

Data Summary Report, Lake Water in Contact with the Slag Pile, Panhandle Smelting and Refining Company, Ponderay, ID

FINAL



Prepared for: The City of Ponderay EDMS#2023BBE3

August 23, 2023

Prepared by:
Alta Science & Engineering, Inc.
988 S. Longmont Avenue, Suite 200
Boise, Idaho 83706
208-336-7080
alta-se.com


Science & Engineering, Inc.

Contents

Section 1	Introduction.....	1
1.1	Site History	1
1.2	Previous Site Assessments.....	2
Section 2	Field Activities.....	2
2.1	Quality Assurance Project Plan Deviations	2
2.2	Surface Water Sampling	2
Section 3	Data Quality Assurance Evaluation.....	3
3.1	Data Accuracy and Precision	3
3.1.1	Accuracy	3
3.1.2	Precision	4
3.2	Data Sensitivity	4
3.3	Data Usability.....	4
Section 4	Surface Water Sample Results	4
Section 5	References and Resources Used	6

Tables

Table 1.	Surface Water Sample Results	8
----------	------------------------------------	---

Figures

Figure 1.	Surface Water Sampling Locations	7
-----------	--	---

Appendices

Appendix A	Field Sheets.....	A
Appendix B	Photographs	B
Appendix C	Analytical Laboratory Results and Chain-of-Custody Documentation.....	C
Appendix D	QA/QC Memorandum	D

Acronyms and Abbreviations

ABCA	Analysis of Brownfields Cleanup Alternatives
Alta	Alta Science & Engineering, Inc.
APN	Assessor Parcel Number
As	arsenic
BNSF	Burlington Northern and Santa Fe
Cd	cadmium
COC	constituent of concern
DO	dissolved oxygen
DQO	data quality objective
ESA	Environmental Site Assessment
Hg	mercury
HNO ₃	nitric acid
IDEQ	Idaho Department of Environmental Quality
IDAPA	Idaho Administrative Procedures Act
MCL	maximum contaminant level
MDL	method detection limit
MS/MSD	matrix spike/matrix spike duplicate
ORP	oxygen reduction potential
Pace	Pace Analytical
Pb	lead
PSRC	Panhandle Smelting and Refining Company
QA/QC	quality assurance/quality control
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
RL	reporting limit
ROW	right-of-way
RSL	Regional Screening Level
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
Zn	zinc

Units

µm	micrometer
mL	milliliter
mg/L	milligram per Liter

Section 1 Introduction

In September 2019, the City of Ponderay (the City) entered into a Brownfields Multipurpose Cooperative Agreement with the U.S. Environmental Protection Agency (USEPA) to clean up the former Panhandle Smelting and Refining Company (PSRC) (the Site). Because of past smelting activities, the Site soils contain high levels of lead (Pb) and other metals that present potential impacts to human health (e.g., Site users) and the environment.

In preparation for cleanup of the PSRC, the City contracted with Alta Science & Engineering, Inc. (Alta) to address existing data gaps associated with 1) metals concentrations in beach sediments near the slag pile, 2) the potential for metals to leach and/or mobilize from slag material into Lake Pend Oreille, and 3) the geotechnical characteristics of soil in the footprint of a proposed onsite waste repository. Alta conducted Phase II Environmental Site Assessment (ESA) fieldwork for PSRC in March 2023 and completed the *Phase II Environmental Assessment Report for the Panhandle Smelting and Refining Company, Ponderay, Idaho* in May 2023 (Alta 2023a). In the Phase II ESA Report, Alta recommended conducting additional surface water sampling in the summer when the lake is in contact with the slag pile to further evaluate the potential for metals to leach/mobilize from slag material into Lake Pend Oreille. This data summary report documents the results of the June 2023 surface water sampling of Lake water in contact with the slag pile.

1.1 Site History

The former PSRC is located in the City of Ponderay and sits along the shoreline of Lake Pend Oreille. The Burlington Northern Santa Fe (BNSF) right-of-way (ROW) borders the Site to the northwest with vacant forested land to the southwest and northeast. The Lake serves as a boundary to the southeast. The Site consists of five parcels totaling 18.13 acres and is generally located in the Southeast Quarter of Section 11, Township 57 North, Range 2 West, Boise Meridian, Bonner County, within the City of Ponderay, Idaho. The five individual parcel descriptions are:

- Bonner County, Idaho, Assessor Parcel Number (APN) RPP00000118252A; the area of this parcel is 11.2 acres.
- Bonner County, Idaho APN RPP00000117850A; the area of this parcel is 1.65 acres.
- Bonner County, Idaho APN RPP00000118150A; the area of this parcel is 1.04 acres.
- Bonner County, Idaho APN RPP00000118275A; the area of this parcel is 0.89 acres.
- Bonner County, Idaho APN RPP00000117800A; the area of this parcel is 3.35 acres.

The PSRC was developed in 1904 as a Pb/silver smelter for local mines and the first ingots were poured on June 12, 1907. Production continued until legal action stopped the smelter in July 1907. After a retrofit with roasters and other equipment, the smelter started back up on October 20, 1908, and ran sporadically through March 1909. Salvage crews dismantled the plant and scrapped all salvageable materials in December 1922. Not much evidence of previous activities remains at the Site today, except for remnants of the smelter operations, ore and waste piles, and a large slag dump that extends out into the Lake.

Because of past smelting activities, the soil in this area contains high levels of Pb and other metals. Mine wastes at the Site present potential human health impacts to Site users and potential environmental impacts to Lake Pend Oreille. Potential human health and potential impacts to the environment are associated with metals contamination of soils, unprocessed ore, and smelter slag (IDEQ 2009).

1.2 Previous Site Assessments

Numerous Site assessments and an Analysis of Brownfield Cleanup Alternatives (ABCA) were completed for the PSRC between 2010 and 2013. A detailed summary of previous assessments along with a summary of the March 2023 Phase II ESA findings are documented in the *Phase II Environmental Site Assessment for the Panhandle Smelting and Refining Company, Ponderay, Idaho* (Alta 2023a). Additional findings from the May 2023 sediment sampling are summarized in the *Data Summary Report for Shoreline Sediments near the Panhandle Smelting and Refining Company, Ponderay, ID* (Alta 2023b).

Section 2 Field Activities

The following sections describe the field sampling activities that occurred during the June 2023 assessment.

Appendix A includes field sheets. Appendix B includes photographs taken during the sampling activities. Appendix C includes the complete laboratory data sheets and chain-of-custody documentation. Appendix D includes the Site-specific quality assurance/quality control (QA/QC) Memorandum.

2.1 Quality Assurance Project Plan Deviations

Sampling procedures followed the *Site Assessment Quality Assurance Project Plan [QAPP] for the Panhandle Smelting and Refining Company, Ponderay, Idaho* (Alta 2023c).

2.2 Surface Water Sampling

The Alta field crew sampled Lake water from four locations during this assessment. Three sites (PSRC-SW-E-1, PSRC-SW-M-2, and PSRC-SW-W-3) were in contact with the slag pile and the fourth (PSRC-SW-Z3-1) was considered a background/reference sample. Sampling locations are included in Figure 1.

The Alta field crew collected samples using the U.S. Geological Survey (USGS) dip sampling method (USGS 2006). Field personnel stood on shore, taking care not to enter the water or disrupt the Lake bottom and extended the grab sampler into the Lake away from the shore and any areas containing thick aquatic vegetation. The field crew emptied the grab sampler into a decontaminated churn sample splitter. At each sample location, the field crew collected one unfiltered sample and one filtered sample. For unfiltered samples, personnel collected the sample directly from the churn splitter into the sample container. For filtered samples, the field crew transferred water from the churn splitter into a 0.45 micrometer (μm), single-use, Nalgene filter. The field crew used a vacuum pump to hand-filter the sample water, and then transferred the filtered sample water directly into the sample container. The laboratory provided all nitric acid (HNO_3) preserved, 500 milliliter (mL), plastic sample containers. Alta placed all surface water samples in a cooler kept in chilled conditions immediately after collection and held them under chain of custody for shipment.

Immediately following sample collection, the Alta field crew measured physical water quality parameters including specific conductance, temperature, pH, dissolved oxygen (DO), oxygen reduction potential (ORP), and turbidity at each sampling site. The field crew dispensed the remaining portion of the water retrieved with the grab sampler into the measurement cup of a YSI ProDSS multi-parameter water quality probe that the field crew calibrated at the beginning

of the day prior to sampling and after all sampling was complete. Field sheets from each sampling location as well as the field log are included in Appendix A.

Field personnel used gloved hands during sample collection, using single-use nitrile gloves at each sample location. Between sample locations, the field crew decontaminated the grab sampler, churn splitter, and water quality probe using distilled water and Liquinox™/distilled water solution. Prior to exiting the field, the field crew collected a field rinsate blank by pouring distilled water from the churn splitter directly into 1) a pre-preserved sample container for an unfiltered rinsate blank sample and 2) a single-use Nalgene filter then into a second pre-preserved sample container for a filtered rinsate blank sample.

Alta submitted seven samples to Pace Analytical (Pace), in Mt. Juliet, Tennessee, for analysis of total metals, dissolved metals analyzed from the filtered samples, and hardness. Analysis using USEPA Method 6020 (USEPA 1998) for metals included arsenic (As), cadmium (Cd), Pb, and zinc (Zn), while analysis for mercury (Hg) used USEPA Method 7470A (USEPA 1994). Analysis for hardness used USEPA Method 130.1 (USEPA 1971). Field QC samples included a field duplicate, a field matrix spike/matrix spike duplicate (MS/MSD), and a field rinsate blank.

