129

MW 8-22-19

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050807 DL Lab Sample ID: 580-86493-1 DL

Matrix: Solid Lab File ID: 35F061119a015.d

Analysis Method: 8082A Date Collected: 05/23/2019 12:50

Extraction Method: 3546 Date Extracted: 05/30/2019 08:48

Sample wt/vol: 10.598(g) Date Analyzed: 06/11/2019 12:34

Con. Extract Vol.: 10(mL) Dilution Factor: 10

Injection Volume: 1(uL) GC Column: ZB-CLPest-2 ID: 0.25(mm)

% Moisture: 23.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302814 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	2.5	JK	0.25	0.091

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050806 Lab Sample ID: 580-86493-2

Matrix: Solid Lab File ID: 35F061019a013.d

Analysis Method: 8082A Date Collected: 05/23/2019 12:35

Extraction Method: 3546 Date Extracted: 05/30/2019 08:48

Sample wt/vol: 10.469(g) Date Analyzed: 06/10/2019 16:06

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-CLPest-1 ID: 0.25(mm)

% Moisture: 1.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302762 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND		0.019	0.0072
11104-28-2	PCB-1221	ND		0.019	0.0041
11141-16-5	PCB-1232	ND		0.019	0.0048
53469-21-9	PCB-1242	ND		0.019	0.0034
12672-29-6	PCB-1248	0.12		0.019	0.0028
11097-69-1	PCB-1254	ND		0.019	0.0036
11096-82-5	PCB-1260	ND	~~F2 F1~~	0.019	0.0072
37324-23-5	PCB-1262	ND		0.019	0.0046

CAS NO.	SURROGATE	%REC	Q	LIMITS
2051-24-3	DCB Decachlorobiphenyl	285	X	39-142
877-09-8	Tetrachloro-m-xylene	87		35-129

8-22-19

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050806 Lab Sample ID: 580-86493-2

Matrix: Solid Lab File ID: 35F061019a013.d

Analysis Method: 8082A Date Collected: 05/23/2019 12:35

Extraction Method: 3546 Date Extracted: 05/30/2019 08:48

Sample wt/vol: 10.469(g) Date Analyzed: 06/10/2019 16:06

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-CLPest-2 ID: 0.25(mm)

% Moisture: 1.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302762 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
11100-14-4	PCB-1268	1.2	~~E P~~ JH	0.019	0.0024

8-22-19

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050805 Lab Sample ID: 580-86493-3

Matrix: Solid Lab File ID: 35F061019a016.d

Analysis Method: 8082A Date Collected: 05/23/2019 12:20

Extraction Method: 3546 Date Extracted: 05/30/2019 08:48

Sample wt/vol: 10.340(g) Date Analyzed: 06/10/2019 16:56

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-CLPest-1 ID: 0.25(mm)

% Moisture: 1.7 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302762 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND		0.020	0.0073
11104-28-2	PCB-1221	ND		0.020	0.0041
11141-16-5	PCB-1232	ND		0.020	0.0048
53469-21-9	PCB-1242	ND		0.020	0.0034
12672-29-6	PCB-1248	0.69		0.020	0.0029
11097-69-1	PCB-1254	ND		0.020	0.0036
11096-82-5	PCB-1260	ND		0.020	0.0073
37324-23-5	PCB-1262	ND		0.020	0.0046
11100-14-4	PCB-1268	0.39		0.020	0.0025

CAS NO.	SURROGATE	%REC	Q	LIMITS
2051-24-3	DCB Decachlorobiphenyl	102		39-142
877-09-8	Tetrachloro-m-xylene	81		35-129

MW 8-22-19

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050902 Lab Sample ID: 580-86493-4

Matrix: Waste Lab File ID: 35F061019a020.d

Analysis Method: 8082A Date Collected: 05/22/2019 16:03

Extraction Method: 3580A Date Extracted: 05/31/2019 14:18

Sample wt/vol: 0.201(g) Date Analyzed: 06/10/2019 18:04

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-CLPest-1 ID: 0.25(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 302762 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND		1.0	0.37
11104-28-2	PCB-1221	ND		1.0	0.47
11141-16-5	PCB-1232	ND		1.0	0.47
53469-21-9	PCB-1242	ND		1.0	0.24
12672-29-6	PCB-1248	ND		1.0	0.18
11097-69-1	PCB-1254	ND		1.0	0.39
11096-82-5	PCB-1260	ND		1.0	0.38
37324-23-5	PCB-1262	ND		1.0	0.23
11100-14-4	PCB-1268	ND		1.0	0.24

CAS NO.	SURROGATE	%REC	Q	LIMITS
2051-24-3	DCB Decachlorobiphenyl	73		39-142
877-09-8	Tetrachloro-m-xylene	60		35-129

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050903 Lab Sample ID: 580-86493-5

Matrix: Waste Lab File ID: 35F061019a021.d

Analysis Method: 8082A Date Collected: 05/22/2019 16:10

Extraction Method: 3580A Date Extracted: 05/31/2019 14:18

Sample wt/vol: 0.232(g) Date Analyzed: 06/10/2019 18:21

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-CLPest-1 ID: 0.25(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 302762 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND		0.86	0.32
11104-28-2	PCB-1221	ND		0.86	0.41
11141-16-5	PCB-1232	ND		0.86	0.41
53469-21-9	PCB-1242	ND		0.86	0.21
12672-29-6	PCB-1248	ND		0.86	0.16
11097-69-1	PCB-1254	ND		0.86	0.34
11096-82-5	PCB-1260	ND		0.86	0.33
37324-23-5	PCB-1262	ND		0.86	0.20
11100-14-4	PCB-1268	ND		0.86	0.21

CAS NO.	SURROGATE	%REC	Q	LIMITS
2051-24-3	DCB Decachlorobiphenyl	73		39-142
877-09-8	Tetrachloro-m-xylene	58		35-129

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050901 Lab Sample ID: 580-86493-6

Matrix: Waste Lab File ID: 35F061019a022.d

Analysis Method: 8082A Date Collected: 05/22/2019 15:58

Extraction Method: 3580A Date Extracted: 05/31/2019 14:19

Sample wt/vol: 0.205(g) Date Analyzed: 06/10/2019 18:38

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-CLPest-1 ID: 0.25(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 302762 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
12674-11-2	PCB-1016	ND		0.98	0.36
11104-28-2	PCB-1221	ND		0.98	0.46
11141-16-5	PCB-1232	ND		0.98	0.46
53469-21-9	PCB-1242	ND		0.98	0.24
12672-29-6	PCB-1248	ND		0.98	0.18
11096-82-5	PCB-1260	ND		0.98	0.38
37324-23-5	PCB-1262	ND		0.98	0.23
11100-14-4	PCB-1268	ND		0.98	0.24

CAS NO.	SURROGATE	%REC	Q	LIMITS
2051-24-3	DCB Decachlorobiphenyl	68		39-142
877-09-8	Tetrachloro-m-xylene	66		35-129

MW 8/22/19

FORM I
PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050901 Lab Sample ID: 580-86493-6

Matrix: Waste Lab File ID: 35F061019a022.d

Analysis Method: 8082A Date Collected: 05/22/2019 15:58

Extraction Method: 3580A Date Extracted: 05/31/2019 14:19

Sample wt/vol: 0.205(g) Date Analyzed: 06/10/2019 18:38

Con. Extract Vol.: 10(mL) Dilution Factor: 1

Injection Volume: 1(uL) GC Column: ZB-CLPest-2 ID: 0.25(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 302762 Units: mg/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
11097-69-1	PCB-1254	1.4	p JK	0.98	0.39

6/27/19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 29, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Inorganic Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of three solid samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Target Analyte List (TAL) metals analyses (EPA Methods 6010D and 7471A) were performed by Test America, Inc., Tacoma, Washington. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050805 19050806 19050807

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained at < 6°C (only applies to mercury). The samples were collected on May 23, 2019, and were analyzed by June 19, 2019, therefore meeting QC criteria of less than 6 months between collection, extraction, and analysis (28 days for mercury).

2. Initial and Continuing Calibration: Acceptable.

A minimum of one calibration standard and a blank were analyzed at the beginning of the ICP analysis sequence and after every 10 samples. No results were greater than 110% of the highest calibration standard. All ICP recoveries were within the QC limits. All AA recoveries were within QC limits and the initial calibration correlation coefficient was > 0.995.

3. Blanks: Satisfactory.

A preparation blank was analyzed for each 20 samples or per matrix per concentration level. Blanks were analyzed after each Initial or Continuing Calibration Verification. There were no detections in any blanks except potassium (14.7 mg/kg) and sodium (26.8 mg/kg) in the method blank and barium, beryllium, cadmium, cobalt, iron, lead, manganese, potassium, sodium, thallium, and zinc in the calibration blanks. All blank results were less than the absolute value of the quantitation limit; therefore, positive sample results greater than the quantitation limit were not qualified (except zinc in samples 19050805 and 19050806 since that blank result was greater than the quantitation limit; these results were qualified as not detected [U] at the reporting limit).

4. ICP Interference Check Sample: Acceptable.

An Interference Check Sample (ICS) was analyzed at the beginning of each sequence or at least twice every 8 hours, whichever was more frequent. All applicable ICS (solution AB) results were within QC limits of 80% - 120% recovery.

5. ICP Serial Dilution: Acceptable.

A serial dilution analysis was performed per matrix per concentration or per sample delivery group, whichever was more frequent. All serial dilution results were within QC limits.

7. Matrix Spike Analysis: Satisfactory.

A matrix spike analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. Spike recoveries were within the QC limits except arsenic, potassium, selenium, and sodium with low recoveries (associated positive results and sample quantitation limits were qualified as estimated quantities with a low bias [JL or UJL]) and calcium, chromium, copper, zinc, and manganese with high recoveries (associated positive results were qualified as estimated quantities with a high bias [JH]).

8. Duplicate Analysis: Satisfactory.

A laboratory duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate and spike duplicate results were within QC limits except chromium, cobalt, copper, iron, lead, manganese, and zinc; associated positive results and sample quantitation limits were qualified as estimated quantities with an unknown bias (JK or UJK).

9. Laboratory Control Sample Analysis: Acceptable.

A Laboratory Control Sample (LCS) was analyzed per SDG per matrix. All LCS results were within the established control limits.

10. Overall Assessment of Data for Use

A total of 69 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on holding time outliers, incorrect sample containers, sample temperature outliers, or serial dilution outliers. No sample results were rejected (R). A total of 27 sample results were qualified based on spike accuracy outliers and based on duplicate precision outliers (some overlap of qualifiers occurred).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Inorganic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

<u>Data Qualifiers and Definitions</u>

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: 19050807 | Lab Sample ID: 580-86493-1

Lab Name: Eurofins TestAmerica, Seattle | Job No.: 580-86493-1

SDG ID.:

Matrix: Solid | Date Sampled: 05/23/2019 12:50

Reporting Basis: DRY | Date Received: 05/29/2019 13:25

% Solids: 76.4

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	130000	8600	1100	mg/Kg			100	6010D
7440-36-0	Antimony	4.6	3.4	0.30	mg/Kg			1	6010D
7440-38-2	Arsenic	10	3.4	0.28	mg/Kg		F1 JL	1	6010D
7440-39-3	Barium	32	0.57	0.090	mg/Kg			1	6010D
7440-41-7	Beryllium	1.6	1.1	0.017	mg/Kg			1	6010D
7440-43-9	Cadmium	1.6	1.1	0.056	mg/Kg			1	6010D
7440-70-2	Calcium	4200	63	11	mg/Kg		F1 JK	1	6010D
7440-47-3	Chromium	5.8	1.5	0.25	mg/Kg		F1 JK	1	6010D
7440-48-4	Cobalt	2.8	1.1	0.029	mg/Kg		JK	1	6010D
7440-50-8	Copper	81	2.9	0.46	mg/Kg		F1 F2 JK	1	6010D
7439-89-6	Iron	13000	74	18	mg/Kg		F2 JK	1	6010D
7439-92-1	Lead	53	1.7	0.25	mg/Kg		JK	1	6010D
7439-95-4	Magnesium	560	63	9.1	mg/Kg			1	6010D
7439-96-5	Manganese	98	2.3	0.44	mg/Kg		F2 F1 JK	1	6010D
7440-02-0	Nickel	320	1.1	0.12	mg/Kg			1	6010D
7440-09-7	Potassium	380	190	7.8	mg/Kg		B JL	1	6010D
7782-49-2	Selenium	~~ND~~ MW	5.7 U	0.45	mg/Kg		F1 JL	1	6010D
7440-22-4	Silver	0.88	2.9 U	0.64	mg/Kg	J Q	JL	1	6010D
7440-23-5	Sodium	8800	110	22	mg/Kg		B JL	1	6010D
7440-28-0	Thallium	~~ND~~ MW	5.7 U	0.48	mg/Kg			1	6010D
7440-62-2	Vanadium	26	2.3	0.30	mg/Kg			1	6010D
7440-66-6	Zinc	200	4.6	1.1	mg/Kg		F1 F2 JK	1	6010D
7439-97-6	Mercury	0.032	0.038	0.011	mg/Kg	J Q	MW	1	7471A

MW 7-29-19

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: 19050806 | Lab Sample ID: 580-86493-2

Lab Name: Eurofins TestAmerica, Seattle | Job No.: 580-86493-1

SDG ID.:

Matrix: Solid | Date Sampled: 05/23/2019 12:35

Reporting Basis: DRY | Date Received: 05/29/2019 13:25

% Solids: 98.4

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	150000	6300	830	mg/Kg			100	6010D
7440-36-0	Antimony	5.6	2.5	0.22	mg/Kg			1	6010D
7440-38-2	Arsenic	14	2.5	0.21	mg/Kg	JL		1	6010D
7440-39-3	Barium	110	42	6.6	mg/Kg			100	6010D
7440-41-7	Beryllium	9.7	0.84	0.013	mg/Kg			1	6010D
7440-43-9	Cadmium	2.4	0.84	0.041	mg/Kg			1	6010D
7440-70-2	Calcium	12000	46	8.4	mg/Kg	JK		1	6010D
7440-47-3	Chromium	14	1.1	0.18	mg/Kg	JK		1	6010D
7440-48-4	Cobalt	1.8	0.84	0.021	mg/Kg	JK		1	6010D
7440-50-8	Copper	1700	2.1	0.33	mg/Kg	JK		1	6010D
7439-89-6	Iron	10000	5400	1300	mg/Kg	JK		100	6010D
7439-92-1	Lead	81	130	19	mg/Kg	JQ		100	6010D
7439-95-4	Magnesium	1300	46	6.6	mg/Kg			1	6010D
7439-96-5	Manganese	100	1.7	0.32	mg/Kg	JK		1	6010D
7440-02-0	Nickel	230	0.84	0.086	mg/Kg			1	6010D
7440-09-7	Potassium	1300	140	5.7	mg/Kg	JL	B	1	6010D
7782-49-2	Selenium	~~ND~~	4.2	U 0.33	mg/Kg	JL		1	6010D
7440-22-4	Silver	~~ND~~	2.1	U 0.47	mg/Kg			1	6010D
7440-23-5	Sodium	52000	84	16	mg/Kg	JL	B	1	6010D
7440-28-0	Thallium	~~ND~~	420	U 35	mg/Kg			100	6010D
7440-62-2	Vanadium	33	1.7	0.22	mg/Kg			1	6010D
7440-66-6	Zinc	~~150~~	330	U 80	mg/Kg	~~J~~		100	6010D
7439-97-6	Mercury	0.013	0.027	0.0080	mg/Kg	JQ		1	7471A

MW 7-29-19

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: 19050805 | Lab Sample ID: 580-86493-3

Lab Name: Eurofins TestAmerica, Seattle | Job No.: 580-86493-1

SDG ID.:

Matrix: Solid | Date Sampled: 05/23/2019 12:20

Reporting Basis: DRY | Date Received: 05/29/2019 13:25

% Solids: 98.3

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7429-90-5	Aluminum	160000	6300	840	mg/Kg			100	6010D
7440-36-0	Antimony	9.0	2.5	0.22	mg/Kg			1	6010D
7440-38-2	Arsenic	14	2.5	0.21	mg/Kg	JL		1	6010D
7440-39-3	Barium	180	42	6.7	mg/Kg			100	6010D
7440-41-7	Beryllium	15	0.84	0.013	mg/Kg			1	6010D
7440-43-9	Cadmium	2.0	0.84	0.041	mg/Kg			1	6010D
7440-70-2	Calcium	9500	46	8.4	mg/Kg	JK		1	6010D
7440-47-3	Chromium	5.3	1.1	0.18	mg/Kg	JK		1	6010D
7440-48-4	Cobalt	1.1	0.84	0.021	mg/Kg	JK		1	6010D
7440-50-8	Copper	220	2.1	0.34	mg/Kg	JK		1	6010D
7439-89-6	Iron	4500	5500	1300	mg/Kg	J Q		100	6010D
7439-92-1	Lead	29	130	19	mg/Kg	J Q		100	6010D
7439-95-4	Magnesium	610	46	6.7	mg/Kg			1	6010D
7439-96-5	Manganese	50	1.7	0.32	mg/Kg	JK		1	6010D
7440-02-0	Nickel	210	0.84	0.087	mg/Kg			1	6010D
7440-09-7	Potassium	1700	140	5.7	mg/Kg	JL	B	1	6010D
7782-49-2	Selenium	ND	4.2	U 0.33	mg/Kg	JL		1	6010D
7440-22-4	Silver	ND	2.1	U 0.47	mg/Kg			1	6010D
7440-23-5	Sodium	60000	84	16	mg/Kg	JL	MW	1	6010D
7440-28-0	Thallium	ND	420	U 35	mg/Kg			100	6010D
7440-62-2	Vanadium	32	1.7	0.22	mg/Kg			1	6010D
7440-66-6	Zinc	~~160~~ MW	340	U 81	mg/Kg	Zn-		100	6010D
7439-97-6	Mercury	0.12	0.022	0.0067	mg/Kg			1	7471A

MW 7-29-19

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 29, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of three solid samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Semivolatile Organic Compound (SVOC) analysis (EPA Method 8270) was performed by Test America, Inc., Tacoma, Washington. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050805 19050806 19050807

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of 0°C to 6°C. The samples were collected on May 23, 2019, were extracted and analyzed by June 7, 2019, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

2. Tuning: Acceptable.

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. Initial Calibration: Satisfactory.

All average Relative Response Factors (RRFs) were within the QC limits except n-nitroso-di-n-propylamine in both initial calibrations; associated sample quantitation limits were rejected (R). All Relative Standard Deviations (RSDs) were within the QC limits except one SMC; no actions were taken as all sample recoveries for this SMC were within QC limits.

4. Continuing Calibration: Satisfactory.

All RRFs were within the QC limits except n-nitroso-di-n-propylamine; associated sample quantitation limits were rejected (R). All % differences were within the QC limits except benzoic acid and butyl benzyl phthalate with low recoveries (associated positive results and sample quantitation limits were qualified as estimated quantities with a low bias [JL or UJL]) and hexachlorobutadiene and 4-

bromophenyl phenyl ether with high recoveries (associated positive results were qualified as estimated quantities with a high bias [JH]).

5. Blanks: Satisfactory.

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank except diethyl phthalate (579 ug/kg); no actions were taken as this analyte was not detected in the associated samples.

6. System Monitoring Compounds (SMCs): Satisfactory.

All SMC recoveries were within QC limits except the SMC in the method blank (no actions were taken as all other SMCs were within QC limits) and low SMC recoveries in all three samples (no actions were taken as evidence of matrix interference is present and all three samples were analyzed at a minimum of a five-fold dilution).

