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Draft Final 2021 Unreclaimed Sites Sampling UR-05 Site Evaluation Summary Report

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Atlantic Richfield Company

Mike Mc Anulty

Liability Manager

317 Anaconda Road

Butte MT 59701

Direct (406) 782-9964

Fax (406) 782-9980

May 24, 2022

Nikia Greene
Remedial Project Manager
US EPA – Montana Office
Baucus Federal Building
10 West 15th Street, Suite 3200
Helena, Montana 59626

Erin Agee
Senior Assistant Regional Counsel
US EPA Region 8 Office of Regional Counsel
CERCLA Enforcement Section
1595 Wynkoop Street
Denver, CO 80202
Mail Code: 8ORC-C

Daryl Reed
DEQ Project Officer
P.O. Box 200901
Helena, Montana 59620-0901

Jonathan Morgan, Esq.
DEQ, Legal Counsel
P.O. Box 200901
Helena, Montana 59620-0901

RE: BPSOU Unreclaimed Sites – Ruby Street (UR-05) Site Evaluation Summary Report

Agency Representatives:

I am writing to you on behalf of Atlantic Richfield Company to submit the Unreclaimed Site Ruby Street (UR-05) Evaluation Summary Report, which summarizes sampling and site evaluation activities. The evaluation summary includes the data summary report (DSR) as Appendix A and the data validation report as an attachment (Attachment A) to the DSR. The report and appendices may be downloaded at the following link:

<https://pioneertechnicalservices.sharepoint.com/:f:/s/submitted/EiNlnRQwfGBBs0LsTK5fZr4Ba-JQYCdh31apIp8GJIYxA>.

If you have any questions or comments, please call me at (907) 355-3914.

Sincerely,

Mike McAnulty

Mike Mc Anulty
Liability Manager & Global Risk Champion
Remediation Management Services Company
An affiliate of **Atlantic Richfield Company**

Atlantic Richfield Company

317 Anaconda Road
Butte MT 59701
Direct (406) 782-9964
Fax (406) 782-9980

Cc: Patricia Gallery / Atlantic Richfield - email
Chris Greco / Atlantic Richfield – email
Josh Bryson / Atlantic Richfield - email
Mike Mc Anulty / Atlantic Richfield - email
Loren Burmeister / Atlantic Richfield – email
Dave Griffis / Atlantic Richfield - email
Jean Martin / Atlantic Richfield - email
Irene Montero / Atlantic Richfield - email
David A. Gratson / Environmental Standards / email
Mave Gasaway / DGS - email
Brienne McClafferty / Holland & Hart - email
Joe Vranka / EPA - email
David Shanight / CDM - email
Curt Coover / CDM - email
James Freeman / DOJ - email
John Sither / DOJ - email
Dave Bowers / DEQ - email
Carolina Balliew / DEQ - email
Matthew Dorrington / DEQ - email
Jim Ford / NRDP - email
Pat Cunneen / NRDP - email
Harley Harris / NRDP - email
Katherine Hausrath / NRDP - email
Meranda Flugge / NRDP - email
Ted Duaine / MBMG - email
Gary Icopini / MBMG - email
Becky Summerville / MR - email
Kristen Stevens / UP - email
Robert Bylsma / UP - email
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Leo Berry / BNSF - email
Robert Lowry / BNSF - email
Brooke Kuhl / BNSF – email
Mark Engdahl / BNSF - email
Jeremie Maehr / Kennedy Jenks - email
Annika Silverman / Kennedy Jenks - email
Matthew Mavrinac / RARUS - email
Harrison Roughton / RARUS - email
Brad Gordon / RARUS - email
Mark Neary / BSB - email
Eric Hassler / BSB - email
Julia Crain / BSB - email
Chad Anderson / BSB - email

Atlantic Richfield Company

317 Anaconda Road
Butte MT 59701
Direct (406) 782-9964
Fax (406) 782-9980

Brandon Warner / BSB – email
Abigail Peltomaa / BSB - email
Eileen Joyce / BSB – email
Sean Peterson/BSB – email
Gordon Hart / BSB – email
Jeremy Grotbo / BSB – email
Karen Maloughney / BSB – email
Josh Vincent / WET - email
Craig Deeney / TREC - email
Scott Bradshaw / TREC - email
Brad Archibald / Pioneer - email
Pat Sampson / Pioneer - email
Joe McElroy / Pioneer – email
Andy Dare / Pioneer – email
Karen Helfrich / Pioneer - email
Leesla Jonart / Pioneer - email
Randa Colling / Pioneer – email
Ian Magruder/ CTEC- email
CTEC of Butte – email
Scott Juskiewicz / Montana Tech – email

File: MiningSharePoint@bp.com - email
BPSOU SharePoint - upload

**SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT**

Draft Final

*2021 Unreclaimed Sites Sampling UR-05
Site Evaluation Summary Report*

Atlantic Richfield Company

2022

**SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT**

Draft Final

***2021 Unreclaimed Sites Sampling UR-05
Site Evaluation Summary Report***

Prepared for:

Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

Prepared by:

Pioneer Technical Services, Inc.
1101 South Montana Street
Butte, Montana 59701

2022

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ABBREVIATIONS AND ACRONYMS

Acronym	Definition	Acronym	Definition
BPSOU	Butte Priority Soils Operable Unit	QA	Quality Assurance
BSB	Butte-Silver Bow	QAPP	Quality Assurance Project Plan
CB	Catch Basin	QC	Quality Control
CD	Consent Decree	SBC	Silver Bow Creek
cy	cubic yards	SD	Settling Defendants
DSR	Data Summary Report	UR	Unreclaimed
FRESOW	Further Remedial Elements Scope of Work	XRF	X-ray Fluorescence
mg/kg	milligram per kilogram		

1.0 INTRODUCTION

This Butte Priority Soils Operable Unit (BPSOU) Unreclaimed (UR) Site Evaluation Summary presents the declarations of the subsurface soil sampling conducted on November 4, 2021, at the UR source area UR-05 within the BPSOU (referred to herein as UR-05 Site or Site).