Section 3 Data Quality Assurance Evaluation

Section 5.0 of the QAPP outlines the data quality objectives (DQOs) and criteria (Alta 2023c). Alta's project Quality Assurance Officer (QAO) reviewed field documentation, results of field and laboratory QA/QC samples, and data reported by the laboratory to ensure that the data had been recorded, transmitted, and processed correctly, and to determine that DQOs were met. Appendix C includes the Analytical Laboratory Results and Chain-of-Custody Documentation and Appendix D includes the Site-specific QA/QC Memorandum, which provides a summary of the data validation and data quality assessment performed by Alta.

3.1 Data Accuracy and Precision

Based on this data quality review, Alta determines the laboratory and field data to be of acceptable quality except for the qualifications that are discussed below.

3.1.1 Accuracy

Alta's QAO qualified the following data based on accuracy results (laboratory control sample or MS):

- Sample results where dissolved Hg or total Cd are below the method detection limit (MDL) are qualified as non-detect estimated (UJ) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, PSRC-SW-W-3, PSRC-SW-Z3-1, and PSRC-RB-1) because the laboratory did not source the MS analysis for these analytes from a Site field sample.
- Sample results where detections of total As and total Pb are below the MDL are qualified as non-detect estimated (UJ) (sample PSRC-RB-1) because the laboratory did not source the MS analysis for these analytes from a Site field sample.
- Sample results where detections of total Pb and total Zn are below the MDL are qualified as non-detect estimated (UJ) (sample PSRC-SW-Z3-1) because the laboratory did not source the MS analysis for these analytes from a Site field sample.
- Sample results above the MDL for total metals (As and Pb) are qualified as estimated (J) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, and PSRC-SW-W-3) because the laboratory did not source the MS analysis for these analytes from a Site field sample.

- Sample results above the MDL for total As are qualified as estimated (J) (sample PSRC-SW-Z3-1) because the laboratory did not source the MS analysis for these analytes from a Site field sample.

3.1.2 Precision

Alta's QAO will qualify the following data based on precision results (MSD or field duplicate):

- Sample results where detections of dissolved Hg or total Cd are below the MDL are qualified as non-detect estimated (UJ) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, PSRC-SW-W-3, PSRC-SW-Z3-1, and PSRC-RB-1) because the laboratory did not source the MSD analysis for these analytes from a Site field sample.
- Sample results where detections of total As and total Pb are below the MDL are qualified as non-detect estimated (UJ) (sample PSRC-RB-1) because the laboratory did not source the MSD analysis for these analytes from a Site field sample.
- Sample results where detections of total Pb and total Zn are below the MDL are qualified as non-detect estimated (UJ) (sample PSRC-SW-Z3-1) because the laboratory did not source the MSD analysis for these analytes from a Site field sample.
- Sample results above the MDL for total metals (As and Pb) are qualified as estimated (J) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, and PSRC-SW-W-3) because the laboratory did not source the MSD analysis for these analytes from a Site field sample.
- Sample results above the MDL for total As are qualified as estimated (J) (sample PSRC-SW-Z3-1) because the laboratory did not source the MSD analysis for these analytes from a Site field sample.

3.1.3 Data Sensitivity

Alta utilized method blanks, field blanks, and rinsate blanks to assess sample collection and decontamination methods in the field and laboratory. The following data are qualified based on detections in the method blank sample:

- Total Zn is reported at the reporting limit (RL) and qualified as not detected (U) in samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, PSRC-SW-W-3, and PSRC-RB-1.

It should be noted that one or more sample and/or QC results were flagged "B" by the laboratory to indicate QC parameters that did not meet the laboratory or method QC criteria. These flags are qualitative and do not necessarily indicate that a data validation qualifier should be assigned. Except for "J" flags, laboratory-assigned qualifiers are for informational purposes only. Data validation qualifiers, if assigned, supersede the laboratory-assigned flags.

3.2 Data Usability

The Alta QAO did not reject any sample results out of a possible 44; therefore, according to the QAPP (Alta 2023c), the completeness for this sampling event is calculated at 100%, which meets the DQO of 90%.

Section 4 Surface Water Sample Results

Alta compared surface water sample results for metals to surface water quality criteria from the Idaho Administrative Procedures Act (IDAPA) Water Quality Standards (IDAPA 58.01.02). For the metals for which there are no IDAPA Water Quality Standards, Alta compared the results to

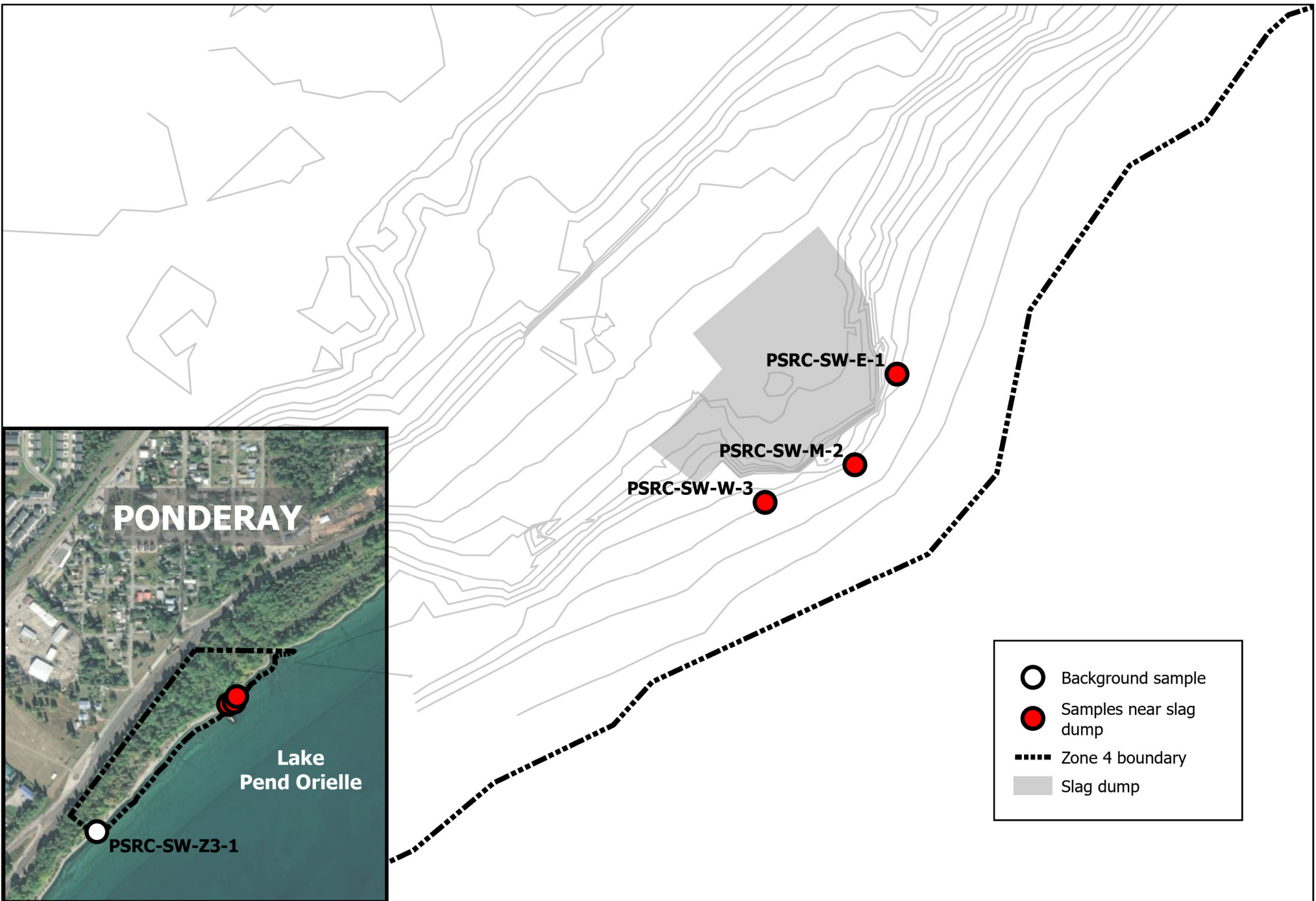
maximum contaminant levels (MCLs) found in the USEPA's Regional Screening Levels (RSLs) for Resident Tapwater table (USEPA 2023). No constituents of concern (COCs) were detected above the surface water quality criteria or MCLs in any of the samples. Table 1 summarizes the surface water sample results (expressed in milligrams per liter [mg/L]). Figure 1 shows the sampling locations.

Total and dissolved As was detected in the three sample locations near the slag pile (PSRC-SW-E-1, PSRC-SW-M-2, PSRC-SW-W-3); however, the concentrations were comparable to that detected in the background/reference sample (PSRC-SW-Z3-1). Total Pb and dissolved Zn were detected in all three sample locations near the slag pile and were not detected in the background/reference sample.