7. Matrix Spike (MS)/MS Duplicate (MSD) Analysis: Satisfactory.

MS and MSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. Several analytes had low recoveries and hexachlorobutadiene had a high recovery; no actions were taken based on MS/MSD outliers alone as matrix interference is suspected.

8. Blank Spike (BS)/BS Duplicate (BSD) Analysis: Satisfactory.

BS and BSD analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits except 2,4-dimethylphenol and 4-chloroaniline with low BS recoveries; associated positive results and sample quantitation limits were qualified as estimated quantities with a low bias (JL or UJL).

9. Duplicate Analysis: Satisfactory.

Duplicate and spike duplicate analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate and spike duplicate results were within QC limits except several MS/MSD outliers. No qualifiers were applied based on the duplicate outliers alone.

10. Internal Standards: Satisfactory.

All internal standards (IS) were within $\pm$ 30 seconds of the continuing calibration IS retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts except perylene-d12 with a low response in the method blank; no actions were taken as there were no detections in the method blank.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

A total of 282 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. A total of 6 sample results were qualified as estimated quantities with a low bias (JL) based on spike accuracy outliers. Three sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the Office of Emergency and Remedial Response Publication "National Functional Guidelines for Superfund Organic Methods Data Review, January 2017". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050807 Lab Sample ID: 580-86493-1

Matrix: Solid Lab File ID: 0607A009.D

Analysis Method: 8270D Date Collected: 05/23/2019 12:50

Extract. Method: 3550B Date Extracted: 05/30/2019 09:14

Sample wt/vol: 10.372(g) Date Analyzed: 06/07/2019 13:55

Con. Extract Vol.: 10(mL) Dilution Factor: 10

Injection Volume: 1(uL) Level: (low/med) Low

% Moisture: 23.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302636 Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
108-95-2	Phenol	ND		1900	290
111-44-4	Bis(2-chloroethyl)ether	ND		1300	97
95-57-8	2-Chlorophenol	ND		2500	160
541-73-1	1,3-Dichlorobenzene	ND		630	61
106-46-7	1,4-Dichlorobenzene	ND		630	100
100-51-6	Benzyl alcohol	ND		6300	970
95-50-1	1,2-Dichlorobenzene	ND		630	150
95-48-7	2-Methylphenol	ND		1900	120
15831-10-4	3 & 4 Methylphenol	ND		2500	190
621-64-7	N-Nitrosodi-n-propylamine	ND		2500	280 R
67-72-1	Hexachloroethane	ND		1900	110
98-95-3	Nitrobenzene	ND		2500	250
78-59-1	Isophorone	ND		1900	93
88-75-5	2-Nitrophenol	ND		2500	260
105-67-9	2,4-Dimethylphenol	ND		1300	JL 190
65-85-0	Benzoic acid	ND		25000	JL 7300
111-91-1	Bis(2-chloroethoxy)methane	ND		2500	230
120-83-2	2,4-Dichlorophenol	ND		1300	190
120-82-1	1,2,4-Trichlorobenzene	ND		630	76
91-20-3	Naphthalene	ND		320	63
106-47-8	4-Chloroaniline	ND	MJ	19000	JL 5000
87-68-3	Hexachlorobutadiene	ND		630	190
59-50-7	4-Chloro-3-methylphenol	ND		1900	420
91-57-6	2-Methylnaphthalene	ND		630	110
77-47-4	Hexachlorocyclopentadiene	ND		1300	250
88-06-2	2,4,6-Trichlorophenol	ND		1900	450
95-95-4	2,4,5-Trichlorophenol	ND		2500	570
91-58-7	2-Chloronaphthalene	ND		320	63
88-74-4	2-Nitroaniline	ND		1300	190
131-11-3	Dimethyl phthalate	ND		1900	160
208-96-8	Acenaphthylene	ND		320	63
606-20-2	2,6-Dinitrotoluene	ND		1900	430
99-09-2	3-Nitroaniline	ND		2500	500
83-32-9	Acenaphthene	68	J Q	320	63

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050807 Lab Sample ID: 580-86493-1

Matrix: Solid Lab File ID: 0607A009.D

Analysis Method: 8270D Date Collected: 05/23/2019 12:50

Extract. Method: 3550B Date Extracted: 05/30/2019 09:14

Sample wt/vol: 10.372(g) Date Analyzed: 06/07/2019 13:55

Con. Extract Vol.: 10(mL) Dilution Factor: 10

Injection Volume: 1(uL) Level: (low/med) Low

% Moisture: 23.6 GPC Cleanup: (Y/N) N

Analysis Batch No.: 302636 Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
51-28-5	2,4-Dinitrophenol	ND		13000	2500
100-02-7	4-Nitrophenol	ND		19000	4600
132-64-9	Dibenzofuran	ND		1900	74
121-14-2	2,4-Dinitrotoluene	ND		2500	540
84-66-2	Diethyl phthalate	ND		19000	960
7005-72-3	4-Chlorophenyl phenyl ether	ND		2500	79
86-73-7	Fluorene	ND		320	63
100-01-6	4-Nitroaniline	ND		1900	630
534-52-1	4,6-Dinitro-2-methylphenol	ND		13000	1300
86-30-6	N-Nitrosodiphenylamine	ND		760	100
101-55-3	4-Bromophenyl phenyl ether	ND		2500	110
118-74-1	Hexachlorobenzene	ND		630	190
87-86-5	Pentachlorophenol	ND		5700	1700
85-01-8	Phenanthrene	590	J Q	760	150
120-12-7	Anthracene	ND		320	63
84-74-2	Di-n-butyl phthalate	ND		6300	720
206-44-0	Fluoranthene	1100		320	63
129-00-0	Pyrene	1000		760	81
85-68-7	Butyl benzyl phthalate	ND		2500	640
91-94-1	3,3'-Dichlorobenzidine	ND		5000	1300
56-55-3	Benzo[a]anthracene	600		320	63
218-01-9	Chrysene	2200		760	160
117-81-7	Bis(2-ethylhexyl) phthalate	ND		7600	900
117-84-0	Di-n-octyl phthalate	ND		1900	720
50-32-8	Benzo[a]pyrene	840		760	160
193-39-5	Indeno[1,2,3-cd]pyrene	1600		500	63
53-70-3	Dibenz(a,h)anthracene	330	J Q	630	150
191-24-2	Benzo[g,h,i]perylene	1800		760	110
86-74-8	Carbazole	ND		1900	100
90-12-0	1-Methylnaphthalene	ND		380	63
205-99-2	Benzo[b]fluoranthene	3200		320	63
207-08-9	Benzo[k]fluoranthene	1700		760	180
108-60-1	bis(chloroisopropyl) ether	ND		2500	180

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050807 Lab Sample ID: 580-86493-1

Matrix: Solid Lab File ID: 0607A009.D

Analysis Method: 8270D Date Collected: 05/23/2019 12:50

Extract. Method: 3550B Date Extracted: 05/30/2019 09:14

Sample wt/vol: 10.372(g) Date Analyzed: 06/07/2019 13:55

Con. Extract Vol.: 10(mL) Dilution Factor: 10

Injection Volume: 1(uL) Level: (low/med) Low

% Moisture: 23.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302636 Units: ug/Kg

CAS NO.	SURROGATE	%REC	Q	LIMITS
367-12-4	2-Fluorophenol (Surr)	13	X	60-125
4165-62-2	Phenol-d5 (Surr)	34	X	59-120
4165-60-0	Nitrobenzene-d5 (Surr)	94		62-120
321-60-8	2-Fluorobiphenyl	73		57-120
118-79-6	2,4,6-Tribromophenol (Surr)	51	X	52-125
1718-51-0	Terphenyl-d14 (Surr)	106		58-120

7-29-19

08/14/2019

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050806 Lab Sample ID: 580-86493-2

Matrix: Solid Lab File ID: 0607A010.D

Analysis Method: 8270D Date Collected: 05/23/2019 12:35

Extract. Method: 3550B Date Extracted: 05/30/2019 09:14

Sample wt/vol: 10.110(g) Date Analyzed: 06/07/2019 14:19

Con. Extract Vol.: 10(mL) Dilution Factor: 5

Injection Volume: 1(uL) Level: (low/med) Low

% Moisture: 1.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302636 Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
51-28-5	2,4-Dinitrophenol	ND		5000	1000
100-02-7	4-Nitrophenol	ND		7500	1800
132-64-9	Dibenzofuran	ND		750	30
121-14-2	2,4-Dinitrotoluene	ND		1000	220
84-66-2	Diethyl phthalate	ND		7500	380
7005-72-3	4-Chlorophenyl phenyl ether	ND		1000	32
86-73-7	Fluorene	ND		130	25
100-01-6	4-Nitroaniline	ND		750	250
534-52-1	4,6-Dinitro-2-methylphenol	ND		5000	500
86-30-6	N-Nitrosodiphenylamine	ND		300	40
101-55-3	4-Bromophenyl phenyl ether	ND		1000	46
118-74-1	Hexachlorobenzene	ND		250	75
87-86-5	Pentachlorophenol	ND		2300	660
85-01-8	Phenanthrene	110	J	300	60
120-12-7	Anthracene	ND		130	25
84-74-2	Di-n-butyl phthalate	ND		2500	290
206-44-0	Fluoranthene	520		130	25
129-00-0	Pyrene	320		300	32
85-68-7	Butyl benzyl phthalate	ND		1000	260
91-94-1	3,3'-Dichlorobenzidine	ND		2000	500
56-55-3	Benzo[a]anthracene	380		130	25
218-01-9	Chrysene	1200		300	65
117-81-7	Bis(2-ethylhexyl) phthalate	ND		3000	360
117-84-0	Di-n-octyl phthalate	ND		750	290
50-32-8	Benzo[a]pyrene	220	J	300	65
193-39-5	Indeno[1,2,3-cd]pyrene	600		200	25
53-70-3	Dibenz(a,h)anthracene	270		250	60
191-24-2	Benzo[g,h,i]perylene	540		300	45
86-74-8	Carbazole	ND		750	41
90-12-0	1-Methylnaphthalene	ND		150	25
205-99-2	Benzo[b]fluoranthene	2100		130	25
207-08-9	Benzo[k]fluoranthene	530		300	70
108-60-1	bis(chloroisopropyl) ether	ND		1000	70

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle | Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050806 | Lab Sample ID: 580-86493-2

Matrix: Solid | Lab File ID: 0607A010.D

Analysis Method: 8270D | Date Collected: 05/23/2019 12:35

Extract. Method: 3550B | Date Extracted: 05/30/2019 09:14

Sample wt/vol: 10.110(g) | Date Analyzed: 06/07/2019 14:19

Con. Extract Vol.: 10(mL) | Dilution Factor: 5

Injection Volume: 1(uL) | Level: (low/med) Low

% Moisture: 1.6 | GPC Cleanup:(Y/N) N

Analysis Batch No.: 302636 | Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
108-95-2	Phenol	ND		750	120
111-44-4	Bis(2-chloroethyl)ether	ND		500	39
95-57-8	2-Chlorophenol	ND		1000	65
541-73-1	1,3-Dichlorobenzene	ND		250	24
106-46-7	1,4-Dichlorobenzene	ND		250	42
100-51-6	Benzyl alcohol	ND		2500	390
95-50-1	1,2-Dichlorobenzene	ND		250	60
95-48-7	2-Methylphenol	ND		750	49
15831-10-4	3 & 4 Methylphenol	ND		1000	75
621-64-7	N-Nitrosodi-n-propylamine	ND		1000	110 R
67-72-1	Hexachloroethane	ND		750	44
98-95-3	Nitrobenzene	ND		1000	100
78-59-1	Isophorone	ND		750	37
88-75-5	2-Nitrophenol	ND		1000	110
105-67-9	2,4-Dimethylphenol	ND		500	JL 75
65-85-0	Benzoic acid	ND		10000	JL 2900
111-91-1	Bis(2-chloroethoxy)methane	ND		1000	90
120-83-2	2,4-Dichlorophenol	ND		500	75
120-82-1	1,2,4-Trichlorobenzene	ND		250	30
91-20-3	Naphthalene	ND		130	25
106-47-8	4-Chloroaniline	ND		7500	JL 2000
87-68-3	Hexachlorobutadiene	ND		250	75
59-50-7	4-Chloro-3-methylphenol	ND		750	170
91-57-6	2-Methylnaphthalene	ND		250	44
77-47-4	Hexachlorocyclopentadiene	ND		500	100
88-06-2	2,4,6-Trichlorophenol	ND		750	180
95-95-4	2,4,5-Trichlorophenol	ND		1000	230
91-58-7	2-Chloronaphthalene	ND		130	25
88-74-4	2-Nitroaniline	ND		500	75
131-11-3	Dimethyl phthalate	ND		750	65
208-96-8	Acenaphthylene	ND		130	25
606-20-2	2,6-Dinitrotoluene	ND		750	170
99-09-2	3-Nitroaniline	ND		1000	200
83-32-9	Acenaphthene	ND		130	25

MW 7-29-19

08/14/2019

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050806 Lab Sample ID: 580-86493-2

Matrix: Solid Lab File ID: 0607A010.D

Analysis Method: 8270D Date Collected: 05/23/2019 12:35

Extract. Method: 3550B Date Extracted: 05/30/2019 09:14

Sample wt/vol: 10.110(g) Date Analyzed: 06/07/2019 14:19

Con. Extract Vol.: 10(mL) Dilution Factor: 5

Injection Volume: 1(uL) Level: (low/med) Low

% Moisture: 1.6 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302636 Units: ug/Kg

CAS NO.	SURROGATE	%REC	Q	LIMITS
367-12-4	2-Fluorophenol (Surr)	38	X	60-125
4165-62-2	Phenol-d5 (Surr)	25	X	59-120
4165-60-0	Nitrobenzene-d5 (Surr)	51	X	62-120
321-60-8	2-Fluorobiphenyl	88		57-120
118-79-6	2,4,6-Tribromophenol (Surr)	24	X	52-125
1718-51-0	Terphenyl-d14 (Surr)	105		58-120

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050805 Lab Sample ID: 580-86493-3

Matrix: Solid Lab File ID: 0607A011.D

Analysis Method: 8270D Date Collected: 05/23/2019 12:20

Extract. Method: 3550B Date Extracted: 05/30/2019 09:16

Sample wt/vol: 10.966(g) Date Analyzed: 06/07/2019 14:43

Con. Extract Vol.: 10(mL) Dilution Factor: 5

Injection Volume: 1(uL) Level: (low/med) Low

% Moisture: 1.7 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302636 Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
108-95-2	Phenol	ND	F2 F1	700	110
111-44-4	Bis(2-chloroethyl)ether	ND		460	36
95-57-8	2-Chlorophenol	ND	F2 F1	930	60
541-73-1	1,3-Dichlorobenzene	ND		230	22
106-46-7	1,4-Dichlorobenzene	ND		230	38
100-51-6	Benzyl alcohol	ND	F1	2300	360
95-50-1	1,2-Dichlorobenzene	ND	F2	230	56
95-48-7	2-Methylphenol	ND	F1	700	45
15831-10-4	3 & 4 Methylphenol	ND	F2 F1	930	70
621-64-7	N-Nitrosodi-n-propylamine	ND	F2 F1	930	100
67-72-1	Hexachloroethane	ND		700	41
98-95-3	Nitrobenzene	ND		930	93
78-59-1	Isophorone	ND		700	34
88-75-5	2-Nitrophenol	ND		930	97
105-67-9	2,4-Dimethylphenol	ND	F1 *	460	70
65-85-0	Benzoic acid	ND		9300	2700
111-91-1	Bis(2-chloroethoxy)methane	ND		930	83
120-83-2	2,4-Dichlorophenol	ND	F2 F1	460	70
120-82-1	1,2,4-Trichlorobenzene	ND		230	28
91-20-3	Naphthalene	ND		120	23
106-47-8	4-Chloroaniline	ND	*	7000	1900
87-68-3	Hexachlorobutadiene	ND	F2 F1	230	70
59-50-7	4-Chloro-3-methylphenol	ND	F1	700	150
91-57-6	2-Methylnaphthalene	ND		230	41
77-47-4	Hexachlorocyclopentadiene	ND	F2 F1	460	93
88-06-2	2,4,6-Trichlorophenol	ND	F2 F1	700	170
95-95-4	2,4,5-Trichlorophenol	ND		930	210
91-58-7	2-Chloronaphthalene	ND		120	23
88-74-4	2-Nitroaniline	ND	F2	460	70
131-11-3	Dimethyl phthalate	ND		700	60
208-96-8	Acenaphthylene	ND		120	23
606-20-2	2,6-Dinitrotoluene	ND		700	160
99-09-2	3-Nitroaniline	ND	F2 F1	930	190
83-32-9	Acenaphthene	44	J	120	23

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050805 Lab Sample ID: 580-86493-3

Matrix: Solid Lab File ID: 0607A011.D

Analysis Method: 8270D Date Collected: 05/23/2019 12:20

Extract. Method: 3550B Date Extracted: 05/30/2019 09:16

Sample wt/vol: 10.966(g) Date Analyzed: 06/07/2019 14:43

Con. Extract Vol.: 10(mL) Dilution Factor: 5

Injection Volume: 1(uL) Level: (low/med) Low

% Moisture: 1.7 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302636 Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
51-28-5	2,4-Dinitrophenol	ND	F1	4600	930
100-02-7	4-Nitrophenol	ND	F1	7000	1700
132-64-9	Dibenzofuran	ND	F2	700	27
121-14-2	2,4-Dinitrotoluene	ND		930	200
84-66-2	Diethyl phthalate	ND	F1	7000	350
7005-72-3	4-Chlorophenyl phenyl ether	ND	F2	930	29
86-73-7	Fluorene	ND		120	23
100-01-6	4-Nitroaniline	ND	F1	700	230
534-52-1	4,6-Dinitro-2-methylphenol	ND		4600	460
86-30-6	N-Nitrosodiphenylamine	ND	F1	280	37
101-55-3	4-Bromophenyl phenyl ether	ND		930	42
118-74-1	Hexachlorobenzene	ND		230	70
87-86-5	Pentachlorophenol	ND	F1	2100	610
85-01-8	Phenanthrene	580		280	56
120-12-7	Anthracene	74	J Q	120	23
84-74-2	Di-n-butyl phthalate	ND		2300	U 260
206-44-0	Fluoranthene	1500		120	23
129-00-0	Pyrene	830		280	30
85-68-7	Butyl benzyl phthalate	ND		930	UL 240
91-94-1	3,3'-Dichlorobenzidine	ND	F1	1900	U 460
56-55-3	Benzo[a]anthracene	290		120	23
218-01-9	Chrysene	1000		280	60
117-81-7	Bis(2-ethylhexyl) phthalate	ND		2800	U 330
117-84-0	Di-n-octyl phthalate	ND		700	U 260
50-32-8	Benzo[a]pyrene	300		280	60
193-39-5	Indeno[1,2,3-cd]pyrene	300		190	23
53-70-3	Dibenz(a,h)anthracene	ND		230	U 56
191-24-2	Benzo[g,h,i]perylene	350		280	42
86-74-8	Carbazole	89	J Q	700	38
90-12-0	1-Methylnaphthalene	ND		140	U 23
205-99-2	Benzo[b]fluoranthene	1000		120	23
207-08-9	Benzo[k]fluoranthene	250	J Q	280	65
108-60-1	bis(chloroisopropyl) ether	ND		930	U 65

FORM I
GC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Seattle Job No.: 580-86493-1

SDG No.:

Client Sample ID: 19050805 Lab Sample ID: 580-86493-3

Matrix: Solid Lab File ID: 0607A011.D

Analysis Method: 8270D Date Collected: 05/23/2019 12:20

Extract. Method: 3550B Date Extracted: 05/30/2019 09:16

Sample wt/vol: 10.966(g) Date Analyzed: 06/07/2019 14:43

Con. Extract Vol.: 10(mL) Dilution Factor: 5

Injection Volume: 1(uL) Level: (low/med) Low

% Moisture: 1.7 GPC Cleanup:(Y/N) N

Analysis Batch No.: 302636 Units: ug/Kg

CAS NO.	SURROGATE	%REC	Q	LIMITS
367-12-4	2-Fluorophenol (Surr)	3	X	60-125
4165-62-2	Phenol-d5 (Surr)	23	X	59-120
4165-60-0	Nitrobenzene-d5 (Surr)	68		62-120
321-60-8	2-Fluorobiphenyl	85		57-120
118-79-6	2,4,6-Tribromophenol (Surr)	8	X	52-125
1718-51-0	Terphenyl-d14 (Surr)	97		58-120

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: September 3, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of three water samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analyses for Polychlorinated Biphenyl (PCB) Congeners (modified EPA Method 1668C) were performed by SGS Axys Analytical Services, Ltd., Sidney, British Columbia, Canada. All sample analyses were evaluated following EPA's Stage 2B Data Validation Manual Process (S2BVM).

The samples were numbered:

19050601 19050602 19050603

Data Qualifications:

1. Sample Holding Times: Satisfactory.

The samples were generally maintained at 0°C to 6°C but were received at the laboratory at 6.9°C; no actions were taken based on this slight temperature exceedance. The samples were collected on May 20, 2019, extracted on July 15, 2019, and were analyzed by July 17, 2019. Samples held at less than 6°C in the dark have a holding time up to a year.

2. Instrument Performance: Acceptable.

The retention times between the calibration standards and samples were within QC limits. Mass spectrometer and chromatographic resolution were within QC limits.

3. Initial and Continuing Calibration: Acceptable.

All initial calibration relative standard deviations (RSDs) were within QC limits. All continuing calibration % differences (% D) were within QC limits.

4. Blanks: Satisfactory.

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each analytical system. Several target analytes were detected in the laboratory blanks at less than the laboratory

acceptance guidelines and less than the lowest calibration equivalent but greater than the reporting limit. For PCB congeners detected in the blank, associated positive sample results less than five times the blank results were qualified as not detected (U) at the lowest method calibration limit (LMCL - as provided by the laboratory) or at the listed result if greater than the LCML.

5. Labeled Compounds: Acceptable.

All recoveries of the labeled compounds were within the established control limits.

6. Ongoing Precision and Recovery (OPR) Analyses: Acceptable.

OPR recoveries were within QC limits.

7. Compound Identification: Acceptable.

PCB 156/157 second column analysis was not requested. No additional qualifiers were applied based on this as all positive PCB 156/157 results were qualified as estimated quantities based on results less than the lowest calibration equivalent.

All EMPC (lab qualifier "K") results greater than the lowest calibration equivalent were qualified as estimated quantities with a high bias (JH).

8. Overall Assessment

The "Cx" qualifier applied by the laboratory indicates a co-elution of that congener with congener "x". Data are reported against the indicated congener which is always the lowest IUPAC-designated congener of the co-elution. These lab qualifiers were crossed out on the Form IA pages for clarity.

For sample 19050602, a disturbance of the mass ion used to monitor instrument performance was observed at the retention time corresponding to PCB congeners 197/200. This result was not a major contributor to the PCB totals; however, as a conservative measure, the result was qualified as not detected (U) at the reported result.

A total of 627 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R).

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the OSTRI Publication "National Functional Guidelines for High Resolution Superfund Organic Data Review, April 2016". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Note: the definition of the "Q" qualifier below has been modified for this project.

<u>Data Qualifiers and Definitions</u>

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate

concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the lowest calibration equivalent but is above the reporting limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

SGS AXYS METHOD MLA-010 Rev 12

Form 1A

PCB CONGENER ANALYSIS REPORT

CLIENT SAMPLE NO.
19050601
Sample Collection:
20-May-2019 09:20

SGS AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4857	**Lab Sample I.D.:**	L31207-1 R
Matrix:	AQUEOUS	**Sample Size:**	0.909 L
Sample Receipt Date:	30-May-2019	**Initial Calibration Date:**	02-May-2019
Extraction Date:	15-Jul-2019	**Instrument ID:**	HR GC/MS
Analysis Date:	18-Jul-2019 **Time:** 03:05:16	**GC Column ID:**	SPB OCTYL
Extract Volume (uL):	20	**Sample Data Filename:**	**PB9C_247 S: 8**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PB9C_247 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PB9C_247 S: 1
Concentration Units:	pg/L		

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
2-MoCB	1		U		0.550 (Q)	3.42	1.001
3-MoCB	2		U		0.550 (Q)		
4-MoCB	3		U		0.550 (Q)	2.69	1.000
2,2'-DiCB	4		U		0.989 (S)	1.61	1.000
2,3-DiCB	5		U		0.855 (S)		
2,3'-DiCB	6		U		0.774 (S)		
2,4-DiCB	7		U		0.793 (S)		
2,4'-DiCB	8		U		0.709 (S)	1.48	1.208
2,5-DiCB	9		U		0.745 (S)		
2,6-DiCB	10		U		0.754 (S)		
3,3'-DiCB	11		U		0.890 (S)	1.62	0.969
3,4-DiCB	12	12 + 13	U		0.896 (S)		
3,4'-DiCB	13	12 + 13	C12M				
3,5-DiCB	14		U		0.823 (S)		
4,4'-DiCB	15		JQ	1.82	1.11 (S)	1.40	1.000
2,2',3-TriCB	16		U		0.550 (Q)	1.64	1.167
2,2',4-TriCB	17		U		0.550 (Q)	1.70	1.138
2,2',5-TriCB	18	18 + 30	JQ	4.61	0.550 (Q)	0.99	1.114
2,2',6-TriCB	19		KJQ	1.27	0.550 (Q)	1.62	1.002
2,3,3'-TriCB	20	20 + 28	U		0.550 (Q)	1.00	0.847
2,3,4-TriCB	21	21 + 33	U		0.550 (Q)	0.96	0.857
2,3,4'-TriCB	22		U		0.550 (Q)	1.03	0.871
2,3,5-TriCB	23		U		0.550 (Q)		
2,3,6-TriCB	24		U		0.550 (Q)		
2,3',4-TriCB	25		U		0.550 (Q)		
2,3',5-TriCB	26	26 + 29	JQ	0.772	0.550 (Q)	0.74	1.302
2,3',6-TriCB	27		U		0.550 (Q)		
2,4,4'-TriCB	28	20 + 28	C20				
2,4,5-TriCB	29	26 + 29	C26				
2,4,6-TriCB	30	18 + 30	C18				
2,4',5-TriCB	31		U		0.550 (Q)	0.98	0.836
2,4',6-TriCB	32		KJ		0.550 (Q)	1.63	1.199
2',3,4-TriCB	33	21 + 33	C21				
2',3,5-TriCB	34		U		0.550 (Q)		
3,3',4-TriCB	35		U		0.550 (Q)		
3,3',5-TriCB	36		U		0.550 (Q)		
3,4,4'-TriCB	37		JQ	1.65	0.550 (Q)	1.26	1.001
3,4,5-TriCB	38		U		0.550 (Q)		
3,4',5-TriCB	39		U		0.550 (Q)		

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
2,2',3,3'-TeCB	40	40 + 41 + 71	J Q	7.84	0.550 (Q)	0.84	1.337
2,2',3,4-TeCB	41	40 + 41 + 71					
2,2',3,4'-TeCB	42		J Q	4.28	0.550 (Q)	0.77	1.313
2,2',3,5-TeCB	43		U		0.550 (Q)		
2,2',3,5'-TeCB	44	44 + 47 + 65	J Q	19.9	0.550 (Q)	0.82	1.286
2,2',3,6-TeCB	45	45 + 51	J Q	3.80	0.550 (Q)	0.78	1.146
2,2',3,6'-TeCB	46		J Q	1.81	0.550 (Q)	0.75	1.161
2,2',4,4'-TeCB	47	44 + 47 + 65					
2,2',4,5-TeCB	48		J Q	1.96	0.550 (Q)	0.86	1.275
2,2',4,5'-TeCB	49	49 + 69	J Q	8.32	0.550 (Q)	0.88	1.260
2,2',4,6-TeCB	50	50 + 53	J Q	4.15	0.550 (Q)	0.53	1.111
2,2',4,6'-TeCB	51	45 + 51					
2,2',5,5'-TeCB	52			28.8	0.550 (Q)	0.78	1.235
2,2',5,6'-TeCB	53	50 + 53					
2,2',6,6'-TeCB	54		U		0.550 (Q)		
2,3,3',4-TeCB	55		U		0.550 (Q)		
2,3,3',4'-TeCB	56		J Q	4.88	0.550 (Q)	0.82	0.904
2,3,3',5-TeCB	57		U		0.550 (Q)		
2,3,3',5'-TeCB	58		U		0.550 (Q)		
2,3,3',6-TeCB	59	59 + 62 + 75	J Q	1.42	0.550 (Q)	0.81	1.303
2,3,4,4'-TeCB	60		K J	1.16	0.550 (Q)	0.97	0.911
2,3,4,5-TeCB	61	61 + 70 + 74 + 76	J	9.80	0.550 (Q)	0.88	0.875
2,3,4,6-TeCB	62	59 + 62 + 75					
2,3,4',5-TeCB	63		U		0.550 (Q)		
2,3,4',6-TeCB	64		J Q	5.08	0.550 (Q)	0.83	1.350
2,3,5,6-TeCB	65	44 + 47 + 65					
2,3',4,4'-TeCB	66		J Q	6.44	0.550 (Q)	0.87	0.884
2,3',4,5-TeCB	67		U		0.550 (Q)		
2,3',4,5'-TeCB	68		U		0.550 (Q)		
2,3',4,6-TeCB	69	49 + 69					
2,3',4',5-TeCB	70	61 + 70 + 74 + 76					
2,3',4',6-TeCB	71	40 + 41 + 71					
2,3',5,5'-TeCB	72		U		0.550 (Q)		
2,3',5',6-TeCB	73		U		0.550 (Q)		
2,4,4',5-TeCB	74	61 + 70 + 74 + 76					
2,4,4',6-TeCB	75	59 + 62 + 75					
2',3,4,5-TeCB	76	61 + 70 + 74 + 76					
3,3',4,4'-TeCB	77		J Q	1.12	0.550 (Q)	0.68	1.000
3,3',4,5-TeCB	78		U		0.550 (Q)		
3,3',4,5'-TeCB	79		U		0.550 (Q)		
3,3',5,5'-TeCB	80		U		0.550 (Q)		
3,4,4',5-TeCB	81		U		0.550 (Q)		
2,2',3,3',4-PeCB	82		J Q	3.13	0.550 (Q)	1.62	0.933
2,2',3,3',5-PeCB	83	83 + 99	J Q	12.3	0.550 (Q)	1.74	0.885
2,2',3,3',6-PeCB	84		J Q	8.61	0.550 (Q)	1.54	1.164
2,2',3,4,4'-PeCB	85	85 + 116 + 117	K J Q	5.61	0.550 (Q)	1.95	0.920
2,2',3,4,5-PeCB	86	86 + 87 + 97 + 109 + 119 + 125	J Q	15.8	0.550 (Q)	1.53	0.901
2,2',3,4,5'-PeCB	87	86 + 87 + 97 + 109 + 119 + 125					
2,2',3,4,6-PeCB	88	88 + 91	K J Q	4.89	0.550 (Q)	1.30	1.154
2,2',3,4,6'-PeCB	89		U		0.550 (Q)		
2,2',3,4',5-PeCB	90	90 + 101 + 113	J Q	18.4	0.550 (Q)	1.60	0.869
2,2',3,4',6-PeCB	91	88 + 91					
2,2',3,5,5'-PeCB	92		J Q	4.54	0.550 (Q)	1.59	0.853
2,2',3,5,6-PeCB	93	93 + 95 + 98 + 100 + 102	K J K	27.5	0.550 (Q)	1.28	1.121
2,2',3,5,6'-PeCB	94		U		0.550 (Q)		
2,2',3,5',6-PeCB	95	93 + 95 + 98 + 100 + 102					
2,2',3,6,6'-PeCB	96		U		0.550 (Q)		
2,2',3',4,5-PeCB	97	86 + 87 + 97 + 109 + 119 + 125					
2,2',3',4,6-PeCB	98	93 + 95 + 98 + 100 + 102					
2,2',4,4',5-PeCB	99	83 + 99					

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
2,2',4,4',6-PeCB	100	93 + 95 + 98 + 100 + 102	C93				
2,2',4,5,5'-PeCB	101	90 + 101 + 113	C90				
2,2',4,5,6'-PeCB	102	93 + 95 + 98 + 100 + 102	C93				
2,2',4,5',6-PeCB	103		U		0.550 (Q)		
2,2',4,6,6'-PeCB	104		U		0.550 (Q)		
2,3,3',4,4'-PeCB	105		J	3.35	0.550 (Q)	1.46	1.000
2,3,3',4,5-PeCB	106		U		0.550 (Q)		
2,3,3',4',5-PeCB	107		J	0.632	0.550 (Q)	1.68	0.997
2,3,3',4,5'-PeCB	108	108 + 124	C U		0.550 (Q)		
2,3,3',4,6-PeCB	109	86 + 87 + 97 + 109 + 119 + 125	C86				
2,3,3',4',6-PeCB	110	110 + 115	C	24.5	0.550 (Q)	1.50	0.925
2,3,3',5,5'-PeCB	111		U		0.550 (Q)		
2,3,3',5,6-PeCB	112		U		0.550 (Q)		
2,3,3',5',6-PeCB	113	90 + 101 + 113	C90				
2,3,4,4',5-PeCB	114		U		0.550 (Q)		
2,3,4,4',6-PeCB	115	110 + 115	C110				
2,3,4,5,6-PeCB	116	85 + 116 + 117	C85				
2,3,4',5,6-PeCB	117	85 + 116 + 117	C85				
2,3',4,4',5-PeCB	118		K J	6.61	0.550 (Q)	1.27	1.000
2,3',4,4',6-PeCB	119	86 + 87 + 97 + 109 + 119 + 125	C86				
2,3',4,5,5'-PeCB	120		U		0.550 (Q)		
2,3',4,5',6-PeCB	121		U		0.550 (Q)		
2',3,3',4,5-PeCB	122		U		0.550 (Q)		
2',3,4,4',5-PeCB	123		U		0.550 (Q)		
2',3,4,5,5'-PeCB	124	108 + 124	C108				
2',3,4,5,6'-PeCB	125	86 + 87 + 97 + 109 + 119 + 125	C86				
3,3',4,4',5-PeCB	126		U		0.560 (S)		
3,3',4,5,5'-PeCB	127		U		0.550 (Q)		
2,2',3,3',4,4'-HxCB	128	128 + 166	C U		0.550 (Q)		
2,2',3,3',4,5-HxCB	129	129 + 138 + 160 + 163	C J	11.6	0.550 (Q)	1.07	0.928
2,2',3,3',4,5'-HxCB	130		U		0.550 (Q)		
2,2',3,3',4,6-HxCB	131		U		0.550 (Q)		
2,2',3,3',4,6'-HxCB	132		J	5.24	0.550 (Q)	1.07	1.173
2,2',3,3',5,5'-HxCB	133		K J	1.04	0.550 (Q)	0.84	1.191
2,2',3,3',5,6-HxCB	134	134 + 143	C J	1.02	0.550 (Q)	1.31	1.140
2,2',3,3',5,6'-HxCB	135	135 + 151 + 154	C K J	15.0	0.550 (Q)	1.52	1.103
2,2',3,3',6,6'-HxCB	136		K J	2.41	0.550 (Q)	0.90	1.023
2,2',3,4,4',5-HxCB	137		U		0.550 (Q)		
2,2',3,4,4',5'-HxCB	138	129 + 138 + 160 + 163	C129				
2,2',3,4,4',6-HxCB	139	139 + 140	C U		0.550 (Q)		
2,2',3,4,4',6'-HxCB	140	139 + 140	C139				
2,2',3,4,5,5'-HxCB	141		J	3.36	0.550 (Q)	1.20	0.903
2,2',3,4,5,6-HxCB	142		U		0.550 (Q)		
2,2',3,4,5,6'-HxCB	143	134 + 143	C134				
2,2',3,4,5',6-HxCB	144		J	1.08	0.550 (Q)	1.26	1.121
2,2',3,4,6,6'-HxCB	145		U		0.550 (Q)		
2,2',3,4',5,5'-HxCB	146		J	5.29	0.550 (Q)	1.18	0.884
2,2',3,4',5,6-HxCB	147	147 + 149	C J	18.3	0.550 (Q)	1.40	1.133
2,2',3,4',5,6'-HxCB	148		U		0.550 (Q)		
2,2',3,4',5',6-HxCB	149	147 + 149	C147				
2,2',3,4',6,6'-HxCB	150		U		0.550 (Q)		
2,2',3,5,5',6-HxCB	151	135 + 151 + 154	C135				
2,2',3,5,6,6'-HxCB	152		U		0.550 (Q)		
2,2',4,4',5,5'-HxCB	153	153 + 168	C	22.9	0.550 (Q)	1.27	0.899
2,2',4,4',5,6'-HxCB	154	135 + 151 + 154	C135				
2,2',4,4',6,6'-HxCB	155		U		0.550 (Q)		
2,3,3',4,4',5-HxCB	156	156 + 157	K C U		0.550 (Q)		
2,3,3',4,4',5'-HxCB	157	156 + 157	C156				
2,3,3',4,4',6-HxCB	158		J	2.14	0.550 (Q)	1.34	0.938
2,3,3',4,5,5'-HxCB	159		K J	2.58	0.550 (Q)	1.72	0.981
2,3,3',4,5,6-HxCB	160	129 + 138 + 160 + 163	C129				