Section 5 References and Resources Used

- Alta Science & Engineering, Inc. (Alta), 2023a. Phase II Environmental Assessment Report for the Panhandle Smelting and Refining Company, Ponderay, Idaho. May.
- Alta, 2023b. Data Summary Report for Shoreline Sediments Near the Panhandle Smelting and Refining Company, Ponderay, ID. July.
- Alta, 2023c. Site Assessment Quality Assurance Project Plan for the Panhandle Smelting and Refining Company, Ponderay, Idaho. Prepared for the City of Ponderay. January 26.
- Idaho Administrative Procedures Act (IDAPA) 58.01.02 – Water Quality Standards.
- Idaho Department of Environmental Quality (IDEQ), 2009. Draft Engineering Evaluation/Cost Analysis Developed for Removal of Smelter Wastes at the Panhandle Smelter, Ponderay, Bonner County, Idaho. May.
- U.S. Environmental Protection Agency (USEPA), 1971. Method 130.1: Hardness, Total (mg/L as CaCO₃) (Colorimetric, Automated EDTA) by Spectrophotometer.
- USEPA, 1994. Method 7470A (SW-846): Mercury in Liquid Waste (Manual Cold-vapor Technique). Revision 1, September.
- USEPA, 1998. Method 6020/6020A; Inductively Coupled Plasma-Mass Spectrometry. Revision 1. January.
- USEPA, 2023. Regional Screening Level Table for Resident Soil. May.
- United States Geological Survey (USGS), 2006. Techniques of Water-Resources Investigations (TWRI), Book 9, Chapter A4, Collection of Water Samples.
- USGS, 2016. Average concentrations of elements in Bonner County, Idaho. Page last modified 20 December 2016. Accessed October 2022 at <https://mrdata.usgs.gov/geochem/county.php?place=f16017&el=Pb&rf=northwestern>

G:\Project_Maps\City of Ponderay\Ponderay Surface Water Sampling DSR\Ponderay Surface Water Sampling DSR.aprx



Alta
Science & Engineering, Inc.

PRINT DATE
July 18, 2023

PROJECT NUMBER
22075

PROJECT MANAGER
S. Weppner

CARTOGRAPHER
A. Ward

1:1,000

0 25 50 Feet

A scale bar showing 0, 25, and 50 feet. To the right is a north arrow pointing upwards.

Figure 1 - Surface Water Sampling Locations

Table 1. Surface Water (SW) Sample Results

Sample ID	Date	Unit	Arsenic (Total)	Arsenic (Dissolved)	Cadmium (Total)	Cadmium (Dissolved)	Lead (Total)	Lead (Dissolved)	Mercury (Total)	Mercury (Dissolved)	Zinc (Total)	Zinc (Dissolved)	Hardness
PSRC-SW-E-1 ††													
Result	6/13/2023	mg/L	0.00108 J	0.00106 J	<0.000150 UJ	<0.000150 U	0.00103 J	<0.000849 U	<0.000100 U	<0.000100 UJ	<0.0250 U	0.00546 J	64.0
Reporting Limit		mg/L	0.00200	0.00200	0.00100	0.00100	0.00200	0.00200	0.000200	0.000200	0.0250	0.0250	30.0
Method Detection Limit		mg/L	0.000180	0.000180	0.000150	0.000150	0.000849	0.000849	0.000100	0.000100	0.00302	0.00302	15.0
PSRC-SW-M-2													
Result	6/13/2023	mg/L	0.00113 J	0.00103 J	<0.000150 UJ	<0.000150 U	0.000996 J	<0.000849 U	<0.000100 U	<0.000100 UJ	<0.0250 U	0.00391 J	61.8
Reporting Limit		mg/L	0.00200	0.00200	0.00100	0.00100	0.00200	0.00200	0.000200	0.000200	0.0250	0.0250	30.0
Method Detection Limit		mg/L	0.000180	0.000180	0.000150	0.000150	0.000849	0.000849	0.000100	0.000100	0.00302	0.00302	15.0
PSRC-SW-W-3													
Result	6/13/2023	mg/L	0.00106 J	0.00108 J	<0.000150 UJ	<0.000150 U	0.00113 J	<0.000849 U	<0.000100 U	<0.000100 UJ	<0.0250 U	0.00455 J	65.7
Reporting Limit		mg/L	0.00200	0.00200	0.00100	0.00100	0.00200	0.00200	0.000200	0.000200	0.0250	0.0250	30.0
Method Detection Limit		mg/L	0.000180	0.000180	0.000150	0.000150	0.000849	0.000849	0.000100	0.000100	0.00302	0.00302	15.0
PSRC-SW-Z3-1													
Result	6/13/2023	mg/L	0.00112 J	0.000991 J	<0.000150 UJ	<0.000150 U	<0.000849 UJ	<0.000849 U	<0.000100 U	<0.000100 UJ	<0.00302 UJ	<0.00302 U	63.0
Reporting Limit		mg/L	0.00200	0.00200	0.00100	0.00100	0.00200	0.00200	0.000200	0.000200	0.0250	0.0250	30.0
Method Detection Limit		mg/L	0.000180	0.000180	0.000150	0.000150	0.000849	0.000849	0.000100	0.000100	0.00302	0.00302	15.0
IDAPA Water Quality Standards¹ - Protection of Aquatic Life		mg/L	0.15 ²	0.15 ²	0.0006 ^{2,3}	0.0006 ^{2,3}	0.0025 ^{2,3}	0.0025 ^{2,3}	0.0003 ⁴	0.0003 ⁴	0.12 ²	0.12 ²	-
IDAPA Water Quality Standards¹ - Protection of Human Health		mg/L	0.01	0.01	-	-	-	-	0.0003 ⁴	0.0003 ⁴	0.87	0.87	-
USEPA RSL Resident Tapwater MCL		mg/L	0.01	0.01	0.005	0.005	0.015	0.015	0.002	0.002	-	-	-
National Secondary Drinking Water⁵		mg/L	-	-	-	-	-	-	-	-	5 ⁵	5 ⁵	-

Notes:

A grey highlighted cell in the "reporting limit" or "method detection limit" row denotes that it is greater than the grey highlighted screening level

Analytical tests for arsenic, cadmium, lead and zinc used USEPA Method 6020. Mercury used USEPA Method 7470A and hardness used USEPA Method 130.1.

USEPA Regional Screening Level (RSL) Resident Tapwater (November 2022); * is maximum contaminant level (MCL); Zinc is noncarcinogenic screening level

¹IDAPA Section 58.01.02.210 - Numeric Criteria for Toxic Substances for Waters Designated for Aquatic Life, Recreation, or Domestic Water Supply Use or USEPA RSL Resident

²Chronic Criteria

³ Aquatic life criteria for these metals are a function of total hardness (mg/L as calcium carbonate), the pollutant's water effect ratio (WER) as defined in Subsection 210.03.c.iii. and multiplied by an appropriate dissolved conversion factor as defined in Subsection 210.02. For comparative purposes only, the example values displayed in this table are shown as dissolved metal and correspond to a total hardness of one hundred (100) mg/L and a water effect ratio of one (1.0).

⁴No aquatic life criterion is adopted for inorganic mercury. The Department believes application of the human health criterion for methylmercury will be protective of aquatic life in most situations.

⁵National Secondary Drinking Water Regulation (IDAPA 58.01.08.050 and 40 CFR Part 141.62)

†† The higher of the duplicate sample is shown

mg/L = milligram per Liter

- = not available

U = not detected above the method detection limit (dissolved arsenic, cadmium, lead, and zinc; total mercury; and hardness) or above the reporting limit (total zinc based on internal data validation).

J = concentration is an estimate

UJ = estimated non-detect concentration based on internal data validation

Appendix A
Field Sheets

SURFACE WATER SAMPLING RECORD

PROJECT: PSRC PONDERA Y	STATION NAME: PSRC-SW-E-1
PROJECT NUMBER: 22075-30-30	SAMPLE NUMBER: PSRC -SW-E-1
LOCATION: EAST END OF SLAG PILE	WEATHER: HAZY, NOWWD, 65°F
DATE: 6/13/23 TIME: 06:30	SAMPLERS: TJ

WATER QUALITY PARAMETERS

pH	Temperature (°C)	S.C. (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)	Turbidity (NTU)
8.43	21.7	143.0	830	102.0	288.1	0.47

SAMPLES

Analytes	Total Metals	Dissolved Metals+Hardness		
Sample ID	PSRC-SW-E-1	PSRC-SW-E-1		
Time	6:40	6:40		
Preservative	HNO₃	HNO₃		
Filtered?	No	Yes		
Container	250 mL Poly	250 mL Poly		

QC Analytes	Total Metals	Dissolved Metals+Hardness		
Sample ID	PSRC-SW-E-1-FD	PSRC-SW-E-1		
Time	6:40	6:40		
Preservative	HNO₃	HNO₃		
Filtered?	No	Yes		
Container	250 mL Poly	250 mL Poly		

Stream bank Description: **SLAG**
 Water Flow Type (circle one): Laminar **Stagnant** Turbulent Other(describe):
 Stream-bed Description: **SLAG**
 Water Quality Description (i.e. cloudy, odor, etc.): **CLEAR**

FLOW MEASUREMENTS: **NA**
 Area (ft²): Velocity (ft/sec): Discharge (Q) (cfs):

NOTES/DEVIATIONS/OBSERVATIONS: **DUP: PSRC-SW-E-1-FD**

[De-Ionized Water Date: **10/12/22**]
 Picture Log:
 Expendable Supplies Used: **NALGENE**



Science & Engineering, Inc.