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG[1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
2,3,3',4,5',6-HxCB	161		U		0.550 (Q)		
2,3,3',4',5,5'-HxCB	162		U		0.550 (Q)		
2,3,3',4',5,6-HxCB	163	129 + 138 + 160 + 163	C129				
2,3,3',4',5',6-HxCB	164		K J Q	0.913	0.550 (Q)	1.83	0.921
2,3,3',5,5',6-HxCB	165		U		0.550 (Q)		
2,3,4,4',5,6-HxCB	166	128 + 166	C128				
2,3',4,4',5,5'-HxCB	167		K J Q	0.786	0.550 (Q)	0.79	1.000
2,3',4,4',5',6-HxCB	168	153 + 168	C153				
3,3',4,4',5,5'-HxCB	169		U		0.550 (Q)		
2,2',3,3',4,4',5-HpCB	170		J Q	4.85	0.550 (Q)	1.02	1.000
2,2',3,3',4,4',6-HpCB	171	171 + 173	K J Q	3.11	0.550 (Q)	1.33	1.163
2,2',3,3',4,5,5'-HpCB	172		J Q	6.61	0.550 (Q)	1.16	0.897
2,2',3,3',4,5,6-HpCB	173	171 + 173	C171				
2,2',3,3',4,5,6'-HpCB	174			49.6	0.550 (Q)	1.06	1.133
2,2',3,3',4,5',6-HpCB	175		K J Q	2.19	0.550 (Q)	1.24	1.103
2,2',3,3',4,6,6'-HpCB	176		J	3.52	0.550 (Q)	1.07	1.034
2,2',3,3',4',5,6-HpCB	177		J	9.33	0.550 (Q)	1.13	1.145
2,2',3,3',5,5',6-HpCB	178		J	18.8	0.550 (Q)	1.15	1.085
2,2',3,3',5,6,6'-HpCB	179			22.6	0.550 (Q)	1.01	1.010
2,2',3,4,4',5,5'-HpCB	180	180 + 193	C	126	0.550 (Q)	1.01	1.000
2,2',3,4,4',5,6-HpCB	181		U		0.550 (Q)		
2,2',3,4,4',5,6'-HpCB	182		U		0.550 (Q)		
2,2',3,4,4',5',6-HpCB	183	183 + 185	C	37.8	0.550 (Q)	1.13	1.128
2,2',3,4,4',6,6'-HpCB	184		U		0.550 (Q)		
2,2',3,4,5,5',6-HpCB	185	183 + 185	C183				
2,2',3,4,5,6,6'-HpCB	186		U		0.550 (Q)		
2,2',3,4',5,5',6-HpCB	187			165	0.550 (Q)	1.03	1.110
2,2',3,4',5,6,6'-HpCB	188		K J Q	1.22	0.550 (Q)	1.26	1.001
2,3,3',4,4',5,5'-HpCB	189		J	0.809	0.550 (Q)	1.05	1.001
2,3,3',4,4',5,6-HpCB	190		K J	2.04	0.550 (Q)	0.88	0.947
2,3,3',4,4',5',6-HpCB	191		K J	0.633	0.550 (Q)	0.82	0.917
2,3,3',4,5,5',6-HpCB	192		U		0.550 (Q)		
2,3,3',4',5,5',6-HpCB	193	180 + 193	C180				
2,2',3,3',4,4',5,5'-OcCB	194			114	0.550 (Q)	0.90	0.991
2,2',3,3',4,4',5,6-OcCB	195		J Q	18.3	0.550 (Q)	0.91	0.946
2,2',3,3',4,4',5,6'-OcCB	196			67.5	0.550 (Q)	0.84	0.916
2,2',3,3',4,4',6,6'-OcCB	197	197 + 200	C	23.4	0.550 (Q)	0.91	1.047
2,2',3,3',4,5,5',6-OcCB	198	198 + 199	C	305	0.550 (Q)	0.88	1.115
2,2',3,3',4,5,5',6'-OcCB	199	198 + 199	C198				
2,2',3,3',4,5,6,6'-OcCB	200	197 + 200	C197				
2,2',3,3',4,5',6,6'-OcCB	201			23.7	0.550 (Q)	0.97	1.023
2,2',3,3',5,5',6,6'-OcCB	202			67.9	0.550 (Q)	0.85	1.000
2,2',3,4,4',5,5',6-OcCB	203			186	0.550 (Q)	0.92	0.920
2,2',3,4,4',5,6,6'-OcCB	204		U		0.550 (Q)		
2,3,3',4,4',5,5',6-OcCB	205		J Q	2.36	0.550 (Q)	0.83	1.000
2,2',3,3',4,4',5,5',6-NoCB	206			222	0.618 (S)	0.78	1.001
2,2',3,3',4,4',5,6,6'-NoCB	207			23.7	0.550 (Q)	0.78	1.020
2,2',3,3',4,5,5',6,6'-NoCB	208			63.4	0.550 (Q)	0.86	1.000
2,2',3,3',4,4',5,5',6,6'-DeCB	209		J Q	19.7	0.550 (Q)	1.06	1.000

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent; C = co-eluting congener.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: Henry Huang

SGS AXYS METHOD MLA-010 Rev 12

CLIENT SAMPLE NO.
19050601
Sample Collection:
20-May-2019 09:20

Form 1A

HOMOLOGUE TOTAL PCB ANALYSIS REPORT

SGS AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4857	**Lab Sample I.D.:**	L31207-1 R
Matrix:	AQUEOUS	**Sample Size:**	0.909 L
Sample Receipt Date:	30-May-2019	**Initial Calibration Date:**	02-May-2019
Extraction Date:	15-Jul-2019	**Instrument ID:**	HR GC/MS
Analysis Date:	18-Jul-2019 **Time:** 03:05:16	**GC Column ID:**	SPB OCTYL
Extract Volume (uL):	20	**Sample Data Filename:**	**PB9C_247 S: 8**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PB9C_247 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PB9C_247 S: 1
Concentration Units:	pg/L		

PCB HOMOLOGUE GROUP	LAB FLAG [1]	CONC. FOUND
Total Monochloro Biphenyls		~~1.83~~ 22.011 U
Total Dichloro Biphenyls		~~20.4~~ 1.82
Total Trichloro Biphenyls		~~17.4~~ 8.30
Total Tetrachloro Biphenyls		105
Total Pentachloro Biphenyls		91.3
Total Hexachloro Biphenyls		70.9
Total Heptachloro Biphenyls		445
Total Octachloro Biphenyls		808
Total Nonachloro Biphenyls		309
Decachloro Biphenyl		19.7
TOTAL PCBs		~~1890~~ 1,850

(1) Where applicable, custom lab flags have been used on this report.
(2) All header information pertains to the initial instrumental analysis of the sample extract. Additional sample datafiles listed refer to secondary analysis of the sample extract.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

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SGS AXYS METHOD MLA-010 Rev 12

CLIENT SAMPLE NO.
19050601

Form 1C
PCB CONGENER TEQ ANALYSIS REPORT

SGS AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4857

Sample Collection: 20-May-2019 09:20

Matrix: AQUEOUS

Lab Sample I.D.: L31207-1 R

Sample Size: 0.909 L

GC Column ID(s): SPB OCTYL

Concentration Units: pg/L

Sample Data Filename(s): PB9C_247 S: 8

COMPOUND	IUPAC NO.	COELUTIONS	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)	WHO 2005 TEF	TEQ U=0	TEQ U=1/2 RL	TEQ U=RL
3,3',4,4'-TeCB	77			1.12 JQ	0.550	0.0001	1.12e-04	1.12e-04	
3,4,4',5-TeCB	81		U		0.550	0.0003	0.00e+00	8.25e-05	
2,3,3',4,4'-PeCB	105			3.35 JQ	0.550	0.00003	1.01e-04	1.01e-04	
2,3,4,4',5-PeCB	114		U		0.550	0.00003	0.00e+00	8.25e-06	
2,3',4,4',5-PeCB	118		U		0.550	0.00003	0.00e+00	8.25e-06	
2',3,4,4',5-PeCB	123		U		0.550	0.00003	0.00e+00	8.25e-06	
3,3',4,4',5-PeCB	126		U		0.560	0.1	0.00e+00	2.80e-02	
2,3,3',4,4',5-HxCB	156	156 + 157	~~MQ~~ U		0.550	0.00003	0.00e+00	8.25e-06	
2,3,3',4,4',5'-HxCB	157	156 + 157	~~C156~~ U						
2,3',4,4',5,5'-HxCB	167		U		0.550	0.00003	0.00e+00	8.25e-06	
3,3',4,4',5,5'-HxCB	169		U		0.550	0.03	0.00e+00	8.25e-03	
2,3,3',4,4',5,5'-HpCB	189			0.809 JQ	0.550	0.00003	2.43e-05	2.43e-05	
				TOTAL TEQ			0.000237 J	0.0366 J	

(1) Where applicable, custom lab flags may have been used on this report; U = not detected at RL; C = co-eluting congener.
(2) Concentrations that do not meet quantification criteria are not included in the TEQ calculations.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: Henry Huang

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: 1668TEQ.xsl; Created: 23-Jul-2019 13:25:16; Application: XMLTransformer-1.17.9;
Report Filename: 1668_PCB1668_HomTotals-TEQsC_L31207-1_TEQ_SJ2591986.html; Workgroup: WG68778; Design ID: 3634]

9-3-19

SGS AXYS METHOD MLA-010 Rev 12

Form 1A

PCB AROCLOR EQUIVALENT ANALYSIS REPORT

CLIENT SAMPLE NO.
19050601
Sample Collection:
20-May-2019 09:20

SGS AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4857	**Lab Sample I.D.:**	L31207-1 R
Matrix:	AQUEOUS	**Sample Size:**	0.909 L
Sample Receipt Date:	30-May-2019	**Initial Calibration Date:**	02-May-2019
Extraction Date:	15-Jul-2019	**Instrument ID:**	HR GC/MS
Analysis Date:	18-Jul-2019 **Time:** 03:05:16	**GC Column ID:**	SPB OCTYL
Extract Volume (uL):	20	**Sample Data Filename:**	PB9C_247 S: 8
Injection Volume (uL):	1.0	**Blank Data Filename:**	PB9C_247 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PB9C_247 S: 1
Concentration Units:	pg/L		

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)
Aroclor 1016	12674-11-2	U		1.91
Aroclor 1221	11104-28-2	U		0.993
Aroclor 1232	11141-16-5	U		1.87
Aroclor 1242	53469-21-9		~~52.1~~ 13.8	2.13
Aroclor 1248	12672-29-6	U		3.36
Aroclor 1254	11097-69-1		225	4.40
Aroclor 1260	11096-82-5		843	2.75

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL.
(2) PCB Aroclor equivalents were calculated from individual PCB congener concentrations using empirically determined conversion factors. Where the PCB pattern was not identifiable as a unique Aroclor formation, the Aroclor has been reported as a 1242/1254/1260 mixture.
(3) All header information pertains to the initial instrumental analysis of the sample extract. Additional sample datafiles listed refer to secondary analysis of the sample extract.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: 1668Aroclor.xsl; Created: 23-Jul-2019 13:24:28; Application: XMLTransformer-1.17.9; Report Filename: 1668_PCB1668_AroclorsC_L31207-1_Aroclor_SJ2591986.html; Workgroup: WG68778; Design ID: 3634]

SGS AXYS METHOD MLA-010 Rev 12

Form 1A

PCB CONGENER ANALYSIS REPORT

CLIENT SAMPLE NO.
19050602
Sample Collection:
20-May-2019 10:48

SGS AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4857	**Lab Sample I.D.:**	L31207-2 R
Matrix:	AQUEOUS	**Sample Size:**	0.902 L
Sample Receipt Date:	30-May-2019	**Initial Calibration Date:**	02-May-2019
Extraction Date:	15-Jul-2019	**Instrument ID:**	HR GC/MS
Analysis Date:	18-Jul-2019 **Time:** 04:09:39	**GC Column ID:**	SPB OCTYL
Extract Volume (uL):	20	**Sample Data Filename:**	**PB9C_247 S: 9**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PB9C_247 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PB9C_247 S: 1
Concentration Units:	pg/L		

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG[1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
2-MoCB	1		U		0.554 (Q)	2.70	1.001
3-MoCB	2		U		0.554 (Q)		
4-MoCB	3		U		0.554 (Q)	4.14	1.001
2,2'-DiCB	4		U		0.659 (S)	1.65	1.002
2,3-DiCB	5		U		0.607 (S)		
2,3'-DiCB	6		J Q	1.52	0.554 (Q)	1.67	1.177
2,4-DiCB	7		U		0.562 (S)		
2,4'-DiCB	8		U		0.554 (Q)	1.65	1.208
2,5-DiCB	9		U		0.554 (Q)		
2,6-DiCB	10		K J Q	0.626	0.554 (Q)	2.02	1.013
3,3'-DiCB	11			30.0 U	0.632 (S)	1.58	0.969
3,4-DiCB	12	12 + 13	J Q	0.980	0.636 (S)	1.71	0.985
3,4'-DiCB	13	12 + 13	C12				
3,5-DiCB	14		U		0.584 (S)		
4,4'-DiCB	15		J Q	9.65	0.831 (S)	1.57	1.001
2,2',3-TriCB	16		K J	4.13	0.554 (Q)	1.20	1.166
2,2',4-TriCB	17		K J	6.91	0.554 (Q)	0.87	1.138
2,2',5-TriCB	18	18 + 30	C J	14.0	0.554 (Q)	1.05	1.113
2,2',6-TriCB	19		J Q	4.58	0.554 (Q)	0.90	1.001
2,3,3'-TriCB	20	20 + 28		46.7	0.554 (Q)	1.01	0.848
2,3,4-TriCB	21	21 + 33	J Q	7.12	0.554 (Q)	0.99	0.857
2,3,4'-TriCB	22		J Q	14.6	0.554 (Q)	0.96	0.872
2,3,5-TriCB	23		U		0.554 (Q)		
2,3,6-TriCB	24		U		0.554 (Q)		
2,3',4-TriCB	25		J Q	1.59	0.554 (Q)	0.95	0.825
2,3',5-TriCB	26	26 + 29	C J	4.99	0.554 (Q)	1.06	1.302
2,3',6-TriCB	27		K J	2.02	0.554 (Q)	0.84	1.151
2,4,4'-TriCB	28	20 + 28	C20				
2,4,5-TriCB	29	26 + 29	C26				
2,4,6-TriCB	30	18 + 30	C18				
2,4',5-TriCB	31			28.1	0.554 (Q)	1.11	0.836
2,4',6-TriCB	32		J Q	8.34	0.554 (Q)	1.14	1.198
2',3,4-TriCB	33	21 + 33	C21				
2',3,5-TriCB	34		U		0.554 (Q)		
3,3',4-TriCB	35		J Q	1.07	0.554 (Q)	0.90	0.985
3,3',5-TriCB	36		U		0.554 (Q)		
3,4,4'-TriCB	37			23.5	0.554 (Q)	1.00	1.001
3,4,5-TriCB	38		U		0.554 (Q)		
3,4',5-TriCB	39		U		0.554 (Q)		

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
2,2',3,3'-TeCB	40	40 + 41 + 71		38.5	0.554 (Q)	0.78	1.337
2,2',3,4-TeCB	41	40 + 41 + 71					
2,2',3,4'-TeCB	42		J	20.0	0.554 (Q)	0.74	1.313
2,2',3,5-TeCB	43		J	2.65	0.554 (Q)	0.84	1.248
2,2',3,5'-TeCB	44	44 + 47 + 65		68.2	0.554 (Q)	0.78	1.286
2,2',3,6-TeCB	45	45 + 51	J	9.81	0.554 (Q)	0.73	1.146
2,2',3,6'-TeCB	46		J	3.26	0.554 (Q)	0.85	1.161
2,2',4,4'-TeCB	47	44 + 47 + 65					
2,2',4,5-TeCB	48		J	12.7	0.554 (Q)	0.77	1.275
2,2',4,5'-TeCB	49	49 + 69		39.9	0.554 (Q)	0.84	1.260
2,2',4,6-TeCB	50	50 + 53	J	7.84	0.554 (Q)	0.79	1.111
2,2',4,6'-TeCB	51	45 + 51					
2,2',5,5'-TeCB	52			80.3	0.554 (Q)	0.77	1.235
2,2',5,6'-TeCB	53	50 + 53					
2,2',6,6'-TeCB	54		U		0.554 (Q)		
2,3,3',4-TeCB	55		U		0.912 (S)		
2,3,3',4'-TeCB	56			43.9	0.927 (S)	0.79	0.904
2,3,3',5-TeCB	57		U		0.826 (S)		
2,3,3',5'-TeCB	58		U		0.850 (S)		
2,3,3',6-TeCB	59	59 + 62 + 75	J	9.21	0.554 (Q)	0.80	1.303
2,3,4,4'-TeCB	60			25.9	0.919 (S)	0.78	0.911
2,3,4,5-TeCB	61	61 + 70 + 74 + 76		134	0.828 (S)	0.77	0.875
2,3,4,6-TeCB	62	59 + 62 + 75					
2,3,4',5-TeCB	63		J	3.12	0.829 (S)	0.74	0.864
2,3,4',6-TeCB	64			39.0	0.554 (Q)	0.74	1.350
2,3,5,6-TeCB	65	44 + 47 + 65					
2,3',4,4'-TeCB	66			92.5	0.860 (S)	0.77	0.884
2,3',4,5-TeCB	67		J	1.46	0.699 (S)	0.71	0.856
2,3',4,5'-TeCB	68		U		0.759 (S)		
2,3',4,6-TeCB	69	49 + 69					
2,3',4',5-TeCB	70	61 + 70 + 74 + 76					
2,3',4',6-TeCB	71	40 + 41 + 71					
2,3',5,5'-TeCB	72		J	0.824	0.796 (S)	0.98	0.822
2,3',5',6-TeCB	73		U		0.554 (Q)		
2,4,4',5-TeCB	74	61 + 70 + 74 + 76					
2,4,4',6-TeCB	75	59 + 62 + 75					
2',3,4,5-TeCB	76	61 + 70 + 74 + 76					
3,3',4,4'-TeCB	77		J	18.3	1.06 (S)	0.80	1.000
3,3',4,5-TeCB	78		U		0.923 (S)		
3,3',4,5'-TeCB	79		J	1.93	0.721 (S)	0.83	0.970
3,3',5,5'-TeCB	80		U		0.810 (S)		
3,4,4',5-TeCB	81		U		0.959 (S)		
2,2',3,3',4-PeCB	82		J	18.1	0.554 (Q)	1.65	0.933
2,2',3,3',5-PeCB	83	83 + 99		62.5	0.554 (Q)	1.70	0.885
2,2',3,3',6-PeCB	84		J	20.8	0.554 (Q)	1.85	1.163
2,2',3,4,4'-PeCB	85	85 + 116 + 117		29.8	0.554 (Q)	1.53	0.919
2,2',3,4,5-PeCB	86	86 + 87 + 97 + 109 + 119 + 125		132	0.554 (Q)	1.70	0.900
2,2',3,4,5'-PeCB	87	86 + 87 + 97 + 109 + 119 + 125					
2,2',3,4,6-PeCB	88	88 + 91	J	14.8	0.554 (Q)	1.79	1.155
2,2',3,4,6'-PeCB	89		J	1.65	0.554 (Q)	2.41	1.182
2,2',3,4',5-PeCB	90	90 + 101 + 113		91.7	0.554 (Q)	1.55	0.869
2,2',3,4',6-PeCB	91	88 + 91					
2,2',3,5,5'-PeCB	92		J	19.5	0.554 (Q)	1.72	0.853
2,2',3,5,6-PeCB	93	93 + 95 + 98 + 100 + 102		54.1	0.554 (Q)	1.56	1.121
2,2',3,5,6'-PeCB	94		J	0.786	0.554 (Q)	1.77	1.102
2,2',3,5',6-PeCB	95	93 + 95 + 98 + 100 + 102					
2,2',3,6,6'-PeCB	96		J	0.759	0.554 (Q)	1.29	1.015
2,2',3',4,5-PeCB	97	86 + 87 + 97 + 109 + 119 + 125					
2,2',3',4,6-PeCB	98	93 + 95 + 98 + 100 + 102					
2,2',4,4',5-PeCB	99	83 + 99					