SURFACE WATER SAMPLING RECORD

PROJECT: PSRC Ponderay	STATION NAME: PSRC-SW-M-2
PROJECT NUMBER: 22075-30-30	SAMPLE NUMBER: PSRC-SW-M-2
LOCATION: CENTRAL SLAG PILE TOE	WEATHER: HAZY, NO WIND, 65°F
DATE: 6/13/23 TIME:	SAMPLERS: TJ

WATER QUALITY PARAMETERS

pH	Temperature (°C)	S.C. (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)	Turbidity (NTU)
8.46	21.6	143.5	8.30	101.6	271.8	0.36

SAMPLES

Analytes	Total Metals	Dissolved Metals+Hardness		
Sample ID	PSRC-SW-M-2	PSRC-SW-M-2		
Time	07:15	07:15		
Preservative	HNO₃	HNO₃		
Filtered?	No	Yes		
Container	250 mL Poly	250 mL Poly		

QC Analytes	Total Metals	Dissolved Metals+Hardness		
Sample ID	PSRC-FB-1	PSRC-FB-1		
Time	07:00	07:00		
Preservative	HNO₃	HNO₃		
Filtered?	No	Yes		
Container	250 mL Poly	250 mL Poly		

Stream bank Description: SLAG
 Water Flow Type (circle one): Laminar ~~Stagnant~~ Turbulent Other(describe):
 Stream-bed Description: SLAG
 Water Quality Description (i.e. cloudy, odor, etc.): CLEAR

FLOW MEASUREMENTS: **NA**
 Area (ft²): Velocity (ft/sec): Discharge (Q) (cfs):

NOTES/DEVIATIONS/OBSERVATIONS:

[De-Ionized Water Date: 10/12/22]

Picture Log:

Expendable Supplies Used: **NALGENES STANDARD FILTER**



SURFACE WATER SAMPLING RECORD

PROJECT: PSRC PONDERAY	STATION NAME: PSRC-SW-W-3
PROJECT NUMBER: 22075-30-30	SAMPLE NUMBER: PSRC-SW-W-3
LOCATION: WEST END SLAG PILE	WEATHER: HAZY, NO WIND, 72°F
DATE: 6/13/23 TIME: 07:50	SAMPLERS: TJ

WATER QUALITY PARAMETERS

pH	Temperature (°C)	S.C. (µ S/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)	Turbidity (NTU)
8.51	22.4	142.8	8.51	106.0	251.5	0.29

SAMPLES

Analytes	Total Metals	Dissolved Metals+Hardness		
Sample ID	PSRC-SW-W-3	PSRC-SW-W-3		
Time	8:15	8:15		
Preservative	HNO₃	HNO₃		
Filtered?	No	Yes		
Container	250 mL Poly	250 mL Poly		

QC Analytes	Total Metals	Dissolved Metals+Hardness		
Sample ID	PSRC-RB-1	PSRC-RB-1		
Time	11:40	11:40		
Preservative	HNO₃	HNO₃		
Filtered?	No	Yes		
Container	250 mL Poly	250 mL Poly		

Stream bank Description: SLAG
 Water Flow Type (circle one): Laminar Stagnant Turbulent Other(describe):
 Stream-bed Description: SLAG
 Water Quality Description (i.e. cloudy, odor, etc.): CLEAR

FLOW MEASUREMENTS: **NA**
 Area (ft²): Velocity (ft/sec): Discharge (Q) (cfs):

NOTES/DEVIATIONS/OBSERVATIONS:

[De-Ionized Water Date: _____]
 Picture Log:
 Expendable Supplies Used:

SURFACE WATER SAMPLING RECORD

PROJECT: <u>PSRC Ponderay</u>	STATION NAME: <u>PSRC-SW-Z3-1</u>
PROJECT NUMBER: <u>22075-30-30</u>	SAMPLE NUMBER: <u>PSRC-SW-Z3-1</u>
LOCATION: <u>Z3+Z4 BOUNDARY</u>	WEATHER: <u>HAZY, NO WIND, 80°F</u>
DATE: <u>6/13/23</u> TIME: <u>08:30</u>	SAMPLERS: <u>TJ</u>

WATER QUALITY PARAMETERS

pH	Temperature (°C)	S.C. (µS/cm)	D.O. (mg/l)	D.O. (% Sat)	ORP (mV)	Turbidity (NTU)
<u>8.13</u>	<u>22.6</u>	<u>141.0</u>	<u>8.87</u>	<u>111.0</u>	<u>196.5</u>	<u>0.19</u>

SAMPLES

Analytes	Total Metals	Dissolved Metals+Hardness	
Sample ID	<u>PSRC-SW-Z3-1</u>	<u>PSRC-SW-Z3-1</u>	<u>X2 FOR MS/MSD</u>
Time	<u>8:45</u>	<u>8:45</u>	
Preservative	<u>HNO₃</u>	<u>HNO₃</u>	
Filtered?	<u>No</u>	<u>Yes</u>	
Container	<u>250 mL Poly</u>	<u>250 mL Poly</u>	

QC Analytes	Total Metals	Dissolved Metals+Hardness	
Sample ID	<u>PSRC-RB-1</u>	<u>PSRC-RB-1</u>	
Time			
Preservative	<u>HNO₃</u>	<u>HNO₃</u>	
Filtered?	<u>No</u>	<u>Yes</u>	
Container	<u>250 mL Poly</u>	<u>250 mL Poly</u>	

Stream bank Description: RIP RAP
 Water Flow Type (circle one): Laminar ~~Stagnant~~ Turbulent Other(describe):
 Stream-bed Description: SAND + ROCK (RIP RAP)
 Water Quality Description (i.e. cloudy, odor, etc.): CLEAR

FLOW MEASUREMENTS: NA
 Area (ft²): Velocity (ft/sec): Discharge (Q) (cfs):

NOTES/DEVIATIONS/OBSERVATIONS: MS/MSD

[De-Ionized Water Date: 10/12/22]
 Picture Log:
 Expendable Supplies Used: NALGENE STANDARD FILTER

Appendix B
Photographs

Photo 1



PSRC-SW-W-1 sampling location facing northeast

Photo 2



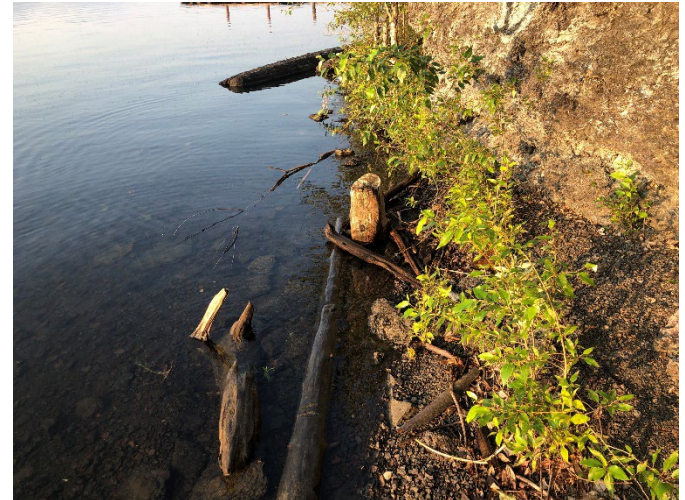
View of PSRC-SW-M-1 location from above standing on the slag pile

Photo 3



PSRC-SW-E-1 sampling location facing northeast

Photo 4



PSRC-SW-E-1 sampling location facing southwest

Photo 5



Pole grab sampler utilized to collect surface water samples.

Photo 6



Churn splitter used for pouring sample water into for transfer to lab bottles

Photo 7



Standard Nalgene filter for dissolved metals samples

Photo 8



PSRC-SW-Z3-1 sample location facing north



PRINT DATE:
July 6, 2023

PROJECT NUMBER:
22075-70

PROJECT MANAGER:
Sarah Weppner

CREATED BY:
Tom Jenkins

PROJECT NAME:
City of Ponderay –
Ponderay Brownfields
Cleanup

APPENDIX A, PHOTO LOG

Data Summary Report
Surface Water Sampling

Photo 9



View of PSRC-SW-Z3-1 sample location facing east

Appendix C
Analytical Laboratory Results and Chain-of-Custody Documentation

Alta Science & Engineering, Inc

Sample Delivery Group: L1626953
Samples Received: 06/16/2023
Project Number: 22075-30-30
Description: Panhandle Smelting and Refining Company
Site: 22075
Report To: Shelley Hicks
988 South Longmont Ave., Suite 200
Boise, ID 83706

Entire Report Reviewed By:



Jason Romer
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

Cp: Cover Page	1	1 Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	2 Tc
Cn: Case Narrative	5	
Sr: Sample Results	6	3 Ss
PSRC-SW-E-1 L1626953-01	6	
PSRC-SW-E-1-FD L1626953-02	7	4 Cn
PSRC-SW-M-2 L1626953-03	8	5 Sr
PSRC-FB-1 L1626953-04	9	
PSRC-SW-W-3 L1626953-05	10	6 Qc
PSRC-SW-Z3-1 L1626953-06	11	
PSRC-RB-1 L1626953-07	12	7 Gl
Qc: Quality Control Summary	13	8 Al
Wet Chemistry by Method 130.1	13	
Mercury by Method 7470A	15	
Metals (ICPMS) by Method 6020	18	9 Sc
Gl: Glossary of Terms	20	
Al: Accreditations & Locations	21	
Sc: Sample Chain of Custody	22	

SAMPLE SUMMARY

PSRC-SW-E-1 L1626953-01 GW

Collected by Tom Jenkins Collected date/time 06/13/23 06:40 Received date/time 06/16/23 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG2078536	1	06/20/23 18:00	06/21/23 17:03	AEC	Mt. Juliet, TN
Mercury by Method 7470A	WG2080604	1	06/29/23 11:22	06/30/23 10:42	LAS	Mt. Juliet, TN
Mercury by Method 7470A	WG2080607	1	07/01/23 11:55	07/02/23 09:26	NDL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080493	1	06/21/23 07:29	06/22/23 15:29	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080518	1	06/21/23 10:09	06/21/23 15:27	JPD	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