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COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
2,2',4,4',6-PeCB	100	93 + 95 + 98 + 100 + 102	C93				
2,2',4,5,5'-PeCB	101	90 + 101 + 113	C90				
2,2',4,5,6'-PeCB	102	93 + 95 + 98 + 100 + 102	C93				
2,2',4,5',6-PeCB	103		J Q	1.03	0.554 (Q)	1.85	1.094
2,2',4,6,6'-PeCB	104		U		0.554 (Q)		
2,3,3',4,4'-PeCB	105			80.0	0.836 (S)	1.54	1.001
2,3,3',4,5-PeCB	106		U		0.778 (S)		
2,3,3',4',5-PeCB	107		J Q	9.37	0.797 (S)	1.36	0.997
2,3,3',4,5'-PeCB	108	108 + 124	J Q	4.73	0.820 (S)	1.55	0.990
2,3,3',4,6-PeCB	109	86 + 87 + 97 + 109 + 119 + 125	C86				
2,3,3',4',6-PeCB	110	110 + 115	C	130	0.554 (Q)	1.67	0.925
2,3,3',5,5'-PeCB	111		J Q	0.926	0.554 (Q)	1.58	0.946
2,3,3',5,6-PeCB	112		U		0.554 (Q)		
2,3,3',5',6-PeCB	113	90 + 101 + 113	C90				
2,3,4,4',5-PeCB	114		J Q	4.30	0.852 (S)	1.72	1.001
2,3,4,4',6-PeCB	115	110 + 115	C110				
2,3,4,5,6-PeCB	116	85 + 116 + 117	C85				
2,3,4',5,6-PeCB	117	85 + 116 + 117	C85				
2,3',4,4',5-PeCB	118			103	0.848 (S)	1.51	1.000
2,3',4,4',6-PeCB	119	86 + 87 + 97 + 109 + 119 + 125	C86				
2,3',4,5,5'-PeCB	120		J Q	1.93	0.554 (Q)	1.25	0.958
2,3',4,5',6-PeCB	121		U		0.554 (Q)		
2',3,3',4,5-PeCB	122		J Q	2.13	0.870 (S)	1.32	1.010
2',3,4,4',5-PeCB	123		J Q	2.71	0.899 (S)	1.39	1.000
2',3,4,5,5'-PeCB	124	108 + 124	C108				
2',3,4,5,6'-PeCB	125	86 + 87 + 97 + 109 + 119 + 125	C86				
3,3',4,4',5-PeCB	126		J Q	2.24	0.982 (S)	1.14	1.000
3,3',4,5,5'-PeCB	127		U		0.826 (S)		
2,2',3,3',4,4'-HxCB	128	128 + 166	J Q	22.0	0.926 (S)	1.24	0.958
2,2',3,3',4,5-HxCB	129	129 + 138 + 160 + 163	C	148	0.909 (S)	1.25	0.929
2,2',3,3',4,5'-HxCB	130		J Q	13.2	1.14 (S)	1.42	0.913
2,2',3,3',4,6-HxCB	131		U		1.04 (S)		
2,2',3,3',4,6'-HxCB	132			29.2	1.08 (S)	1.15	1.175
2,2',3,3',5,5'-HxCB	133		J Q	17.2	0.995 (S)	1.40	1.192
2,2',3,3',5,6-HxCB	134	134 + 143	J	4.64	1.03 (S)	1.10	1.140
2,2',3,3',5,6'-HxCB	135	135 + 151 + 154		90.1	0.554 (Q)	1.28	1.106
2,2',3,3',6,6'-HxCB	136		J Q	7.33	0.554 (Q)	1.10	1.024
2,2',3,4,4',5-HxCB	137		J	8.03	1.09 (S)	1.34	0.918
2,2',3,4,4',5'-HxCB	138	129 + 138 + 160 + 163	C129				
2,2',3,4,4',6-HxCB	139	139 + 140	J Q	2.58	0.932 (S)	1.40	1.153
2,2',3,4,4',6'-HxCB	140	139 + 140	C139				
2,2',3,4,5,5'-HxCB	141			34.7	0.989 (S)	1.29	0.903
2,2',3,4,5,6-HxCB	142		U		1.07 (S)		
2,2',3,4,5,6'-HxCB	143	134 + 143	C134				
2,2',3,4,5',6-HxCB	144		J Q	8.13	0.554 (Q)	1.20	1.122
2,2',3,4,6,6'-HxCB	145		U		0.554 (Q)		
2,2',3,4',5,5'-HxCB	146			149	0.894 (S)	1.25	0.884
2,2',3,4',5,6-HxCB	147	147 + 149	C	119	0.913 (S)	1.21	1.133
2,2',3,4',5,6'-HxCB	148		J Q	4.84	0.554 (Q)	1.95	1.084
2,2',3,4',5',6-HxCB	149	147 + 149	C147				
2,2',3,4',6,6'-HxCB	150		J Q	1.68	0.554 (Q)	1.31	1.013
2,2',3,5,5',6-HxCB	151	135 + 151 + 154	C135				
2,2',3,5,6,6'-HxCB	152		U		0.554 (Q)		
2,2',4,4',5,5'-HxCB	153	153 + 168	C	268	0.779 (S)	1.24	0.899
2,2',4,4',5,6'-HxCB	154	135 + 151 + 154	C135				
2,2',4,4',6,6'-HxCB	155		J Q	0.640	0.554 (Q)	1.31	1.002
2,3,3',4,4',5-HxCB	156	156 + 157	J Q	42.7	1.06 (S)	1.22	1.000
2,3,3',4,4',5'-HxCB	157	156 + 157	C156				
2,3,3',4,4',6-HxCB	158			25.6	0.711 (S)	1.24	0.939
2,3,3',4,5,5'-HxCB	159		U		0.790 (S)		
2,3,3',4,5,6-HxCB	160	129 + 138 + 160 + 163	C129				

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG[1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
2,3,3',4,5',6-HxCB	161		U		0.700 (S)		
2,3,3',4',5,5'-HxCB	162		U		0.774 (S)		
2,3,3',4',5,6-HxCB	163	129 + 138 + 160 + 163	C129				
2,3,3',4',5',6-HxCB	164		J Q	9.56	0.744 (S)	1.36	0.921
2,3,3',5,5',6-HxCB	165		U		0.858 (S)		
2,3,4,4',5,6-HxCB	166	128 + 166	C128				
2,3',4,4',5,5'-HxCB	167			26.7	0.810 (S)	1.29	1.001
2,3',4,4',5',6-HxCB	168	153 + 168	C153				
3,3',4,4',5,5'-HxCB	169		U		0.925 (S)		
2,2',3,3',4,4',5-HpCB	170			144	0.554 (Q)	1.05	1.000
2,2',3,3',4,4',6-HpCB	171	171 + 173	C	45.3	0.554 (Q)	1.06	1.163
2,2',3,3',4,5,5'-HpCB	172			267	0.554 (Q)	1.02	0.897
2,2',3,3',4,5,6-HpCB	173	171 + 173	C171				
2,2',3,3',4,5,6'-HpCB	174			496	0.554 (Q)	1.03	1.133
2,2',3,3',4,5',6-HpCB	175			51.2	0.554 (Q)	1.11	1.103
2,2',3,3',4,6,6'-HpCB	176			42.3	0.554 (Q)	1.02	1.034
2,2',3,3',4',5,6-HpCB	177			147	0.554 (Q)	1.04	1.146
2,2',3,3',5,5',6-HpCB	178			264	0.554 (Q)	1.05	1.085
2,2',3,3',5,6,6'-HpCB	179			177	0.554 (Q)	1.04	1.010
2,2',3,4,4',5,5'-HpCB	180	180 + 193	C	2900	0.554 (Q)	1.05	1.001
2,2',3,4,4',5,6-HpCB	181		J Q	2.82	0.554 (Q)	0.94	1.157
2,2',3,4,4',5,6'-HpCB	182			42.1	0.554 (Q)	0.95	1.116
2,2',3,4,4',5',6-HpCB	183	183 + 185	C	712	0.554 (Q)	1.06	1.127
2,2',3,4,4',6,6'-HpCB	184		J Q	7.66	0.554 (Q)	0.98	1.025
2,2',3,4,5,5',6-HpCB	185	183 + 185	C183				
2,2',3,4,5,6,6'-HpCB	186		U		0.554 (Q)		
2,2',3,4',5,5',6-HpCB	187			2370	0.554 (Q)	1.03	1.110
2,2',3,4',5,6,6'-HpCB	188		J Q	17.6	0.554 (Q)	0.94	1.001
2,3,3',4,4',5,5'-HpCB	189			27.9	2.06 (S)	1.02	1.000
2,3,3',4,4',5,6-HpCB	190			57.2	0.554 (Q)	1.03	0.947
2,3,3',4,4',5',6-HpCB	191		J Q	10.8	0.554 (Q)	0.97	0.918
2,3,3',4,5,5',6-HpCB	192		U		0.554 (Q)		
2,3,3',4',5,5',6-HpCB	193	180 + 193	C180				
2,2',3,3',4,4',5,5'-OcCB	194			4280	3.85 (S)	0.90	0.991
2,2',3,3',4,4',5,6-OcCB	195			542	4.08 (S)	0.89	0.945
2,2',3,3',4,4',5,6'-OcCB	196			2090	0.554 (Q)	0.90	0.916
2,2',3,3',4,4',6,6'-OcCB	197	197 + 200	C	561 U	0.554 (Q)	0.93	1.046
2,2',3,3',4,5,5',6-OcCB	198	198 + 199	C	7360	0.554 (Q)	0.91	1.115
2,2',3,3',4,5,5',6'-OcCB	199	198 + 199	C198				
2,2',3,3',4,5,6,6'-OcCB	200	197 + 200	C197				
2,2',3,3',4,5',6,6'-OcCB	201			597	0.554 (Q)	0.89	1.023
2,2',3,3',5,5',6,6'-OcCB	202			1370	0.554 (Q)	0.89	1.000
2,2',3,4,4',5,5',6-OcCB	203			5130	0.554 (Q)	0.91	0.919
2,2',3,4,4',5,6,6'-OcCB	204		K J Q	5.16	0.554 (Q)	1.16	1.039
2,3,3',4,4',5,5',6-OcCB	205			68.6	3.10 (S)	0.85	1.000
2,2',3,3',4,4',5,5',6-NoCB	206			8180	2.11 (S)	0.79	1.000
2,2',3,3',4,4',5,6,6'-NoCB	207			837	1.60 (S)	0.78	1.020
2,2',3,3',4,5,5',6,6'-NoCB	208			2070	1.90 (S)	0.78	1.001
2,2',3,3',4,4',5,5',6,6'-DeCB	209			714	0.554 (Q)	1.18	1.000

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent; G = lock mass interference present; C = co-eluting congener.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: Henry Huang

SGS AXYS METHOD MLA-010 Rev 12

CLIENT SAMPLE NO.
19050602
Sample Collection:
20-May-2019 10:48

Form 1A

HOMOLOGUE TOTAL PCB ANALYSIS REPORT

SGS AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4857	**Lab Sample I.D.:**	L31207-2 R
Matrix:	AQUEOUS	**Sample Size:**	0.902 L
Sample Receipt Date:	30-May-2019	**Initial Calibration Date:**	02-May-2019
Extraction Date:	15-Jul-2019	**Instrument ID:**	HR GC/MS
Analysis Date:	18-Jul-2019 **Time:** 04:09:39	**GC Column ID:**	SPB OCTYL
Extract Volume (uL):	20	**Sample Data Filename:**	**PB9C_247 S: 9**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PB9C_247 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PB9C_247 S: 1
Concentration Units:	pg/L		

PCB HOMOLOGUE GROUP	LAB FLAG [1]	CONC. FOUND
Total Monochloro Biphenyls		~~0.903~~ MW 22,1660
Total Dichloro Biphenyls		~~52.1~~ MW 128
Total Trichloro Biphenyls		155
Total Tetrachloro Biphenyls		652
Total Pentachloro Biphenyls		746
Total Hexachloro Biphenyls		1030
Total Heptachloro Biphenyls		7780
Total Octachloro Biphenyls		~~22000~~ MW 21,400
Total Nonachloro Biphenyls		11100
Decachloro Biphenyl		714
TOTAL PCBs		~~44200~~ MW 43,600

(1) Where applicable, custom lab flags have been used on this report.
(2) All header information pertains to the initial instrumental analysis of the sample extract. Additional sample datafiles listed refer to secondary analysis of the sample extract.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: Form1668HTII.xsl; Created: 23-Jul-2019 13:25:16; Application: XMLTransformer-1.17.9; Report Filename: 1668_PCB1668_HomTotals-TEQsC_L31207-2_Form1AHT_SJ2591988.html; Workgroup: WG68778; Design ID: 3634]

MW 9-3-19

SGS AXYS METHOD MLA-010 Rev 12

CLIENT SAMPLE NO.
19050602

Form 1C
PCB CONGENER TEQ ANALYSIS REPORT

SGS AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4857

Sample Collection: 20-May-2019 10:48

Matrix: AQUEOUS

Lab Sample I.D.: L31207-2 R

Sample Size: 0.902 L

GC Column ID(s): SPB OCTYL

Concentration Units: pg/L

Sample Data Filename(s): PB9C_247 S: 9

COMPOUND	IUPAC NO.	COELUTIONS	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)	WHO 2005 TEF	TEQ U=0	TEQ U=1/2 RL	TEQ U=RL
3,3',4,4'-TeCB	77			18.3 JQ	1.06	0.0001	1.83e-03	1.83e-03	
3,4,4',5-TeCB	81		U		0.959	0.0003	0.00e+00	1.44e-04	
2,3,3',4,4'-PeCB	105			80.0	0.836	0.00003	2.40e-03	2.40e-03	
2,3,4,4',5-PeCB	114			4.30 JQ	0.852	0.00003	1.29e-04	1.29e-04	
2,3',4,4',5-PeCB	118			103	0.848	0.00003	3.09e-03	3.09e-03	
2',3,4,4',5-PeCB	123			2.71 JQ	0.899	0.00003	8.13e-05	8.13e-05	
3,3',4,4',5-PeCB	126		U		0.982	0.1	0.00e+00	4.91e-02	
2,3,3',4,4',5-HxCB	156	156 + 157	~~C~~ MW	42.7 JQ	1.06	0.00003	1.28e-03	1.28e-03	
2,3,3',4,4',5'-HxCB	157	156 + 157	~~C156~~ MW						
2,3',4,4',5,5'-HxCB	167			26.7	0.810	0.00003	8.01e-04	8.01e-04	
3,3',4,4',5,5'-HxCB	169		U		0.925	0.03	0.00e+00	1.39e-02	
2,3,3',4,4',5,5'-HpCB	189			27.9	2.06	0.00003	8.37e-04	8.37e-04	
				TOTAL TEQ			0.0104 J	0.0736 J	

(1) Where applicable, custom lab flags may have been used on this report; U = not detected at RL; C = co-eluting congener.
(2) Concentrations that do not meet quantification criteria are not included in the TEQ calculations.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: Henry Huang

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: 1668TEQ.xsl; Created: 23-Jul-2019 13:25:16; Application: XMLTransformer-1.17.9;
Report Filename: 1668_PCB1668_HomTotals-TEQsC_L31207-2_TEQ_SJ2591988.html; Workgroup: WG68778; Design ID: 3634]

MW 9349

SGS AXYS METHOD MLA-010 Rev 12

Form 1A

PCB AROCLOR EQUIVALENT ANALYSIS REPORT

CLIENT SAMPLE NO.
19050602
Sample Collection:
20-May-2019 10:48

SGS AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4857	**Lab Sample I.D.:**	L31207-2 R
Matrix:	AQUEOUS	**Sample Size:**	0.902 L
Sample Receipt Date:	30-May-2019	**Initial Calibration Date:**	02-May-2019
Extraction Date:	15-Jul-2019	**Instrument ID:**	HR GC/MS
Analysis Date:	18-Jul-2019 **Time:** 04:09:39	**GC Column ID:**	SPB OCTYL
Extract Volume (uL):	20	**Sample Data Filename:**	**PB9C_247 S: 9**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PB9C_247 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PB9C_247 S: 1
Concentration Units:	pg/L		

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)
Aroclor 1016	12674-11-2	U		1.50
Aroclor 1221	11104-28-2	U		0.776
Aroclor 1232	11141-16-5	U		1.88
Aroclor 1242	53469-21-9		~~284~~ 266	1.66
Aroclor 1248	12672-29-6	U		5.24
Aroclor 1254	11097-69-1		1560	4.43
Aroclor 1260	11096-82-5		18800	2.77

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL.
(2) PCB Aroclor equivalents were calculated from individual PCB congener concentrations using empirically determined conversion factors. Where the PCB pattern was not identifiable as a unique Aroclor formation, the Aroclor has been reported as a 1242/1254/1260 mixture.
(3) All header information pertains to the initial instrumental analysis of the sample extract. Additional sample datafiles listed refer to secondary analysis of the sample extract.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: 1668Aroclor.xsl; Created: 23-Jul-2019 13:24:28; Application: XMLTransformer-1.17.9;
Report Filename: 1668_PCB1668_AroclorsC_L31207-2_Aroclor_SJ2591988.html; Workgroup: WG68778; Design ID: 3634]

SGS AXYS METHOD MLA-010 Rev 12

Form 1A
PCB CONGENER ANALYSIS REPORT

CLIENT SAMPLE NO.
19050603
Sample Collection:
20-May-2019 11:54

SGS AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4857	**Lab Sample I.D.:**	L31207-3 R
Matrix:	AQUEOUS	**Sample Size:**	0.856 L
Sample Receipt Date:	30-May-2019	**Initial Calibration Date:**	02-May-2019
Extraction Date:	15-Jul-2019	**Instrument ID:**	HR GC/MS
Analysis Date:	18-Jul-2019 **Time:** 05:14:01	**GC Column ID:**	SPB OCTYL
Extract Volume (uL):	20	**Sample Data Filename:**	**PB9C_247 S: 10**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PB9C_247 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PB9C_247 S: 1
Concentration Units:	pg/L		

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG[1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
2-MoCB	1		U		0.584 (Q)	2.52	1.000
3-MoCB	2		U		0.584 (Q)		
4-MoCB	3		U		0.584 (Q)	3.24	1.000
2,2'-DiCB	4		U	7.16	0.878 (S)	1.63	1.000
2,3-DiCB	5		U		0.738 (S)		
2,3'-DiCB	6		J Q	1.07	0.668 (S)	1.65	1.177
2,4-DiCB	7		U		0.684 (S)	1.62	1.158
2,4'-DiCB	8		U	4.71	0.612 (S)	1.51	1.208
2,5-DiCB	9		U		0.643 (S)		
2,6-DiCB	10		J Q	1.76	0.651 (S)	1.76	1.013
3,3'-DiCB	11		U		0.768 (S)	1.62	0.969
3,4-DiCB	12	12 + 13	J Q	1.88	0.773 (S)	1.56	0.983
3,4'-DiCB	13	12 + 13					
3,5-DiCB	14		U		0.711 (S)		
4,4'-DiCB	15		J Q	19.7	0.940 (S)	1.59	1.000
2,2',3-TriCB	16			40.2	0.584 (Q)	0.99	1.166
2,2',4-TriCB	17			28.5	0.584 (Q)	0.98	1.138
2,2',5-TriCB	18	18 + 30		79.9	0.584 (Q)	1.10	1.113
2,2',6-TriCB	19			52.5	0.584 (Q)	1.18	1.001
2,3,3'-TriCB	20	20 + 28		117	0.646 (S)	1.03	0.847
2,3,4-TriCB	21	21 + 33	J Q	14.2	0.636 (S)	1.06	0.857
2,3,4'-TriCB	22			53.6	0.741 (S)	1.03	0.872
2,3,5-TriCB	23		U		0.697 (S)		
2,3,6-TriCB	24		J Q	3.15	0.584 (Q)	1.15	1.159
2,3',4-TriCB	25		J Q	6.36	0.584 (Q)	1.08	0.825
2,3',5-TriCB	26	26 + 29	J Q	13.8	0.669 (S)	0.99	1.302
2,3',6-TriCB	27		J Q	20.3	0.584 (Q)	1.04	1.151
2,4,4'-TriCB	28	20 + 28	C20				
2,4,5-TriCB	29	26 + 29	C26				
2,4,6-TriCB	30	18 + 30	C18				
2,4',5-TriCB	31			75.0	0.609 (S)	1.04	0.836
2,4',6-TriCB	32			49.6	0.614 (S)	1.03	1.198
2',3,4-TriCB	33	21 + 33	C21				
2',3,5-TriCB	34		U		0.679 (S)		
3,3',4-TriCB	35		J Q	2.31	0.778 (S)	0.89	0.985
3,3',5-TriCB	36		U		0.678 (S)		
3,4,4'-TriCB	37			51.6	0.848 (S)	1.02	1.001
3,4,5-TriCB	38		U		0.676 (S)		
3,4',5-TriCB	39		U		0.686 (S)		

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG[1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
2,2',3,3'-TeCB	40	40 + 41 + 71	C	206	0.584 (Q)	0.78	1.337
2,2',3,4-TeCB	41	40 + 41 + 71	C40 MW				
2,2',3,4'-TeCB	42			81.0	0.584 (Q)	0.74	1.312
2,2',3,5-TeCB	43		J Q	14.3	0.584 (Q)	0.86	1.247
2,2',3,5'-TeCB	44	44 + 47 + 65	C	291	0.584 (Q)	0.76	1.285
2,2',3,6-TeCB	45	45 + 51	C MW	93.6	0.584 (Q)	0.78	1.146
2,2',3,6'-TeCB	46			37.6	0.584 (Q)	0.79	1.161
2,2',4,4'-TeCB	47	44 + 47 + 65	C44 MW				
2,2',4,5-TeCB	48			43.5	0.584 (Q)	0.79	1.274
2,2',4,5'-TeCB	49	49 + 69	C	141	0.584 (Q)	0.78	1.260
2,2',4,6-TeCB	50	50 + 53	C	69.5	0.584 (Q)	0.81	1.111
2,2',4,6'-TeCB	51	45 + 51	C45 MW				
2,2',5,5'-TeCB	52			326	0.584 (Q)	0.76	1.235
2,2',5,6'-TeCB	53	50 + 53	C50 MW				
2,2',6,6'-TeCB	54		J Q	1.23	0.584 (Q)	0.66	1.001
2,3,3',4-TeCB	55		J Q	6.08	1.33 (S)	0.81	0.889
2,3,3',4'-TeCB	56			110	1.35 (S)	0.76	0.904
2,3,3',5-TeCB	57		U		1.20 (S)		
2,3,3',5'-TeCB	58		U		1.24 (S)		
2,3,3',6-TeCB	59	59 + 62 + 75	C MW	32.4	0.584 (Q)	0.81	1.302
2,3,4,4'-TeCB	60			46.1	1.34 (S)	0.75	0.911
2,3,4,5-TeCB	61	61 + 70 + 74 + 76	C MW	240	1.21 (S)	0.78	0.875
2,3,4,6-TeCB	62	59 + 62 + 75	C59 MW				
2,3,4',5-TeCB	63		J Q	4.91	1.21 (S)	0.80	0.865
2,3,4',6-TeCB	64			139	0.584 (Q)	0.81	1.348
2,3,5,6-TeCB	65	44 + 47 + 65	C44 MW				
2,3',4,4'-TeCB	66			144	1.25 (S)	0.76	0.885
2,3',4,5-TeCB	67		J Q	3.21	1.02 (S)	0.82	0.857
2,3',4,5'-TeCB	68		U		1.10 (S)		
2,3',4,6-TeCB	69	49 + 69	C49				
2,3',4',5-TeCB	70	61 + 70 + 74 + 76	C61				
2,3',4',6-TeCB	71	40 + 41 + 71	C40 MW				
2,3',5,5'-TeCB	72		J Q	1.35	1.16 (S)	0.79	0.823
2,3',5',6-TeCB	73		U		0.584 (Q)		
2,4,4',5-TeCB	74	61 + 70 + 74 + 76	C61				
2,4,4',6-TeCB	75	59 + 62 + 75	C59				
2',3,4,5-TeCB	76	61 + 70 + 74 + 76	C61 MW				
3,3',4,4'-TeCB	77		J Q	19.0	1.56 (S)	0.82	1.000
3,3',4,5-TeCB	78		U		1.34 (S)		
3,3',4,5'-TeCB	79		J Q	2.41	1.05 (S)	0.84	0.969
3,3',5,5'-TeCB	80		U		1.18 (S)		
3,4,4',5-TeCB	81		U		1.38 (S)		
2,2',3,3',4-PeCB	82			35.2	2.12 (S)	1.59	0.934
2,2',3,3',5-PeCB	83	83 + 99	C	66.5	1.91 (S)	1.53	0.885
2,2',3,3',6-PeCB	84			72.7	2.10 (S)	1.64	1.163
2,2',3,4,4'-PeCB	85	85 + 116 + 117	C	31.7	1.64 (S)	1.50	0.920
2,2',3,4,5-PeCB	86	86 + 87 + 97 + 109 + 119 + 125	C MW	130	1.66 (S)	1.62	0.901
2,2',3,4,5'-PeCB	87	86 + 87 + 97 + 109 + 119 + 125	C86				
2,2',3,4,6-PeCB	88	88 + 91	C MW	27.4	1.89 (S)	1.64	1.154
2,2',3,4,6'-PeCB	89		K J Q	5.24	2.03 (S)	1.86	1.181
2,2',3,4',5-PeCB	90	90 + 101 + 113	C MW	128	1.65 (S)	1.60	0.869
2,2',3,4',6-PeCB	91	88 + 91	C88 MW				
2,2',3,5,5'-PeCB	92		K MW JH	28.4	1.93 (S)	1.84	0.853
2,2',3,5,6-PeCB	93	93 + 95 + 98 + 100 + 102	C MW	159	1.81 (S)	1.62	1.121
2,2',3,5,6'-PeCB	94		U		1.98 (S)		
2,2',3,5',6-PeCB	95	93 + 95 + 98 + 100 + 102	C93 MW				
2,2',3,6,6'-PeCB	96		J Q	2.50	0.584 (Q)	1.50	1.015
2,2',3',4,5-PeCB	97	86 + 87 + 97 + 109 + 119 + 125	C86				
2,2',3',4,6-PeCB	98	93 + 95 + 98 + 100 + 102	C93				
2,2',4,4',5-PeCB	99	83 + 99	C83 MW				

MW 9-3-19

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
2,2',4,4',6-PeCB	100	93 + 95 + 98 + 100 + 102	C93				
2,2',4,5,5'-PeCB	101	90 + 101 + 113	C90				
2,2',4,5,6'-PeCB	102	93 + 95 + 98 + 100 + 102	C93				
2,2',4,5',6-PeCB	103		U		1.63 (S)		
2,2',4,6,6'-PeCB	104		U		0.584 (Q)		
2,3,3',4,4'-PeCB	105			63.1	1.43 (S)	1.55	1.000
2,3,3',4,5-PeCB	106		U		1.35 (S)		
2,3,3',4',5-PeCB	107		J Q	7.33	1.38 (S)	1.37	0.998
2,3,3',4,5'-PeCB	108	108 + 124	C J Q	4.14	1.42 (S)	1.34	0.991
2,3,3',4,6-PeCB	109	86 + 87 + 97 + 109 + 119 + 125	C86				
2,3,3',4',6-PeCB	110	110 + 115	C	221	1.44 (S)	1.61	0.925
2,3,3',5,5'-PeCB	111		U		1.43 (S)		
2,3,3',5,6-PeCB	112		U		1.44 (S)		
2,3,3',5',6-PeCB	113	90 + 101 + 113	C90				
2,3,4,4',5-PeCB	114		J Q	3.91	1.43 (S)	1.66	1.001
2,3,4,4',6-PeCB	115	110 + 115	C110				
2,3,4,5,6-PeCB	116	85 + 116 + 117	C85				
2,3,4',5,6-PeCB	117	85 + 116 + 117	C85				
2,3',4,4',5-PeCB	118			95.4	1.49 (S)	1.57	1.000
2,3',4,4',6-PeCB	119	86 + 87 + 97 + 109 + 119 + 125	C86				
2,3',4,5,5'-PeCB	120		U		1.40 (S)		
2,3',4,5',6-PeCB	121		U		1.47 (S)		
2',3,3',4,5-PeCB	122		J Q	2.36	1.51 (S)	1.35	1.010
2',3,4,4',5-PeCB	123		U		1.52 (S)		
2',3,4,5,5'-PeCB	124	108 + 124	C108				
2',3,4,5,6'-PeCB	125	86 + 87 + 97 + 109 + 119 + 125	C86				
3,3',4,4',5-PeCB	126		U		1.79 (S)		
3,3',4,5,5'-PeCB	127		U		1.43 (S)		
2,2',3,3',4,4'-HxCB	128	128 + 166	C J Q	12.0	1.07 (S)	1.32	0.957
2,2',3,3',4,5-HxCB	129	129 + 138 + 160 + 163	C	105	1.05 (S)	1.22	0.928
2,2',3,3',4,5'-HxCB	130		J Q	9.97	1.31 (S)	1.26	0.913
2,2',3,3',4,6-HxCB	131		J Q	1.71	1.20 (S)	1.10	1.158
2,2',3,3',4,6'-HxCB	132			40.0	1.24 (S)	1.18	1.174
2,2',3,3',5,5'-HxCB	133		J Q	10.4	1.15 (S)	1.23	1.191
2,2',3,3',5,6-HxCB	134	134 + 143	C J Q	7.27	1.18 (S)	1.11	1.139
2,2',3,3',5,6'-HxCB	135	135 + 151 + 154	C	85.2	0.584 (Q)	1.33	1.104
2,2',3,3',6,6'-HxCB	136		J Q	12.5	0.584 (Q)	1.24	1.023
2,2',3,4,4',5-HxCB	137		K J Q	5.49	1.26 (S)	1.50	0.918
2,2',3,4,4',5'-HxCB	138	129 + 138 + 160 + 163	C129				
2,2',3,4,4',6-HxCB	139	139 + 140	C K J Q	2.06	1.07 (S)	1.46	1.152
2,2',3,4,4',6'-HxCB	140	139 + 140	C139				
2,2',3,4,5,5'-HxCB	141			29.4	1.14 (S)	1.22	0.903
2,2',3,4,5,6-HxCB	142		U		1.23 (S)		
2,2',3,4,5,6'-HxCB	143	134 + 143	C134				
2,2',3,4,5',6-HxCB	144		K J Q	7.82	0.584 (Q)	1.55	1.121
2,2',3,4,6,6'-HxCB	145		U		0.584 (Q)		
2,2',3,4',5,5'-HxCB	146			61.9	1.03 (S)	1.21	0.884
2,2',3,4',5,6-HxCB	147	147 + 149	C	129	1.05 (S)	1.26	1.133
2,2',3,4',5,6'-HxCB	148		J Q	1.97	0.584 (Q)	1.38	1.084
2,2',3,4',5',6-HxCB	149	147 + 149	C147				
2,2',3,4',6,6'-HxCB	150		J Q	1.94	0.584 (Q)	1.33	1.013
2,2',3,5,5',6-HxCB	151	135 + 151 + 154	C135				
2,2',3,5,6,6'-HxCB	152		U		0.584 (Q)		
2,2',4,4',5,5'-HxCB	153	153 + 168	C	186	0.897 (S)	1.28	0.898
2,2',4,4',5,6'-HxCB	154	135 + 151 + 154	C135				
2,2',4,4',6,6'-HxCB	155		U		0.584 (Q)		
2,3,3',4,4',5-HxCB	156	156 + 157	C J Q	13.2	1.20 (S)	1.40	1.000
2,3,3',4,4',5'-HxCB	157	156 + 157	C156				
2,3,3',4,4',6-HxCB	158		J Q	20.0	0.819 (S)	1.27	0.938
2,3,3',4,5,5'-HxCB	159		U		0.910 (S)		
2,3,3',4,5,6-HxCB	160	129 + 138 + 160 + 163	C129				

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG[1]	CONC. FOUND	REPORTING LIMIT (RL)[2]	ION ABUND. RATIO	RRT
2,3,3',4,5',6-HxCB	161		U		0.806 (S)		
2,3,3',4',5,5'-HxCB	162		U		0.891 (S)		
2,3,3',4',5,6-HxCB	163	129 + 138 + 160 + 163	C129				
2,3,3',4',5',6-HxCB	164		J Q	8.96	0.856 (S)	1.12	0.921
2,3,3',5,5',6-HxCB	165		U		0.989 (S)		
2,3,4,4',5,6-HxCB	166	128 + 166	C128				
2,3',4,4',5,5'-HxCB	167		J Q	12.9	0.931 (S)	1.30	1.000
2,3',4,4',5',6-HxCB	168	153 + 168	C153				
3,3',4,4',5,5'-HxCB	169		U		1.09 (S)		
2,2',3,3',4,4',5-HpCB	170			70.1	0.584 (Q)	1.03	1.001
2,2',3,3',4,4',6-HpCB	171	171 + 173	C	23.9	0.584 (Q)	1.07	1.163
2,2',3,3',4,5,5'-HpCB	172			125	0.584 (Q)	1.02	0.897
2,2',3,3',4,5,6-HpCB	173	171 + 173	C171				
2,2',3,3',4,5,6'-HpCB	174			323	0.584 (Q)	1.02	1.133
2,2',3,3',4,5',6-HpCB	175			29.7	0.584 (Q)	1.04	1.102
2,2',3,3',4,6,6'-HpCB	176			24.3	0.584 (Q)	1.04	1.034
2,2',3,3',4',5,6-HpCB	177			79.7	0.584 (Q)	1.09	1.145
2,2',3,3',5,5',6-HpCB	178			142	0.584 (Q)	1.00	1.085
2,2',3,3',5,6,6'-HpCB	179			133	0.584 (Q)	1.06	1.010
2,2',3,4,4',5,5'-HpCB	180	180 + 193	C	1640	0.584 (Q)	1.03	1.001
2,2',3,4,4',5,6-HpCB	181		U		0.584 (Q)		
2,2',3,4,4',5,6'-HpCB	182		J Q	19.0	0.584 (Q)	1.08	1.116
2,2',3,4,4',5',6-HpCB	183	183 + 185	C	354	0.584 (Q)	1.02	1.127
2,2',3,4,4',6,6'-HpCB	184		J Q	2.77	0.584 (Q)	0.96	1.025
2,2',3,4,5,5',6-HpCB	185	183 + 185	C183				
2,2',3,4,5,6,6'-HpCB	186		U		0.584 (Q)		
2,2',3,4',5,5',6-HpCB	187			1160	0.584 (Q)	1.03	1.110
2,2',3,4',5,6,6'-HpCB	188		J Q	10.0	0.584 (Q)	1.09	1.001
2,3,3',4,4',5,5'-HpCB	189		J Q	19.8	0.623 (S)	1.04	1.001
2,3,3',4,4',5,6-HpCB	190			28.3	0.584 (Q)	1.13	0.947
2,3,3',4,4',5',6-HpCB	191		J Q	5.60	0.584 (Q)	1.06	0.918
2,3,3',4,5,5',6-HpCB	192		U		0.584 (Q)		
2,3,3',4',5,5',6-HpCB	193	180 + 193	C180				
2,2',3,3',4,4',5,5'-OcCB	194			2170	1.72 (S)	0.90	0.991
2,2',3,3',4,4',5,6-OcCB	195			388	1.82 (S)	0.92	0.945
2,2',3,3',4,4',5,6'-OcCB	196			1090	0.584 (Q)	0.88	0.916
2,2',3,3',4,4',6,6'-OcCB	197	197 + 200	C	306	0.584 (Q)	0.87	1.047
2,2',3,3',4,5,5',6-OcCB	198	198 + 199	C	3860	0.584 (Q)	0.90	1.115
2,2',3,3',4,5,5',6'-OcCB	199	198 + 199	C198				
2,2',3,3',4,5,6,6'-OcCB	200	197 + 200	C197				
2,2',3,3',4,5',6,6'-OcCB	201			302	0.584 (Q)	0.89	1.023
2,2',3,3',5,5',6,6'-OcCB	202			642	0.584 (Q)	0.88	1.001
2,2',3,4,4',5,5',6-OcCB	203			2470	0.584 (Q)	0.89	0.920
2,2',3,4,4',5,6,6'-OcCB	204		J Q	2.69	0.584 (Q)	0.79	1.039
2,3,3',4,4',5,5',6-OcCB	205			39.2	1.41 (S)	0.94	1.000
2,2',3,3',4,4',5,5',6-NoCB	206			3400	0.911 (S)	0.80	1.000
2,2',3,3',4,4',5,6,6'-NoCB	207			360	0.644 (S)	0.79	1.019
2,2',3,3',4,5,5',6,6'-NoCB	208			816	0.722 (S)	0.80	1.000
2,2',3,3',4,4',5,5',6,6'-DeCB	209			234	0.584 (Q)	1.13	1.000

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than lowest calibration equivalent; C = co-eluting congener.
(2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

SGS AXYS METHOD MLA-010 Rev 12

Form 1A

HOMOLOGUE TOTAL PCB ANALYSIS REPORT

CLIENT SAMPLE NO.
19050603
Sample Collection:
20-May-2019 11:54

SGS AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4857	**Lab Sample I.D.:**	L31207-3 R
Matrix:	AQUEOUS	**Sample Size:**	0.856 L
Sample Receipt Date:	30-May-2019	**Initial Calibration Date:**	02-May-2019
Extraction Date:	15-Jul-2019	**Instrument ID:**	HR GC/MS
Analysis Date:	18-Jul-2019 **Time:** 05:14:01	**GC Column ID:**	SPB OCTYL
Extract Volume (uL):	20	**Sample Data Filename:**	**PB9C_247 S: 10**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PB9C_247 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PB9C_247 S: 1
Concentration Units:	pg/L		

PCB HOMOLOGUE GROUP	LAB FLAG [1]	CONC. FOUND
Total Monochloro Biphenyls		~~1.13~~ MW 23,3570
Total Dichloro Biphenyls		~~40.7~~ MW 22.4
Total Trichloro Biphenyls		608
Total Tetrachloro Biphenyls		2050
Total Pentachloro Biphenyls		1050
Total Hexachloro Biphenyls		749
Total Heptachloro Biphenyls		4190
Total Octachloro Biphenyls		11300
Total Nonachloro Biphenyls		4580
Decachloro Biphenyl		234
TOTAL PCBs		24800

(1) Where applicable, custom lab flags have been used on this report.
(2) All header information pertains to the initial instrumental analysis of the sample extract. Additional sample datafiles listed refer to secondary analysis of the sample extract.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____Henry Huang_____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: Form1668HTII.xsl; Created: 23-Jul-2019 13:25:16; Application: XMLTransformer-1.17.9;
Report Filename: 1668_PCB1668_HomTotals-TEQsC_L31207-3_Form1AHT_SJ2591990.html; Workgroup: WG68778; Design ID: 3634]

MW 9349

SGS AXYS METHOD MLA-010 Rev 12

CLIENT SAMPLE NO.
19050603

Form 1C
PCB CONGENER TEQ ANALYSIS REPORT

SGS AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4857

Sample Collection: 20-May-2019 11:54

Matrix: AQUEOUS

Lab Sample I.D.: L31207-3 R

Sample Size: 0.856 L

GC Column ID(s): SPB OCTYL

Concentration Units: pg/L

Sample Data Filename(s): PB9C_247 S: 10

COMPOUND	IUPAC NO.	COELUTIONS	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)	WHO 2005 TEF	TEQ U=0	TEQ U=1/2 RL	TEQ U=RL
3,3',4,4'-TeCB	77			19.0 JQ	1.56	0.0001	1.90e-03	1.90e-03	
3,4,4',5-TeCB	81		U		1.38	0.0003	0.00e+00	2.07e-04	
2,3,3',4,4'-PeCB	105			63.1	1.43	0.00003	1.89e-03	1.89e-03	
2,3,4,4',5-PeCB	114			3.91 JQ	1.43	0.00003	1.17e-04	1.17e-04	
2,3',4,4',5-PeCB	118			95.4	1.49	0.00003	2.86e-03	2.86e-03	
2',3,4,4',5-PeCB	123		U		1.52	0.00003	0.00e+00	2.28e-05	
3,3',4,4',5-PeCB	126		U		1.79	0.1	0.00e+00	8.95e-02	
2,3,3',4,4',5-HxCB	156	156 + 157	~~C~~	13.2 JQ	1.20	0.00003	3.96e-04	3.96e-04	
2,3,3',4,4',5'-HxCB	157	156 + 157	~~C~~						
2,3',4,4',5,5'-HxCB	167			12.9 JQ	0.931	0.00003	3.87e-04	3.87e-04	
3,3',4,4',5,5'-HxCB	169		U		1.09	0.03	0.00e+00	1.64e-02	
2,3,3',4,4',5,5'-HpCB	189			19.8 JQ	0.623	0.00003	5.94e-04	5.94e-04	
				TOTAL TEQ			0.00815 J	0.114 J	