4 Cn

PSRC-SW-E-1-FD L1626953-02 GW

Collected by Tom Jenkins Collected date/time 06/13/23 06:40 Received date/time 06/16/23 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG2078536	1	06/20/23 18:00	06/21/23 17:04	AEC	Mt. Juliet, TN
Mercury by Method 7470A	WG2080604	1	06/29/23 11:22	06/30/23 09:45	LAS	Mt. Juliet, TN
Mercury by Method 7470A	WG2080607	1	07/01/23 11:55	07/02/23 09:28	NDL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080493	1	06/21/23 07:29	06/22/23 15:32	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080518	1	06/21/23 10:09	06/21/23 15:30	JPD	Mt. Juliet, TN

5 Sr

6 Qc

7 Gl

8 Al

PSRC-SW-M-2 L1626953-03 GW

Collected by Tom Jenkins Collected date/time 06/13/23 07:15 Received date/time 06/16/23 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG2078536	1	06/20/23 18:00	06/21/23 17:05	AEC	Mt. Juliet, TN
Mercury by Method 7470A	WG2080607	1	07/01/23 11:55	07/02/23 09:34	NDL	Mt. Juliet, TN
Mercury by Method 7470A	WG2081401	1	07/01/23 11:43	07/02/23 11:12	NDL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080493	1	06/21/23 07:29	06/22/23 15:36	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080518	1	06/21/23 10:09	06/21/23 15:40	JPD	Mt. Juliet, TN

9 Sc

PSRC-FB-1 L1626953-04 GW

Collected by Tom Jenkins Collected date/time 06/13/23 07:00 Received date/time 06/16/23 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG2078536	1	06/20/23 18:00	06/21/23 17:05	AEC	Mt. Juliet, TN
Mercury by Method 7470A	WG2080607	1	07/01/23 11:55	07/02/23 08:51	NDL	Mt. Juliet, TN
Mercury by Method 7470A	WG2081401	1	07/01/23 11:43	07/02/23 11:14	NDL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080493	1	06/21/23 07:29	06/22/23 15:39	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080518	1	06/21/23 10:09	06/21/23 15:43	JPD	Mt. Juliet, TN

PSRC-SW-W-3 L1626953-05 GW

Collected by Tom Jenkins Collected date/time 06/13/23 08:15 Received date/time 06/16/23 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG2078536	1	06/20/23 18:00	06/21/23 17:08	AEC	Mt. Juliet, TN
Mercury by Method 7470A	WG2080607	1	07/01/23 11:55	07/02/23 09:36	NDL	Mt. Juliet, TN
Mercury by Method 7470A	WG2081401	1	07/01/23 11:43	07/02/23 11:16	NDL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080493	1	06/21/23 07:29	06/22/23 15:56	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080518	1	06/21/23 10:09	06/21/23 15:47	JPD	Mt. Juliet, TN

SAMPLE SUMMARY

PSRC-SW-Z3-1 L1626953-06 GW

Collected by: Tom Jenkins
 Collected date/time: 06/13/23 08:45
 Received date/time: 06/16/23 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG2078536	1	06/20/23 18:00	06/21/23 17:09	AEC	Mt. Juliet, TN
Mercury by Method 7470A	WG2080607	1	07/01/23 11:55	07/02/23 09:38	NDL	Mt. Juliet, TN
Mercury by Method 7470A	WG2081401	1	07/01/23 11:43	07/02/23 11:18	NDL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080493	1	06/21/23 07:29	06/22/23 15:16	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080518	1	06/21/23 10:09	06/21/23 15:50	JPD	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

⁴ Cn

PSRC-RB-1 L1626953-07 GW

Collected by: Tom Jenkins
 Collected date/time: 06/13/23 11:40
 Received date/time: 06/16/23 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG2078536	1	06/20/23 18:00	06/21/23 17:13	AEC	Mt. Juliet, TN
Mercury by Method 7470A	WG2080607	1	07/01/23 11:55	07/02/23 09:40	NDL	Mt. Juliet, TN
Mercury by Method 7470A	WG2081401	1	07/01/23 11:43	07/02/23 11:20	NDL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080493	1	06/21/23 07:29	06/22/23 15:59	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2080518	1	06/21/23 10:09	06/21/23 14:15	JPD	Mt. Juliet, TN

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Jason Romer
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	64.0		15.0	30.0	1	06/21/2023 17:03	WG2078536

Mercury by Method 7470A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Mercury	U		0.000100	0.000200	1	06/30/2023 10:42	WG2080604
Mercury,Dissolved	U		0.000100	0.000200	1	07/02/2023 09:26	WG2080607

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Arsenic	0.00108	J	0.000180	0.00200	1	06/21/2023 15:27	WG2080518
Arsenic,Dissolved	0.00106	J	0.000180	0.00200	1	06/22/2023 15:29	WG2080493
Cadmium	U		0.000150	0.00100	1	06/21/2023 15:27	WG2080518
Cadmium,Dissolved	U		0.000150	0.00100	1	06/22/2023 15:29	WG2080493
Lead	0.000966	J	0.000849	0.00200	1	06/21/2023 15:27	WG2080518
Lead,Dissolved	U		0.000849	0.00200	1	06/22/2023 15:29	WG2080493
Zinc	0.00485	B J	0.00302	0.0250	1	06/21/2023 15:27	WG2080518
Zinc,Dissolved	0.00546	J	0.00302	0.0250	1	06/22/2023 15:29	WG2080493

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	63.7		15.0	30.0	1	06/21/2023 17:04	WG2078536

1 Cp

2 Tc

Mercury by Method 7470A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Mercury	U		0.000100	0.000200	1	06/30/2023 09:45	WG2080604
Mercury,Dissolved	U		0.000100	0.000200	1	07/02/2023 09:28	WG2080607

3 Ss

4 Cn

5 Sr

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Arsenic	0.00104	J	0.000180	0.00200	1	06/21/2023 15:30	WG2080518
Arsenic,Dissolved	0.00105	J	0.000180	0.00200	1	06/22/2023 15:32	WG2080493
Cadmium	U		0.000150	0.00100	1	06/21/2023 15:30	WG2080518
Cadmium,Dissolved	U		0.000150	0.00100	1	06/22/2023 15:32	WG2080493
Lead	0.00103	J	0.000849	0.00200	1	06/21/2023 15:30	WG2080518
Lead,Dissolved	U		0.000849	0.00200	1	06/22/2023 15:32	WG2080493
Zinc	0.00497	B J	0.00302	0.0250	1	06/21/2023 15:30	WG2080518
Zinc,Dissolved	0.00432	J	0.00302	0.0250	1	06/22/2023 15:32	WG2080493

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	61.8		15.0	30.0	1	06/21/2023 17:05	WG2078536

Mercury by Method 7470A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Mercury	U		0.000100	0.000200	1	07/02/2023 11:12	WG2081401
Mercury,Dissolved	U		0.000100	0.000200	1	07/02/2023 09:34	WG2080607

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Arsenic	0.00113	J	0.000180	0.00200	1	06/21/2023 15:40	WG2080518
Arsenic,Dissolved	0.00103	J	0.000180	0.00200	1	06/22/2023 15:36	WG2080493
Cadmium	U		0.000150	0.00100	1	06/21/2023 15:40	WG2080518
Cadmium,Dissolved	U		0.000150	0.00100	1	06/22/2023 15:36	WG2080493
Lead	0.000996	J	0.000849	0.00200	1	06/21/2023 15:40	WG2080518
Lead,Dissolved	U		0.000849	0.00200	1	06/22/2023 15:36	WG2080493
Zinc	0.00489	B J	0.00302	0.0250	1	06/21/2023 15:40	WG2080518
Zinc,Dissolved	0.00391	J	0.00302	0.0250	1	06/22/2023 15:36	WG2080493

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	U		15.0	30.0	1	06/21/2023 17:05	WG2078536

Mercury by Method 7470A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Mercury	U		0.000100	0.000200	1	07/02/2023 11:14	WG2081401
Mercury,Dissolved	U		0.000100	0.000200	1	07/02/2023 08:51	WG2080607

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Arsenic	U		0.000180	0.00200	1	06/21/2023 15:43	WG2080518
Arsenic,Dissolved	U		0.000180	0.00200	1	06/22/2023 15:39	WG2080493
Cadmium	U		0.000150	0.00100	1	06/21/2023 15:43	WG2080518
Cadmium,Dissolved	U		0.000150	0.00100	1	06/22/2023 15:39	WG2080493
Lead	U		0.000849	0.00200	1	06/21/2023 15:43	WG2080518
Lead,Dissolved	U		0.000849	0.00200	1	06/22/2023 15:39	WG2080493
Zinc	U		0.00302	0.0250	1	06/21/2023 15:43	WG2080518
Zinc,Dissolved	U		0.00302	0.0250	1	06/22/2023 15:39	WG2080493

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	65.7		15.0	30.0	1	06/21/2023 17:08	WG2078536

Mercury by Method 7470A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Mercury	U		0.000100	0.000200	1	07/02/2023 11:16	WG2081401
Mercury,Dissolved	U		0.000100	0.000200	1	07/02/2023 09:36	WG2080607