(1) Where applicable, custom lab flags may have been used on this report; U = not detected at RL; C = co-eluting congener.
(2) Concentrations that do not meet quantification criteria are not included in the TEQ calculations.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: Henry Huang

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: 1668TEQ.xsl; Created: 23-Jul-2019 13:25:16; Application: XMLTransformer-1.17.9; Report Filename: 1668_PCB1668_HomTotals-TEQsC_L31207-3_TEQ_SJ2591990.html; Workgroup: WG68778; Design ID: 3634]

9-3-19

SGS AXYS METHOD MLA-010 Rev 12

Form 1A

PCB AROCLOR EQUIVALENT ANALYSIS REPORT

CLIENT SAMPLE NO.
19050603
Sample Collection:
20-May-2019 11:54

SGS AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4857	**Lab Sample I.D.:**	L31207-3 R
Matrix:	AQUEOUS	**Sample Size:**	0.856 L
Sample Receipt Date:	30-May-2019	**Initial Calibration Date:**	02-May-2019
Extraction Date:	15-Jul-2019	**Instrument ID:**	HR GC/MS
Analysis Date:	18-Jul-2019 **Time:** 05:14:01	**GC Column ID:**	SPB OCTYL
Extract Volume (uL):	20	**Sample Data Filename:**	**PB9C_247 S: 10**
Injection Volume (uL):	1.0	**Blank Data Filename:**	PB9C_247 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	PB9C_247 S: 1
Concentration Units:	pg/L		

COMPOUND	CAS NO.	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT (RL)
Aroclor 1016	12674-11-2	U		1.74
Aroclor 1221	11104-28-2	U		0.857
Aroclor 1232	11141-16-5	U		1.99
Aroclor 1242	53469-21-9		~~830~~ 816	1.94
Aroclor 1248	12672-29-6	U		7.63
Aroclor 1254	11097-69-1		1570	15.3
Aroclor 1260	11096-82-5		10300	2.92

(1) Where applicable, custom lab flags have been used on this report; U = not detected at RL.
(2) PCB Aroclor equivalents were calculated from individual PCB congener concentrations using empirically determined conversion factors. Where the PCB pattern was not identifiable as a unique Aroclor formation, the Aroclor has been reported as a 1242/1254/1260 mixture.
(3) All header information pertains to the initial instrumental analysis of the sample extract. Additional sample datafiles listed refer to secondary analysis of the sample extract.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: Henry Huang

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

For Axys Internal Use Only [XSL Template: 1668Aroclor.xsl; Created: 23-Jul-2019 13:24:28; Application: XMLTransformer-1.17.9; Report Filename: 1668_PCB1668_AroclorsC_L31207-3_Aroclor_SJ2591990.html; Workgroup: WG68778; Design ID: 3634]

For the sample 19050602 (SGS AXYS ID: L31207-2), a disturbance of the mass ion used to monitor instrument performance (lock-mass) was observed at the retention time corresponding to PCB congeners 197/200, as indicated by the flag of 'G'. As the analyte is not major contributor to the PCB totals, data are not considered significantly affected.

ANALYTICAL DISCUSSION

The predominant PCB congener pattern observed was that of Aroclor 1268 formulation. The Aroclor 1268 concentrations, calculated by the empirical formulae Aroclor 1268 = (PCB 198/199 + PCB 206 + PCB 208 + PCB 209) * 1.3, are listed in the following table. A lower concentration pattern consistent with Aroclors 1242, 1254 and 1260 was also present and have been reported. Summing the reported concentrations for Aroclor 1242, 1254 and 1260 plus the concentration calculated for A1268 gives good agreement with the Total PCB concentrations determined from the sum of 209 PCB congener data.

CLIENT ID	SGS AXYS ID	Aroclor 1268 Concentration (ng/L)
19050601	L31207-1	790
19050602	L31207-2	24000
19050603	L31207-3	11000

All the three samples were originally analyzed in the analysis batch WG68278 and were repeated in the analysis batch WG68788 due to elevated blank background. The repeat analysis was successful, and the repeat data are reported, indicated by the sample test suffix 'R' added to the SGS AXYS IDs.

DATA PACKAGE

This data package, DPWG69049, includes the following documentation after this narrative:

- Method summary
- Sample 'Correlation Table'
- Sample receiving documentation
- Sample pretreatment records
- Laboratory extraction worksheets
- Sample data reports (in order of SGS AXYS ID)
- Laboratory QC data reports
- Instrumental QC data reports and mass resolution printouts (in order of analysis date)
- Audit change reports
- Sample raw data and chromatography (in order of SGS AXYS ID)
- Laboratory QC raw data and chromatography
- Instrumental QC raw data and chromatography (in order of analysis date)
- Accreditation Scope

I certify that this data package complies with the terms and conditions of the contract, both technically and for completeness, except for the conditions detailed above. In addition, I certify, that to the best of my knowledge and belief, the data as reported are true and accurate. The following signature, on behalf of SGS AXYS Analytical Services Ltd, authorizes the release of the data contained in this data package.

Signed: Henry Huang, Ph.D.,
Data Validation Chemist

01 Aug. 2019
Date Signed

MW 8-2019

ecology and environment, inc.
Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: July 15, 2019

TO: Steve Hall, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Data Quality Assurance Review, Former Kaiser Smelter Removal Assessment Site, Mead, Washington**

REF: TO: TO-68HE0719F0066 PAN: 1004530.F066.001.01

The data quality assurance review of two building material samples collected from the Former Kaiser Smelter Removal Assessment site in Mead, Washington, has been completed. Analyses for Polychlorinated Biphenyls (PCBs - EPA Method 1668) were performed by Eurofins Test America, Inc., Knoxville, Tennessee. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Manual Process (S2B/4VM).

The samples were numbered: 19050103 19050108

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The samples were maintained at 0°C to 6°C. The samples were collected in clear glass jars instead of amber glass jars; no actions were taken as the samples were maintained in the dark after collection as much as practicable. The samples were collected on May 22, 2019, extracted on June 20, 2019, and were analyzed on June 27, 2019. Samples held at less than 6°C in the dark have a holding time up to a year.

2. **Instrument Performance: Acceptable.**

The resolution and window defining mix percent recovery results were within QC limits.

3. **Initial and Continuing Calibration: Acceptable.**

All initial calibration relative standard deviations (RSDs) were within QC limits. All continuing calibration % differences (% D) were within QC limits.

4. **Blanks: Satisfactory.**

A method blank was prepared at the required frequency of every time samples were extracted for each matrix and for each concentration level, or every 20 samples, whichever is greater, and for each analytical system. Several target analytes were detected in the laboratory blank; no actions were taken as all blank results were less than ½ the reporting limit (except PCB 206) and all associated sample results were either non-detect or were more than twice the reporting limit. The PCB 206 sample results were much more than 1,000 times the positive blank result.

5. **Isotope Dilution: Acceptable.**

All recoveries of the isotope dilution analytes were within the established control limits.

6. **Blank Spike (BS): Acceptable.**

BS recoveries were within QC limits.

7. **Target Compound Quantitation and Quantitation Limits: Acceptable.**

Sample results and quantitation limits were correctly performed. Positive results for co-eluting PCBs were qualified as estimated quantities with an unknown bias (JK). Results listed as Estimated Maximum Possible Concentrations (EMPCs) were qualified as estimated quantities with a high bias (JH).

8. **Laboratory Contact**

No laboratory contact was required.

9. **Overall Assessment**

A total of 418 results were validated in this data memorandum. No sample results were qualified as estimated quantities (J) based on duplicate precision outliers, spike accuracy outliers, holding time outliers, blank detections, incorrect sample containers, or sample temperature outliers. No sample results were rejected (R). The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation, and/or the OSTRI Publication "National Functional Guidelines for High Resolution Superfund Organic Data Review, April 2016". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050103 Lab Sample ID: 140-15383-1

Matrix: Solid Lab File ID: 140-15383-a-1-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 12:18

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.02(g) Date Analyzed: 06/27/2019 15:03

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
2051-60-7	PCB-1	ND		4900	340
2051-61-8	PCB-2	ND		4900	410
2051-62-9	PCB-3	ND		4900	450
13029-08-8	PCB-4	ND		9800	2100
16605-91-7	PCB-5	3500	J	4900	1800
25569-80-6	PCB-6	ND		4900	1600
33284-50-3	PCB-7	ND		4900	1600
34883-43-7	PCB-8	ND		9800	1400
34883-39-1	PCB-9	ND		4900	1600
33146-45-1	PCB-10	ND		4900	1800
2050-67-1	PCB-11	ND		9800	1500
2974-92-7	PCB-12	ND		9800	1600
2974-90-5	PCB-13	ND		9800	1600
34883-41-5	PCB-14	ND		4900	1300
2050-68-2	PCB-15	ND		4900	1700
38444-78-9	PCB-16	ND		4900	1500
37680-66-3	PCB-17	ND		4900	1300
37680-65-2	PCB-18	ND		9800	1100
38444-73-4	PCB-19	ND		4900	1600
38444-84-7	PCB-20	ND		9800	290
55702-46-0	PCB-21	ND		9800	280
38444-85-8	PCB-22	ND		4900	290
55720-44-0	PCB-23	6900		4900	290
55702-45-9	PCB-24	12000		4900	1100
55712-37-3	PCB-25	720	J	4900	270
38444-81-4	PCB-26	3200	J	9800	280
38444-76-7	PCB-27	ND		4900	950
7012-37-5	PCB-28	ND		9800	290
15862-07-4	PCB-29	3200	J	9800	280
35693-92-6	PCB-30	ND		9800	1100
16606-02-3	PCB-31	ND		9800	280
38444-77-8	PCB-32	ND		4900	910
38444-86-9	PCB-33	ND		9800	280
37680-68-5	PCB-34	11000		4900	300

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050103 Lab Sample ID: 140-15383-1

Matrix: Solid Lab File ID: 140-15383-a-1-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 12:18

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.02(g) Date Analyzed: 06/27/2019 15:03

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
37680-69-6	PCB-35	ND		4900	300
38444-87-0	PCB-36	ND		4900	280
38444-90-5	PCB-37	ND		4900	290
53555-66-1	PCB-38	ND		4900	310
38444-88-1	PCB-39	ND		4900	270
38444-93-8	PCB-40	ND	C	15000	2700
52663-59-9	PCB-41	ND	C40	15000	2700
36559-22-5	PCB-42	ND		4900	2700
70362-46-8	PCB-43	ND	C	9800	2500
41464-39-5	PCB-44	ND	C	15000	2400
70362-45-7	PCB-45	ND	C	9800	2800
41464-47-5	PCB-46	ND		4900	3400
2437-79-8	PCB-47	ND	C44	15000	2400
70362-47-9	PCB-48	ND		4900	2700
41464-40-8	PCB-49	ND	C	9800	2200
62796-65-0	PCB-50	ND	C	9800	2600
68194-04-7	PCB-51	ND	C45	9800	2800
35693-99-3	PCB-52	ND		4900	2700
41464-41-9	PCB-53	ND	C50	9800	2600
15968-05-5	PCB-54	ND		4900	1600
74338-24-2	PCB-55	ND		4900	2000
41464-43-1	PCB-56	ND		4900	2000
70424-67-8	PCB-57	ND		4900	2000
41464-49-7	PCB-58	ND		4900	2000
74472-33-6	PCB-59	ND	C	15000	1900
33025-41-1	PCB-60	ND		4900	2000
33284-53-6	PCB-61	ND	C	20000	1900
54230-22-7	PCB-62	ND	C59	15000	1900
74472-34-7	PCB-63	ND		4900	1800
52663-58-8	PCB-64	ND		4900	1800
33284-54-7	PCB-65	ND	C44	15000	2400
32598-10-0	PCB-66	ND		4900	1900
73575-53-8	PCB-67	ND		4900	1700
73575-52-7	PCB-68	ND		4900	1800

06/28/2019

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050103 Lab Sample ID: 140-15383-1

Matrix: Solid Lab File ID: 140-15383-a-1-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 12:18

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.02(g) Date Analyzed: 06/27/2019 15:03

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
60233-24-1	PCB-69	ND	C49	9800	2200
32598-11-1	PCB-70	ND	C61	20000	1900
41464-46-4	PCB-71	ND	C40	15000	2700
41464-42-0	PCB-72	ND		4900	2000
74338-23-1	PCB-73	ND	C43	9800	2500
32690-93-0	PCB-74	ND	C61	20000	1900
32598-12-2	PCB-75	ND	C59	15000	1900
70362-48-0	PCB-76	ND	C61	20000	1900
32598-13-3	PCB-77	ND		4900	1900
70362-49-1	PCB-78	ND		4900	2000
41464-48-6	PCB-79	ND		4900	1800
33284-52-5	PCB-80	ND		4900	1700
70362-50-4	PCB-81	ND		4900	1900
52663-62-4	PCB-82	ND	G	8400	8400
60145-20-2	PCB-83	ND	C	9800	7700
52663-60-2	PCB-84	ND	G	8500	8500
65510-45-4	PCB-85	ND	C	15000	6200
55312-69-1	PCB-86	ND	C	29000	6300
38380-02-8	PCB-87	ND	C86	29000	6300
55215-17-3	PCB-88	ND	C	9800	7600
73575-57-2	PCB-89	ND	G	8300	8300
68194-07-0	PCB-90	ND	C	15000	6400
68194-05-8	PCB-91	ND	C88	9800	7600
52663-61-3	PCB-92	ND	G	7200	7200
73575-56-1	PCB-93	ND	C	9800	7300
73575-55-0	PCB-94	ND	G	8300	8300
38379-99-6	PCB-95	ND	G	8000	8000
73575-54-9	PCB-96	ND	G	6200	6200
41464-51-1	PCB-97	ND	C86	29000	6300
60233-25-2	PCB-98	ND	C	9800	7100
38380-01-7	PCB-99	ND	C83	9800	7700
39485-83-1	PCB-100	ND	C93	9800	7300
37680-73-2	PCB-101	ND	C90	15000	6400
68194-06-9	PCB-102	ND	C98	9800	7100

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050103 Lab Sample ID: 140-15383-1

Matrix: Solid Lab File ID: 140-15383-a-1-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 12:18

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.02(g) Date Analyzed: 06/27/2019 15:03

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
60145-21-3	PCB-103	ND	G	7300	7300
56558-16-8	PCB-104	ND	G	5600	5600
32598-14-4	PCB-105	ND		4900	260
70424-69-0	PCB-106	ND		4900	250
70424-68-9	PCB-107	ND		4900	270
70362-41-3	PCB-108	ND	C	9800	250
74472-35-8	PCB-109	ND	C86	29000	6300
38380-03-9	PCB-110	ND	C	9800	5300
39635-32-0	PCB-111	ND	G	5100	5100
74472-36-9	PCB-112	ND	G	5400	5400
68194-10-5	PCB-113	ND	C90	15000	6400
74472-37-0	PCB-114	ND		4900	210
74472-38-1	PCB-115	ND	C110	9800	5300
18259-05-7	PCB-116	ND	C85	15000	6200
68194-11-6	PCB-117	ND	C85	15000	6200
31508-00-6	PCB-118	ND		4900	240
56558-17-9	PCB-119	ND	C86	29000	6300
68194-12-7	PCB-120	ND	G	5200	5200
56558-18-0	PCB-121	ND	G	5400	5400
76842-07-4	PCB-122	ND		4900	290
65510-44-3	PCB-123	ND		4900	250
70424-70-3	PCB-124	ND	C108	9800	250
74472-39-2	PCB-125	ND	C86	29000	6300
57465-28-8	PCB-126	ND		4900	270
39635-33-1	PCB-127	ND		4900	250
38380-07-3	PCB-128	40000	~~C B~~ G JK	9800	2200
55215-18-4	PCB-129	7300	~~J C B~~ G JK	20000	2300
52663-66-8	PCB-130	ND		4900	3100
61798-70-7	PCB-131	ND		4900	3200
38380-05-1	PCB-132	ND		4900	3000
35694-04-3	PCB-133	ND		4900	2900
52704-70-8	PCB-134	ND	C	9800	3000
52744-13-5	PCB-135	19000	G JK	9800	110
38411-22-2	PCB-136	ND		4900	78

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050103 Lab Sample ID: 140-15383-1

Matrix: Solid Lab File ID: 140-15383-a-1-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 12:18

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.02(g) Date Analyzed: 06/27/2019 15:03

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
35694-06-5	PCB-137	ND		4900 U	2600
35065-28-2	PCB-138	7300	J B C129 q JK	20000	2300
56030-56-9	PCB-139	ND	C	9800 U	2600
59291-64-4	PCB-140	ND	C139	9800	2600
52712-04-6	PCB-141	ND		4900	2700
41411-61-4	PCB-142	ND		4900	2900
68194-15-0	PCB-143	ND	C134	9800	3000
68194-14-9	PCB-144	4200	J q H	4900	98
74472-40-5	PCB-145	ND		4900 U	74
51908-16-8	PCB-146	5900		4900	2600
68194-13-8	PCB-147	12000	C q JK	9800	2900
74472-41-6	PCB-148	ND		4900 U	100
38380-04-0	PCB-149	12000	C147 q JK	9800	2900
68194-08-1	PCB-150	ND		4900 U	71
52663-63-5	PCB-151	19000	C135 JK	9800	110
68194-09-2	PCB-152	ND		4900 U	77
35065-27-1	PCB-153	75000	C JK	9800	2000
60145-22-4	PCB-154	3600	J q H	4900	84
33979-03-2	PCB-155	7000	q JH	4900	71
38380-08-4	PCB-156	ND	C JK	9800 U	2400
69782-90-7	PCB-157	ND	C156	9800	2400
74472-42-7	PCB-158	ND		4900	1800
39635-35-3	PCB-159	12000	B	4900	1900
41411-62-5	PCB-160	7300	J B C129 q JK	20000	2300
74472-43-8	PCB-161	ND		4900 U	1900
39635-34-2	PCB-162	ND		4900 U	1900
74472-44-9	PCB-163	7300	J B C129 q JK	20000	2300
74472-45-0	PCB-164	ND		4900 U	2000
74472-46-1	PCB-165	ND		4900 U	2200

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050103 Lab Sample ID: 140-15383-1

Matrix: Solid Lab File ID: 140-15383-a-1-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 12:18

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.02(g) Date Analyzed: 06/27/2019 15:03