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Arsenic	0.00106	J	0.000180	0.00200	1	06/21/2023 15:47	WG2080518
Arsenic,Dissolved	0.00108	J	0.000180	0.00200	1	06/22/2023 15:56	WG2080493
Cadmium	U		0.000150	0.00100	1	06/21/2023 15:47	WG2080518
Cadmium,Dissolved	U		0.000150	0.00100	1	06/22/2023 15:56	WG2080493
Lead	0.00113	J	0.000849	0.00200	1	06/21/2023 15:47	WG2080518
Lead,Dissolved	U		0.000849	0.00200	1	06/22/2023 15:56	WG2080493
Zinc	0.00327	B J	0.00302	0.0250	1	06/21/2023 15:47	WG2080518
Zinc,Dissolved	0.00455	J	0.00302	0.0250	1	06/22/2023 15:56	WG2080493

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	63.0		15.0	30.0	1	06/21/2023 17:09	WG2078536

1 Cp

2 Tc

Mercury by Method 7470A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Mercury	U		0.000100	0.000200	1	07/02/2023 11:18	WG2081401
Mercury,Dissolved	U		0.000100	0.000200	1	07/02/2023 09:38	WG2080607

3 Ss

4 Cn

5 Sr

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Arsenic	0.00112	J	0.000180	0.00200	1	06/21/2023 15:50	WG2080518
Arsenic,Dissolved	0.000991	J	0.000180	0.00200	1	06/22/2023 15:16	WG2080493
Cadmium	U		0.000150	0.00100	1	06/21/2023 15:50	WG2080518
Cadmium,Dissolved	U		0.000150	0.00100	1	06/22/2023 15:16	WG2080493
Lead	U		0.000849	0.00200	1	06/21/2023 15:50	WG2080518
Lead,Dissolved	U		0.000849	0.00200	1	06/22/2023 15:16	WG2080493
Zinc	U		0.00302	0.0250	1	06/21/2023 15:50	WG2080518
Zinc,Dissolved	U		0.00302	0.0250	1	06/22/2023 15:16	WG2080493

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	U		15.0	30.0	1	06/21/2023 17:13	WG2078536

Mercury by Method 7470A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Mercury	U		0.000100	0.000200	1	07/02/2023 11:20	WG2081401
Mercury,Dissolved	U		0.000100	0.000200	1	07/02/2023 09:40	WG2080607

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis date / time	Batch
Arsenic	U		0.000180	0.00200	1	06/21/2023 14:15	WG2080518
Arsenic,Dissolved	U		0.000180	0.00200	1	06/22/2023 15:59	WG2080493
Cadmium	U		0.000150	0.00100	1	06/21/2023 14:15	WG2080518
Cadmium,Dissolved	U		0.000150	0.00100	1	06/22/2023 15:59	WG2080493
Lead	U		0.000849	0.00200	1	06/21/2023 14:15	WG2080518
Lead,Dissolved	U		0.000849	0.00200	1	06/22/2023 15:59	WG2080493
Zinc	0.00661	B J	0.00302	0.0250	1	06/21/2023 14:15	WG2080518
Zinc,Dissolved	U		0.00302	0.0250	1	06/22/2023 15:59	WG2080493

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3939679-1 06/21/23 16:57

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hardness (colorimetric) as CaCO3	U		15.0	30.0

L1626585-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1626585-01 06/21/23 17:00 • (DUP) R3939679-3 06/21/23 17:01

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness (colorimetric) as CaCO3	U	U	1	0.000		20

L1626953-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1626953-06 06/21/23 17:09 • (DUP) R3939679-5 06/21/23 17:10

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness (colorimetric) as CaCO3	63.0	63.2	1	0.317		20

Laboratory Control Sample (LCS)

(LCS) R3939679-2 06/21/23 16:58

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Hardness (colorimetric) as CaCO3	100	99.8	99.8	85.0-115	

L1626585-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1626585-01 06/21/23 17:00 • (MS) R3939679-4 06/21/23 17:02

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Hardness (colorimetric) as CaCO3	100	U	107	107	1	80.0-120	

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L1626953-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1626953-06 06/21/23 17:09 • (MS) R3939679-6 06/21/23 17:11 • (MSD) R3939679-7 06/21/23 17:12

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	100	63.0	164	165	101	102	1	80.0-120			0.608	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3943370-1 06/30/23 09:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.000100	0.000200

Laboratory Control Sample (LCS)

(LCS) R3943370-2 06/30/23 09:43

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Mercury	0.00300	0.00285	95.1	80.0-120	

L1626953-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1626953-02 06/30/23 09:45 • (MS) R3943370-3 06/30/23 09:47 • (MSD) R3943370-4 06/30/23 09:49

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.00300	U	0.00302	0.00286	101	95.3	1	75.0-125			5.53	20

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3943890-1 07/02/23 08:47

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury,Dissolved	U		0.000100	0.000200

Laboratory Control Sample (LCS)

(LCS) R3943890-2 07/02/23 08:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Mercury,Dissolved	0.00300	0.00330	110	80.0-120	

L1626953-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1626953-04 07/02/23 08:51 • (MS) R3943890-3 07/02/23 08:53 • (MSD) R3943890-4 07/02/23 08:55

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury,Dissolved	0.00300	U	0.00315	0.00324	105	108	1	75.0-125			2.73	20

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3943892-1 07/02/23 10:37

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Mercury	U		0.000100	0.000200

Laboratory Control Sample (LCS)

(LCS) R3943892-2 07/02/23 10:39

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Mercury	0.00300	0.00313	104	80.0-120	

L1626822-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1626822-05 07/02/23 10:41 • (MS) R3943892-3 07/02/23 10:47 • (MSD) R3943892-4 07/02/23 10:49

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Mercury	0.00300	U	0.00328	0.00313	109	104	1	75.0-125			4.60	20

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Method Blank (MB)

(MB) R3940241-1 06/22/23 15:09

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Arsenic,Dissolved	U		0.000180	0.00200
Cadmium,Dissolved	U		0.000150	0.00100
Lead,Dissolved	U		0.000849	0.00200
Zinc,Dissolved	U		0.00302	0.0250

Laboratory Control Sample (LCS)

(LCS) R3940241-2 06/22/23 15:13

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic,Dissolved	0.0500	0.0542	108	80.0-120	
Cadmium,Dissolved	0.0500	0.0540	108	80.0-120	
Lead,Dissolved	0.0500	0.0522	104	80.0-120	
Zinc,Dissolved	0.0500	0.0521	104	80.0-120	

L1626953-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1626953-06 06/22/23 15:16 • (MS) R3940241-4 06/22/23 15:22 • (MSD) R3940241-5 06/22/23 15:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Arsenic,Dissolved	0.0500	0.000991	0.0532	0.0519	104	102	1	75.0-125			2.49	20
Cadmium,Dissolved	0.0500	U	0.0511	0.0520	102	104	1	75.0-125			1.80	20
Lead,Dissolved	0.0500	U	0.0498	0.0504	99.6	101	1	75.0-125			1.19	20
Zinc,Dissolved	0.0500	U	0.0525	0.0501	105	100	1	75.0-125			4.69	20

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3939602-1 06/21/23 14:09

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Arsenic	U		0.000180	0.00200
Cadmium	U		0.000150	0.00100
Lead	U		0.000849	0.00200
Zinc	0.00343	↓	0.00302	0.0250

Laboratory Control Sample (LCS)

(LCS) R3939602-2 06/21/23 14:12

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	0.0500	0.0573	115	80.0-120	
Cadmium	0.0500	0.0575	115	80.0-120	
Lead	0.0500	0.0571	114	80.0-120	
Zinc	0.0500	0.0564	113	80.0-120	

L1626953-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1626953-07 06/21/23 14:15 • (MS) R3939602-4 06/21/23 14:22 • (MSD) R3939602-5 06/21/23 14:25

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Arsenic	0.0500	U	0.0521	0.0529	104	106	1	75.0-125			1.64	20
Cadmium	0.0500	U	0.0525	0.0531	105	106	1	75.0-125			1.17	20
Lead	0.0500	U	0.0535	0.0523	107	105	1	75.0-125			2.36	20
Zinc	0.0500	0.00661	0.0530	0.0505	92.8	87.7	1	75.0-125			4.99	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

ACCREDITATIONS & LOCATIONS

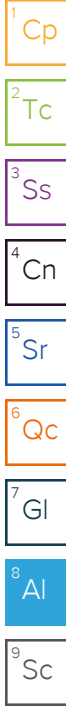
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



Company Name/Address:

Alta Science & Engineering, Inc

988 South Longmont Ave., Suite 200
Boise, ID 83706

Billing Information:

Accounting
220 East 5th Street, Suite 325
Moscow, ID 83843

Pres
Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1



MT JULIET, TN

12065 Lebanon Rd Mount Juliet, TN 37122
Submitting a sample via this chain of custody
constitutes acknowledgment and acceptance of the
Pace Terms and Conditions found at:
https://info.pacelabs.com/hubs/pas-standard-terms.pdf

SDG # **L1626953**
G165

Accnum: **ALTASCIBID**

Template: **T224437**

Prelogin: **P979909**

PM: **841 - Kelly Mercer**

PB: **02/10/23**

Shipped Via: **FedEX Ground**

Remarks Sample # (lab only)