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
41411-63-6	PCB-166	40000	C128 B JK	9800	2200
52663-72-6	PCB-167	8600	B	4900	1500
59291-65-5	PCB-168	75000	C153 JK	9800	2000
32774-16-6	PCB-169	ND		4900 U	1500
35065-30-6	PCB-170	93000	B JH	4900	1500
52663-71-5	PCB-171	23000	JK	9800	1500
52663-74-8	PCB-172	75000	B	4900	1500
68194-16-1	PCB-173	23000	C171 B JK	9800	1500
38411-25-5	PCB-174	420000	B	4900	1400
40186-70-7	PCB-175	14000	B	4900	1300
52663-65-7	PCB-176	15000		4900	1000
52663-70-4	PCB-177	110000	B	4900	1400
52663-67-9	PCB-178	120000		4900	1400
52663-64-6	PCB-179	96000		4900	1100
35065-29-3	PCB-180	2500000	JK	9800	1100
74472-47-2	PCB-181	ND		4900 U	1300
60145-23-5	PCB-182	12000		4900	1300
52663-69-1	PCB-183	540000	JK	9800	1300
74472-48-3	PCB-184	ND		4900 U	1100
52712-05-7	PCB-185	540000	B C183 JK	9800	1300
74472-49-4	PCB-186	ND		4900 U	1100
52663-68-0	PCB-187	1700000	B	4900	1200
74487-85-7	PCB-188	ND		4900 U	940
39635-31-9	PCB-189	21000	B JH	4900	3200
41411-64-7	PCB-190	63000		4900	960
74472-50-7	PCB-191	ND		4900 U	1000
74472-51-8	PCB-192	ND		4900 U	1100
69782-91-8	PCB-193	2500000	C180 B JK	9800	1100
35694-08-7	PCB-194	4200000	B	8800	8800
52663-78-2	PCB-195	500000	B	9600	9600
42740-50-1	PCB-196	2300000	B	4900	600
33091-17-7	PCB-197	75000	JH	4900	460

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050103 Lab Sample ID: 140-15383-1

Matrix: Solid Lab File ID: 140-15383-a-1-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 12:18

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.02(g) Date Analyzed: 06/27/2019 15:03

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
68194-17-2	PCB-198	7900000	G B	JK 9800	610
52663-75-9	PCB-199	7900000	G198 B	JK 9800	610
52663-73-7	PCB-200	340000	B	4900	410
40186-71-8	PCB-201	510000		4900	420
2136-99-4	PCB-202	1000000	B	4900	470
52663-76-0	PCB-203	5500000	B	4900	550
74472-52-9	PCB-204	ND		4900 U	460
74472-53-0	PCB-205	120000	B G	7400	7400
40186-72-9	PCB-206	6900000	B G	7000	7000
52663-79-3	PCB-207	770000	B G	6100	6100
52663-77-1	PCB-208	1700000	B G	7300	7300
2051-24-3	PCB-209	870000	B	4900	4500

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mu 7/16/19

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050103 Lab Sample ID: 140-15383-1

Matrix: Solid Lab File ID: 140-15383-a-1-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 12:18

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.02(g) Date Analyzed: 06/27/2019 15:03

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
234432-85-0	PCB-1L	78		30-140
208263-77-8	PCB-3L	70		30-140
234432-86-1	PCB-4L	71	q JH	30-140
208263-67-6	PCB-15L	82		30-140
234432-87-2	PCB-19L	73		30-140
208263-79-0	PCB-37L	51		30-140
234432-88-3	PCB-54L	79		30-140
105600-23-5	PCB-77L	76		30-140
208461-24-9	PCB-81L	80		30-140
234432-89-4	PCB-104L	62	q JH	30-140
208263-62-1	PCB-105L	77		30-140
208263-63-2	PCB-114L	89	q JH	30-140
104130-40-7	PCB-118L	84		30-140
208263-64-3	PCB-123L	82		30-140
208263-65-4	PCB-126L	67	q JH	30-140
234432-90-7	PCB-155L	129		30-140
208263-68-7	PCB-156L	81	C JK	30-140
235416-30-5	PCB-157L	81	C156 JK	30-140
208263-69-8	PCB-167L	95		30-140
208263-70-1	PCB-169L	101		30-140
160901-80-4	PCB-170L	98	q JH	30-140
234432-91-8	PCB-188L	99		30-140
208263-73-4	PCB-189L	85		30-140
105600-26-8	PCB-202L	114		30-140
234446-64-1	PCB-205L	76		30-140
208263-75-6	PCB-206L	95		30-140
234432-92-9	PCB-208L	69		30-140
105600-27-9	PCB-209L	49		30-140

CAS NO.	SURROGATE	%REC	Q	LIMITS
208263-76-7	PCB-28L	68		40-125
235416-29-2	PCB-111L	79		40-125
232919-67-4	PCB-178L	92		40-125

MW 7-16-19

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050108 Lab Sample ID: 140-15383-2

Matrix: Solid Lab File ID: 140-15383-a-2-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 17:10

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.03(g) Date Analyzed: 06/27/2019 16:05

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
2051-60-7	PCB-1	ND		7400	68
2051-61-8	PCB-2	ND		7400	80
2051-62-9	PCB-3	ND		7400	91
13029-08-8	PCB-4	ND		15000	4000
16605-91-7	PCB-5	ND		7400	3600
25569-80-6	PCB-6	ND		7400	3100
33284-50-3	PCB-7	ND		7400	3200
34883-43-7	PCB-8	ND		15000	2900
34883-39-1	PCB-9	ND		7400	3300
33146-45-1	PCB-10	ND		7400	3500
2050-67-1	PCB-11	ND		15000	3100
2974-92-7	PCB-12	ND	C	15000	3200
2974-90-5	PCB-13	ND	C12	15000	3200
34883-41-5	PCB-14	ND		7400	2700
2050-68-2	PCB-15	ND		7400	3600
38444-78-9	PCB-16	ND		7400	310
37680-66-3	PCB-17	ND		7400	280
37680-65-2	PCB-18	ND	C	15000	250
38444-73-4	PCB-19	ND		7400	340
38444-84-7	PCB-20	ND	C	15000	410
55702-46-0	PCB-21	ND	C	15000	400
38444-85-8	PCB-22	ND		7400	420
55720-44-0	PCB-23	ND		7400	420
55702-45-9	PCB-24	ND		7400	230
55712-37-3	PCB-25	ND		7400	380
38444-81-4	PCB-26	ND	C	15000	400
38444-76-7	PCB-27	ND		7400	200
7012-37-5	PCB-28	ND	C20	15000	410
15862-07-4	PCB-29	ND	C26	15000	400
35693-92-6	PCB-30	ND	C18	15000	250
16606-02-3	PCB-31	ND		15000	400
38444-77-8	PCB-32	ND		7400	190
38444-86-9	PCB-33	ND	C21	15000	400
37680-68-5	PCB-34	ND		7400	430

06/28/2019

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050108 Lab Sample ID: 140-15383-2

Matrix: Solid Lab File ID: 140-15383-a-2-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 17:10

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.03(g) Date Analyzed: 06/27/2019 16:05

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
37680-69-6	PCB-35	ND		7400	420
38444-87-0	PCB-36	ND		7400	400
38444-90-5	PCB-37	ND		7400	420
53555-66-1	PCB-38	ND		7400	430
38444-88-1	PCB-39	ND		7400	390
38444-93-8	PCB-40	ND	C	22000	180
52663-59-9	PCB-41	ND	C40	22000	180
36559-22-5	PCB-42	ND		7400	180
70362-46-8	PCB-43	ND	C	15000	160
41464-39-5	PCB-44	ND	C	22000	160
70362-45-7	PCB-45	ND	C	15000	180
41464-47-5	PCB-46	ND		7400	220
2437-79-8	PCB-47	ND	C44	22000	160
70362-47-9	PCB-48	ND		7400	180
41464-40-8	PCB-49	ND	C	15000	140
62796-65-0	PCB-50	ND	C	15000	170
68194-04-7	PCB-51	ND	C45	15000	180
35693-99-3	PCB-52	ND		7400	170
41464-41-9	PCB-53	ND	C50	15000	170
15968-05-5	PCB-54	ND		7400	410
74338-24-2	PCB-55	ND		7400	130
41464-43-1	PCB-56	ND		7400	130
70424-67-8	PCB-57	ND		7400	130
41464-49-7	PCB-58	ND		7400	130
74472-33-6	PCB-59	ND	C	22000	120
33025-41-1	PCB-60	ND		7400	130
33284-53-6	PCB-61	ND	C	29000	120
54230-22-7	PCB-62	ND	C59	22000	120
74472-34-7	PCB-63	ND		7400	120
52663-58-8	PCB-64	ND		7400	120
33284-54-7	PCB-65	ND	C44	22000	160
32598-10-0	PCB-66	ND		7400	120
73575-53-8	PCB-67	ND		7400	110
73575-52-7	PCB-68	ND		7400	110

7/6/19
06/28/2019

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050108 Lab Sample ID: 140-15383-2

Matrix: Solid Lab File ID: 140-15383-a-2-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 17:10

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.03(g) Date Analyzed: 06/27/2019 16:05

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
60233-24-1	PCB-69	ND	C49	15000	140
32598-11-1	PCB-70	ND	C61	29000	120
41464-46-4	PCB-71	ND	C40	22000	180
41464-42-0	PCB-72	ND		7400	130
74338-23-1	PCB-73	ND	C43	15000	160
32690-93-0	PCB-74	ND	C61	29000	120
32598-12-2	PCB-75	ND	C59	22000	120
70362-48-0	PCB-76	ND	C61	29000	120
32598-13-3	PCB-77	3900	J C	7400	110
70362-49-1	PCB-78	ND		7400	130
41464-48-6	PCB-79	ND		7400	110
33284-52-5	PCB-80	ND		7400	110
70362-50-4	PCB-81	ND		7400	130
52663-62-4	PCB-82	3600	J C	7400	280
60145-20-2	PCB-83	ND		15000	250
52663-60-2	PCB-84	ND		7400	280
65510-45-4	PCB-85	4300	J C	22000	200
55312-69-1	PCB-86	ND	C	44000	210
38380-02-8	PCB-87	ND	C86	44000	210
55215-17-3	PCB-88	ND	C	15000	250
73575-57-2	PCB-89	ND		7400	270
68194-07-0	PCB-90	ND	C	22000	210
68194-05-8	PCB-91	ND	C88	15000	250
52663-61-3	PCB-92	ND		7400	240
73575-56-1	PCB-93	ND	C	15000	240
73575-55-0	PCB-94	ND		7400	270
38379-99-6	PCB-95	ND		7400	260
73575-54-9	PCB-96	ND		7400	200
41464-51-1	PCB-97	ND	C86	44000	210
60233-25-2	PCB-98	ND	C	15000	230
38380-01-7	PCB-99	ND	C83	15000	250
39485-83-1	PCB-100	ND	C93	15000	240
37680-73-2	PCB-101	ND	C90	22000	210
68194-06-9	PCB-102	ND	C98	15000	230

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050108 Lab Sample ID: 140-15383-2

Matrix: Solid Lab File ID: 140-15383-a-2-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 17:10

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.03(g) Date Analyzed: 06/27/2019 16:05

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
60145-21-3	PCB-103	ND		7400	240
56558-16-8	PCB-104	ND		7400	180
32598-14-4	PCB-105	ND		7400	1700
70424-69-0	PCB-106	ND		7400	1800
70424-68-9	PCB-107	ND		7400	1900
70362-41-3	PCB-108	ND	C	15000	1800
74472-35-8	PCB-109	ND	C86	44000	210
38380-03-9	PCB-110	ND	C	15000	170
39635-32-0	PCB-111	9900		7400	170
74472-36-9	PCB-112	ND		7400	180
68194-10-5	PCB-113	ND	C90	22000	210
74472-37-0	PCB-114	ND		7400	1800
74472-38-1	PCB-115	ND	C110	15000	170
18259-05-7	PCB-116	4300	J C K C85	22000	200
68194-11-6	PCB-117	4300	J C K C85	22000	200
31508-00-6	PCB-118	7900	C B JH	7400	1700
56558-17-9	PCB-119	ND	C86	44000	210
68194-12-7	PCB-120	ND		7400	170
56558-18-0	PCB-121	ND		7400	180
76842-07-4	PCB-122	ND		7400	2100
65510-44-3	PCB-123	ND		7400	1900
70424-70-3	PCB-124	ND	C108	15000	1800
74472-39-2	PCB-125	ND	C86	44000	210
57465-28-8	PCB-126	ND		7400	1600
39635-33-1	PCB-127	ND		7400	1800
38380-07-3	PCB-128	180000	C B JK	15000	6600
55215-18-4	PCB-129	170000	C B JK	29000	6800
52663-66-8	PCB-130	ND	C	9000	9000
61798-70-7	PCB-131	ND	C	9300	9300
38380-05-1	PCB-132	48000	C JH	8700	8700
35694-04-3	PCB-133	ND	C	8500	8500
52704-70-8	PCB-134	ND	C	15000	8800
52744-13-5	PCB-135	220000	C JK	15000	69

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050108 Lab Sample ID: 140-15383-2

Matrix: Solid Lab File ID: 140-15383-a-2-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 17:10

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.03(g) Date Analyzed: 06/27/2019 16:05

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
38411-22-2	PCB-136	ND		7400	U 49
35694-06-5	PCB-137	ND	G	7600	U 7600
35065-28-2	PCB-138	170000	C129 B JK	29000	6800
56030-56-9	PCB-139	ND	C	15000	U 7500
59291-64-4	PCB-140	ND	C139	15000	U 7500
52712-04-6	PCB-141	73000	G	7900	7900
41411-61-4	PCB-142	ND	G	8400	U 8400
68194-15-0	PCB-143	ND	C134	15000	U 8800
68194-14-9	PCB-144	30000	q JH	7400	62
74472-40-5	PCB-145	ND		7400	U 47
51908-16-8	PCB-146	75000	G	7500	7500
68194-13-8	PCB-147	250000	C JK	15000	8500
74472-41-6	PCB-148	ND		7400	U 66
38380-04-0	PCB-149	250000	C147 JK	15000	8500
68194-08-1	PCB-150	ND		7400	U 45
52663-63-5	PCB-151	220000	q C135 JK	15000	69
68194-09-2	PCB-152	ND		7400	U 48
35065-27-1	PCB-153	740000	C JK	15000	5900
60145-22-4	PCB-154	ND		7400	U 53
33979-03-2	PCB-155	ND		7400	45
38380-08-4	PCB-156	ND	C	15000	6900
69782-90-7	PCB-157	ND	C156	15000	6900
74472-42-7	PCB-158	ND		7400	U 5300
39635-35-3	PCB-159	23000	q B JH	7400	5600
41411-62-5	PCB-160	170000	C129 B JK	29000	6800
74472-43-8	PCB-161	ND		7400	U 5600
39635-34-2	PCB-162	ND		7400	U 5500
74472-44-9	PCB-163	170000	C129 B JK	29000	6800
74472-45-0	PCB-164	ND		7400	U 5900
74472-46-1	PCB-165	ND		7400	U 6400
41411-63-6	PCB-166	180000	C128 B JK	15000	6600

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050108 Lab Sample ID: 140-15383-2

Matrix: Solid Lab File ID: 140-15383-a-2-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 17:10

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.03(g) Date Analyzed: 06/27/2019 16:05

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
52663-72-6	PCB-167	12000	B	7400	4400
59291-65-5	PCB-168	740000	C153 JK	15000	5900
32774-16-6	PCB-169	ND		7400 U	4500
35065-30-6	PCB-170	220000	G B	13000	13000
52663-71-5	PCB-171	38000	q G B	15000	13000
52663-74-8	PCB-172	92000	G B	13000	13000
68194-16-1	PCB-173	38000	q C171 JK B	15000	13000
38411-25-5	PCB-174	950000	G B	12000	12000
40186-70-7	PCB-175	ND	G	12000 U	12000
52663-65-7	PCB-176	69000	G	8900	8900
52663-70-4	PCB-177	300000	G B	12000	12000
52663-67-9	PCB-178	280000	G	13000	13000
52663-64-6	PCB-179	610000	G	9400	9400
35065-29-3	PCB-180	4300000	C B JK	15000	9800
74472-47-2	PCB-181	ND	G	12000 U	12000
60145-23-5	PCB-182	ND	G	11000 U	11000
52663-69-1	PCB-183	1200000	C B JK	15000	11000
74472-48-3	PCB-184	ND	G	9600 U	9600
52712-05-7	PCB-185	1200000	C183 JK B	15000	11000
74472-49-4	PCB-186	ND	G	9300 U	9300
52663-68-0	PCB-187	4200000	G B	11000	11000
74487-85-7	PCB-188	ND	G	8600 U	8600
39635-31-9	PCB-189	19000	q B JH	7400	7000
41411-64-7	PCB-190	110000	G	8500	8500
74472-50-7	PCB-191	ND	G	8800 U	8800
74472-51-8	PCB-192	ND	G	9900 U	9900
69782-91-8	PCB-193	4300000	C180 JK B	15000	9800
35694-08-7	PCB-194	8000000	G B	17000	17000
52663-78-2	PCB-195	1000000	G B	19000	19000
42740-50-1	PCB-196	3300000	G B	8800	8800
33091-17-7	PCB-197	110000		7400	6700
68194-17-2	PCB-198	13000000	G B JK	15000	9000

06/28/2019

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050108 Lab Sample ID: 140-15383-2

Matrix: Solid Lab File ID: 140-15383-a-2-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 17:10

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.03(g) Date Analyzed: 06/27/2019 16:05

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	COMPOUND NAME	RESULT	Q	RL	EDL
52663-75-9	PCB-199	13000000	~~C198~~ B JK	15000	9000
52663-73-7	PCB-200	870000	B	7400	6000
40186-71-8	PCB-201	1100000		7400	6100
2136-99-4	PCB-202	2900000	B	7400	6900
52663-76-0	PCB-203	9100000	G B	8000	8000
74472-52-9	PCB-204	ND		7400	6800
74472-53-0	PCB-205	170000	G q B JH	15000	15000
40186-72-9	PCB-206	13000000	G B	14000	14000
52663-79-3	PCB-207	1400000	G B	11000	11000
52663-77-1	PCB-208	3400000	G B	12000	12000
2051-24-3	PCB-209	1300000	B	7400	3000

FORM I
HI-RES PCBS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins TestAmerica, Knoxville Job No.: 140-15383-1

SDG No.:

Client Sample ID: 19050108 Lab Sample ID: 140-15383-2

Matrix: Solid Lab File ID: 140-15383-a-2-ca.d

Analysis Method: 1668A Date Collected: 05/22/2019 17:10

Extract. Method: HRMS-Sox Date Extracted: 06/20/2019 09:30

Sample wt/vol: 1.03(g) Date Analyzed: 06/27/2019 16:05

Con. Extract Vol.: 50(mL) Dilution Factor: 10

Injection Volume: 2(uL) Level: (low/med) Low

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 31164 Units: ng/g

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
234432-85-0	PCB-1L	70		30-140
208263-77-8	PCB-3L	65		30-140
234432-86-1	PCB-4L	70		30-140
208263-67-6	PCB-15L	76		30-140
234432-87-2	PCB-19L	93		30-140
208263-79-0	PCB-37L	77		30-140
234432-88-3	PCB-54L	91		30-140
105600-23-5	PCB-77L	114		30-140
208461-24-9	PCB-81L	71		30-140
234432-89-4	PCB-104L	95	q	30-140
208263-62-1	PCB-105L	95		30-140
208263-63-2	PCB-114L	75		30-140
104130-40-7	PCB-118L	83		30-140
208263-64-3	PCB-123L	77	q	30-140
208263-65-4	PCB-126L	98		30-140
234432-90-7	PCB-155L	103		30-140
208263-68-7	PCB-156L	78	C	30-140
235416-30-5	PCB-157L	78	C156	30-140
208263-69-8	PCB-167L	86		30-140
208263-70-1	PCB-169L	65	q	30-140
160901-80-4	PCB-170L	94		30-140
234432-91-8	PCB-188L	69		30-140
208263-73-4	PCB-189L	89		30-140
105600-26-8	PCB-202L	71		30-140
234446-64-1	PCB-205L	79		30-140
208263-75-6	PCB-206L	101		30-140
234432-92-9	PCB-208L	91		30-140
105600-27-9	PCB-209L	94	q	30-140

CAS NO.	SURROGATE	%REC	Q	LIMITS
208263-76-7	PCB-28L	77		40-125
235416-29-2	PCB-111L	109		40-125
232919-67-4	PCB-178L	64		40-125