Report to:
Shelley Hicks

Email To: sarah.weppner@alta-se.com; shelley.hicks@alta-se.com

Project Description:
Panhandle Smelting and Refining Company

City/State Collected: **PONDERAY, ID**

Please Circle:
 PT MT CT ET

Phone: **208-336-7080**

Client Project #
22075-30-30

Lab Project #
ALTASCIBID-PONDERAY

Collected by (print):
TOM JENKINS

Site/Facility ID #
22075

P.O. #
22075

Collected by (signature):
Thomas Jenkins

Rush? (Lab MUST Be Notified)
 Same Day Five Day
 Next Day 5 Day (Rad Only)
 Two Day 10 Day (Rad Only)
 Three Day

Quote #
22075
Date Results Needed
NORMAL

No. of
Cntrs

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Alkalinity 1L-HDPE NoPres	Anions (Ca,K,Mg,Na) 250mlHDPE-HNO3	Chloride,Sulfate,pH 250mlHDPE-NoPres	Diss Pb,Cd,Zn,As,Hg 250mlHDPE-HNO3	Pb,Cd,Zn,As,Hg, Hard 250mlHDPE-HNO3							
PSRC-SW-E-1	GRAB	GW	-	6/13/23	6:40	2												
PSRC-SW-E-1-FD	GRAB	GW	-	6/13/23	6:40	2												-01
PSRC-SW-M-2	GRAB	GW	-	6/13/23	7:15	2												-02
PSRC-FB-1	GRAB	GW	-	6/13/23	7:00	2												-03
PSRC-SW-W-3	GRAB	GW	-	6/13/23	8:15	2												-04
PSRC-SW-Z3-1	GRAB	GW	-	6/13/23	8:45	2												-05
PSRC-RB-1	GRAB	GW	-	6/13/23	11:40	2												-06
																		-07

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other

Remarks: **DISSOLVED METALS SAMPLES FILTERED**
- PLEASE RUN SITE SPECIFIC MS/MSD FROM PSRC-SW-Z3-1

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
 UPS FedEx Courier

Tracking # **6351 9918 1540**

Sample Receipt Checklist	
COC Seal Present/Intact:	<input checked="" type="checkbox"/> NP <input type="checkbox"/> Y <input type="checkbox"/> N
COC Signed/Accurate:	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
Bottles arrive intact:	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
Correct bottles used:	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
Sufficient volume sent:	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
If Applicable	
VOA Zero Headspace:	<input type="checkbox"/> Y <input type="checkbox"/> N
Preservation Correct/Checked:	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
RAD Screen <0.5 mR/hr:	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N

Relinquished by: (Signature)
Thomas Jenkins

Date: **6/15/23** Time: **15:00**

Received by: (Signature)

Trip Blank Received: Yes / No
HCL/MeOH
TBR

Relinquished by: (Signature)

Date: _____ Time: _____

Received by: (Signature)

Temp: **60.15°C** Bottles Received: **16**
0.150 = 0.1

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date: _____ Time: _____

Received for lab by: (Signature)
Caleb Tapp

Date: **6/16/23** Time: **09:15**

PH-10BDH4321 TRC-2141141
CR6-20221V

Condition:
NCF / OK

Appendix D
QA/QC Memorandum

INTERNAL MEMORANDUM

To: Derek Forseth, Project Manager
Sarah Weppner, Quality Assurance Officer

From: Allison Marshall, Data Validator
Rachel Gibeault, Data Validator

Date: July 25, 2023

Contract No./Title: City of Ponderay / Task Order No. 1

Alta Project No.: 22075

Subject: **QA/QC Review of the June 2023 Sampling Event at the Panhandle Smelting and Refining Company Site**

1 Introduction

This memorandum provides a summary of the data validation and data quality assessment performed on the sample results for the surface water sampling effort that occurred on June 13, 2023, at the Panhandle Smelting and Refining Company (PSRC) Site located on the northern shoreline of Lake Pend Oreille, Ponderay, Idaho. Alta Science & Engineering, Inc.'s (Alta's) quality assurance/quality control (QA/QC) review followed guidelines set forth in the following documents:

- *Site Assessment Quality Assurance Project Plan (QAPP) for the Panhandle Smelting and Refining Company, Ponderay, Idaho (Alta 2023)*
- *National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA 2020)*
- *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (USEPA 2009)*
- *USEPA Guidance on Environmental Data Verification and Data Validation (USEPA 2002)*

This memorandum discusses the data validation and quality assessment performed for the Sample Delivery Group (SDG) or Work Order listed in Table 1. Data qualifiers used in this review are defined by the U.S. Environmental Protection Agency (USEPA 2020).

Table 1. Sample Delivery Group Data Validation

Laboratory	SDG / Work Order	Analysis	Matrix	Data Validation Level (USEPA 2009)	Review Conducted by
Pace ^a	L1626953	total metals, dissolved metals, hardness ^b	Surface Water	Stage 2A	Alta data validator

Footnotes:

^a Pace Analytical National, Mt Juliet, TN^b total & dissolved (field filtered) metals target analytes: arsenic, cadmium, lead, and zinc analyzed using USEPA Method 6020A (USEPA 1998); mercury using USEPA Method 7470A (USEPA 1994); and hardness using USEPA Method 130.1 (USEPA 1971).

2 Data Validation and Quality Assessment Summary of Surface Water Results

Alta's Stage 2A validation of the analytical data and review of the field data are summarized in Table 2. Procedures/checks that require further discussion are explained below the table, as necessary.

Table 2. Data Quality Review Summary for Surface Water Samples

Data Validation Procedure of Check	Acceptable Frequency? ^a	Acceptable Performance? ^b	Data Qualified?	Discussion Item Number
Sample condition upon receipt at laboratory	--	Y	N	
Preservation	--	Y	N	
Laboratory followed specified analytical methods and shows analysis dates	--	Y	N	
Holding times	--	Y	N	
Requested target analyte results are reported with lab qualifiers and units	--	Y	N	
Requested reporting limits are present	--	Y	N	
Method Blanks	Y	N	Y	1
Surrogate Recoveries/ Deuterated Monitoring Compounds Recoveries	-	-	-	
Matrix Spikes (MS)	N	N	Y	2
Laboratory Control Samples (LCS)	Y	Y	N	

Table 2. Data Quality Review Summary for Surface Water Samples

Data Validation Procedure of Check	Acceptable Frequency? ^a	Acceptable Performance? ^b	Data Qualified?	Discussion Item Number
Matrix Spike Duplicates (MSD)	N	N	Y	3
Trip Blank	-	-	-	
Field Blank	Y	Y	N	
Rinsate Blank (Table 3)	Y	N	N	4
Field Duplicate (Table 4)	Y	Y	N	5

^a Frequencies as defined in the QAPP (Alta 2023).

^b As defined in the QAPP (Alta 2023) or based on professional judgment of the data validator.

-- = not applicable

Discussion Items

- Method Blank:** A laboratory or method blank is a sample of known matrix where the specific constituents requested for analysis are known to be absent or are present at concentrations less than the laboratory minimum limit of detection. The laboratory blank is analyzed to measure the response of the analytical system to the analyte at a theoretical concentration of zero. The laboratory analyzed method blanks for each of the analysis methods (total metals, dissolved metals, and hardness), which satisfies the QAPP requirement of one method blank per analyte group. Most of the analytes were not detected above the method detection limit (MDL) with the exception of total zinc, which had a reported result of 0.00343 J milligrams per liter (mg/L). Per the National Functional Guidelines for Inorganics: ICP-MS (USEPA 2020):

 - Sample results where total zinc detections are below the MDL are not qualified (PSRC-SW-Z3-1 and PSRC-FB-1).
 - Sample results for total zinc that were detected below the RL will be reported at the RL and qualified as not detected (U) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, PSRC-SW-W-3, and PSRC-RB-1).
- Matrix Spikes (MS):** A MS sample has a known amount of the target analyte added to the project matrix before analysis to assess possible matrix interferences on the analysis. Percent recoveries (%Rs) on MS samples should be compared to %Rs of laboratory control samples (LCS). From a total of four field samples, the Alta field crew collected one site-specific MS/matrix spike duplicate (MSD) sample. The Alta field crew requested that site-specific MS analysis be conducted using sample PSRC-SW-Z3-1. However, the laboratory conducted MS analysis using multiple site-specific samples. MS analysis for hardness and dissolved metals (arsenic, cadmium, lead, and zinc) were conducted from sample PSRC-SW-Z3-1 and analysis for total mercury was conducted from sample PSRC-SW-E-1-FD, meeting the QAPP criteria of one MS sample per 20 field samples for these analytes. %Rs were within laboratory and QAPP (Alta 2023) limits.

However, MS analysis for dissolved mercury and total metals (arsenic, cadmium, lead, and zinc) were conducted using the field blank and rinsate blank samples, respectively. %Rs for the MS and LCS analyses for dissolved mercury and these total metals were within laboratory and QAPP limits (Alta 2023), indicating issues were not encountered with the analysis methods; however, conclusions cannot be made regarding potential matrix interference. Therefore, per the National Functional Guidelines for Inorganics: ICP-MS or mercury (USEPA 2020):

- a. Sample results where dissolved mercury or total cadmium are <MDL are qualified as non-detect estimated (UJ) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, PSRC-SW-W-3, PSRC-SW-Z3-1, and PSRC-RB-1).
 - b. Sample results where detections of total arsenic and total lead are <MDL are qualified as non-detect estimated (UJ) (sample PSRC-RB-1).
 - c. Sample results where detections of total lead and total zinc are <MDL are qualified as non-detect estimated (UJ) (sample PSRC-SW-Z3-1).
 - d. Sample results >MDL for total metals (arsenic and lead) are qualified as estimated (J) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, and PSRC-SW-W-3).
 - e. Sample results >MDL for total arsenic are qualified as estimated (J) (sample PSRC-SW-Z3-1).
3. **Matrix Spike Duplicate (MSD):** Relative percent differences (RPDs) for the site-specific MSD surface water samples were within laboratory and QAPP (Alta 2023) limits for hardness, dissolved metals (arsenic, cadmium, lead, and zinc), and total mercury. As noted in Discussion Item #2, the MSD analysis for dissolved mercury and total metals (arsenic, cadmium, lead, and zinc) were conducted on a field blank and rinsate blank sample, respectively. While the RPDs were within laboratory and QAPP limits, conclusions cannot be drawn regarding possible matrix interference. Therefore, per the National Functional Guidelines for Inorganics: ICP-MS or mercury (USEPA 2020):
- a. Sample results where detections of dissolved mercury or total cadmium are <MDL are qualified as non-detect estimated (UJ) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, PSRC-SW-W-3, PSRC-SW-Z3-1, and PSRC-RB-1).
 - b. Sample results where detections of total arsenic and total lead are <MDL are qualified as non-detect estimated (UJ) (sample PSRC-RB-1).
 - c. Sample results where detections of total lead and total zinc are <MDL are qualified as non-detect estimated (UJ) (sample PSRC-SW-Z3-1).
 - d. Sample results >MDL for total metals (arsenic and lead) are qualified as estimated (J) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, and PSRC-SW-W-3).
 - e. Sample results >MDL for total arsenic are qualified as estimated (J) (sample PSRC-SW-Z3-1).
- **Rinsate Blank:** The Alta field crew collected a rinsate blank per the QAPP (Alta 2023) labeled PSRC-RB-1. Rinsate blanks are blank sample matrix passed through or over non-dedicated sampling equipment to check the decontamination process between samples or sample sites. None of the analytes were detected above the MDL except total zinc, which had a detection of 0.00661 J mg/L (Table 3). However, as stated in Discussion Item #1 above, the total zinc result is determined to be not detected above the RL and results below the RL may not be accurately detected. As a result, total zinc is reported at the RL and qualified as not detected (U) in sample PSRC-RB-1 as shown in Table 3.

Table 3. Rinsate Blank Analysis

Sample ID	Sample Date	Analyte	Reported Concentration (mg/L)	
PSRC-RB-1	6/13/2023	Arsenic (Total)	0.000180	UJ
		Arsenic (Dissolved)	0.000180	U
		Cadmium (Total)	0.000150	UJ
		Cadmium (Dissolved)	0.000150	U
		Lead (Total)	0.000849	UJ
		Lead (Dissolved)	0.000849	U
		Mercury (Total)	0.000100	U
		Mercury (Dissolved)	0.000100	UJ
		Zinc (Total)	0.0250	U
		Zinc (Dissolved)	0.00302	U
		Hardness	15.0	U

mg/L = milligrams per liter

U = not detected above the method detection limit (dissolved arsenic, cadmium, lead, and zinc; total mercury; and hardness) or above the reporting limit (total zinc based on internal data validation).

UJ = result is estimated and not detected above the method detection limit.

4. **Field Duplicate:** One field duplicate (sample PSRC-SW-E-1-FD) was collected from the original sample location of PSRC-SW-E-1, which satisfies the QAPP requirement of one duplicate per 20 samples (Alta 2023). Results of the field duplicate analyses are shown in Table 4. RPD was either not applicable or not calculable due to analytes not being detected or being detected at concentrations less than 5 times the respective RL. Precision is acceptable due to the difference between the original and duplicate concentrations being less than the RL per the National Functional Guidelines for Inorganics (USEPA 2020). No qualification is necessary.

Table 4. Field Duplicate Sample Analysis

Sample ID	Sample Date	Analyte	Original Concentration (mg/L)		Duplicate Concentration (mg/L)		RPD
PSRC-SW-E-1/ PSRC-SW-E-1-FD	6/13/2023	Arsenic (Total)	0.00108	J	0.00104	J	NC
		Arsenic (Dissolved)	0.00106	J	0.00105	J	NC
		Cadmium (Total)	0.000150	UJ	0.000150	UJ	NA
		Cadmium (Dissolved)	0.000150	U	0.000150	U	NA
		Lead (Total)	0.000966	J	0.00103	J	NC
		Lead (Dissolved)	0.000849	U	0.000849	U	NA
		Mercury (Total)	0.000100	U	0.000100	U	NA
		Mercury (Dissolved)	0.000100	UJ	0.000100	UJ	NA
		Zinc (Total)	0.0250	U	0.0250	U	NC
		Zinc (Dissolved)	0.00546	J	0.00432	J	NC
		Hardness	64.0		63.7		NC

Relative Percent Difference (RPD) = $|X1-X2|/((X1+X2)/2)*100$

Where: X1 = Original Concentration and X2 = Duplicate Concentration

NA = RPD cannot be calculated because one or more of the results are not detected.

NC = Non-calculable; original and duplicate concentrations were less than 5x analyte-specific reporting limits (USEPA 2020).

mg/L = milligrams per Liter.

U = concentration was not detected above the method detection limit (for dissolved cadmium and lead, and total mercury) and not detected above the reporting limit based on internal data validation (total zinc).

UJ = estimated non-detect concentration based on internal data validation.

J = concentration is an estimate.

3 Overall Assessment

Based on this data quality review, Alta determines the laboratory and field data to be of acceptable quality except for the qualifications that are discussed below.

3.1 Sample Handling and Custody

Alta's Quality Assurance Officer (QAO) did not qualify any data based on sample handling and custody.

3.2 Data Accuracy and Precision

3.2.1 Accuracy

Alta's QAO qualified the following data based on MS analysis not being performed from field samples for dissolved Hg, and total As, Cd, Pb, and Zn.

- Sample results where dissolved mercury or total cadmium are <MDL are qualified as non-detect estimated (UJ) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, PSRC-SW-W-3, PSRC-SW-Z3-1, and PSRC-RB-1).
- Sample results where detections of total arsenic and total lead are <MDL are qualified as non-detect estimated (UJ) (sample PSRC-RB-1).
- Sample results where detections of total lead and total zinc are <MDL are qualified as non-detect estimated (UJ) (sample PSRC-SW-Z3-1).
- Sample results >MDL for total metals (arsenic and lead) are qualified as estimated (J) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, and PSRC-SW-W-3).
- Sample results >MDL for total arsenic are qualified as estimated (J) (sample PSRC-SW-Z3-1).

3.2.2 Precision

Alta's QAO qualified the following data based on precision results (MSD or field duplicate):

- Sample results where detections of dissolved mercury or total cadmium are <MDL are qualified as non-detect estimated (UJ) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, PSRC-SW-W-3, PSRC-SW-Z3-1, and PSRC-RB-1).
- Sample results where detections of total arsenic and total lead are <MDL are qualified as non-detect estimated (UJ) (sample PSRC-RB-1).
- Sample results where detections of total lead and total zinc are <MDL are qualified as non-detect estimated (UJ) (sample PSRC-SW-Z3-1).
- Sample results >MDL for total metals (arsenic and lead) are qualified as estimated (J) (samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, and PSRC-SW-W-3).
- Sample results >MDL for total arsenic are qualified as estimated (J) (sample PSRC-SW-Z3-1).

3.3 Data Sensitivity

Method blanks, field blanks, and rinsate blanks were utilized to assess sample collection and decontamination methods in the field and laboratory. The following data are qualified based on detections in the method blank sample:

- Total zinc is reported at the RL and qualified as not detected (U) in samples PSRC-SW-E-1, PSRC-SW-E-1-FD, PSRC-SW-M-2, PSRC-SW-W-3, and PSRC-RB-1.

It should be noted that one or more sample and/or QC results were flagged "B" by the laboratory to indicate QC parameters that did not meet the laboratory or method QC criteria. These flags are qualitative and do not necessarily indicate that a data validation qualifier should be assigned. Except for "J" flags, laboratory-assigned qualifiers are for informational purposes only. Data validation qualifiers, if assigned, supersede the laboratory-assigned flags.

3.4 Data Usability

The Alta QAO did not reject any sample results out of a possible 44; therefore, according to the QAPP (Alta 2023), the completeness for this sampling event is calculated at 100%, which meets the data quality objective of 90%.

4 References and Resources Used

Alta Science & Engineering, Inc. (Alta), 2023. Site Assessment Quality Assurance Project Plan for the Panhandle Smelting and Refining Company, Ponderay, Idaho. Prepared for the City of Ponderay. January 26.

USEPA, 1971. Method 130.1: Hardness, Total (mg/L as CaCO₃) (Colorimetric, Automated EDTA) by Spectrophotometer.

USEPA, 1994. Method 7470A (SW-846): Mercury in Liquid Waste (Manual Cold-vapor Technique). Revision 1, September.

USEPA, 1998. Method 6020/6020A; Inductively Coupled Plasma-Mass Spectrometry. Revision 1. January.

USEPA, 2002. USEPA Guidance on Environmental Data Verification and Data Validation. USEPA QA/G-8; November.

USEPA, 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85, USEPA 540-R-08-005 prepared by the Office of Solid Waste and Emergency Response; January.

USEPA, 2020. National Functional Guidelines for Inorganic Superfund Methods Data Review, Office of Superfund Remediation and Technology Innovation (OSRTI). OLEM 9240.1-66, USEPA-542-R-20-006; November.