Unreclaimed solid media sites located within the BPSOU may have potentially been impacted by historical mining related activities. These sites must be evaluated to determine if remedial action is required. Site evaluations are completed to determine if a specific Site poses a threat to human health, contributes metals-impacted sediments to existing or planned wet weather control features, or contributes to the degradation of surface water quality as described in the BPSOU Consent Decree (CD), Appendix D, Attachment C Further Remedial Elements Scope of Work (FRESOW) (EPA, 2020).

Source areas within the BPSOU may include upland soil waste, mine waste, and floodplain soil and waste. These source areas have the potential to act as indirect pathways for human exposure, contribute metal inputs to the alluvial and bedrock aquifers, and act as metals sources to surface water (to Blacktail Creek and Silver Bow Creek [SBC]) via storm water runoff.

Means and methods used to characterize UR sites and make remediation recommendations are described in the 2021 *UR Sites Quality Assurance Project Plan* (QAPP) (Atlantic Richfield Company, 2021) (referred to herein as the QAPP). Results from site sampling/inspection activities will be used to make site declarations and drive remedial action requirements to be completed by the Settling Defendants (SDs). Contaminated solid media identified within the BPSOU will be addressed through a combination of source removal, capping, and/or land reclamation as appropriate to meet the Butte Hill Revegetation Specifications (EPA, 2020). The specific Remedial Action Work Plans will be prepared by SDs and approved by Agencies prior to implementation.

1.1 Objectives

This Site Evaluation Summary Report presents all Site data and declarations, as required in the FRESOW (EPA, 2020), from the UR-05 Site investigation. Results from the 2021 investigation are summarized in the Data Summary Report (DSR) in Appendix A, which includes a Data Validation Report. The conclusions and declarations provided in this report were based on the objectives and procedures executed and outlined in the DSR. General Site and sample station photographs are included in Appendix B.

This Evaluation Summary Report includes information within each related report as described below:

Site Evaluation Summary:

- A summary of all Site data (historical and new).
- A declaration as to whether the Site contains concentrations at or above human health action levels or the Waste Identification Criteria in Table 1 in Appendix 1 of the BPSOU CD (EPA, 2020), whichever is more stringent.

- A declaration as to whether historical mine waste at the Site is contributing to the degradation of surface water quality.
- A declaration as to whether the Site contributes metals-impacted sediment to existing or planned wet weather control features.

DSR (Appendix A):

- Investigation objectives.
- Data quality assessment.
- Project objectives and sampling design review.
- Preliminary data review.
- Conclusions on the quality of the data.
- Sampling and analysis summary.

Data Validation Report (Attachment A of the DSR):

- Quality assurance (QA) and quality control (QC) review of inorganic data.
- Level A/B Assessment.
- Assessment of precision, accuracy, representativeness, comparability, completeness, and sensitivity between X-ray fluorescence (XRF) and laboratory data.
- Overall data summary.

The following sections provide details about the items bulleted above.

The land use at the UR-05 Site is residential per professional judgment by the field team lead and informed by current county zoning and guidance listed in the 2006 Record of Decision requirements (Appendix A of the BPSOU CD; EPA, 2020). Human health action levels and storm water criteria for residential space were referenced to prepare this declaration. The action levels are listed in Table 1.

2.0 SITE DESCRIPTION AND BACKGROUND

Site UR-05 is approximately 0.3 acre. It is located just west of the intersection of North Montana Street and Ruby Street on the east side of the Tullamore residential subdivision (Figure 1). Butte-Silver Bow (BSB) owns the Site, and the adjacent property south of the Site is privately owned. The Site is bordered on the north by a walking trail, on the west and south by private residences, and on the east by North Montana Street. Site UR-05 is vacant and has a moderate amount of established grass with weeds around the boundary. The north boundary of the Site contains sandy and dry soil. The south boundary of the Site has bare areas with visible light staining (potentially from manganese and iron). There is an abandoned vehicle on the Site. The area east of the vehicle contains light, yellow-colored soil with developing rills that drain to the south.

3.0 SITE EVALUATION

The Site was evaluated following the Unreclaimed Area Logic Diagram (Appendix A.3 of the QAPP) to determine if reclamation is warranted. The 2021 Site investigation was completed on November 4, 2021. Sampling activities were performed according to specified standard operating procedures as outlined in the QAPP. The DSR in Appendix A includes a description of

the 2021 investigation. Composite samples were collected from each location at the specified depth intervals of 0 to 2 inches, 2 to 6 inches, and 6 to 12 inches. Historical¹ data sets were available from 1987 (Butte Railbed Analysis Letter Report), 1991 (Butte Area NPL Site), and 1993 (TCRA sample results). Photographs of the sampling events are included in Appendix B.

3.1 Data Summary

A total of 5 sample stations were collected in the 2021 sampling event were sampled by collecting 3-point composite samples at 3 depth intervals. Each sample was collected and analyzed by XRF for arsenic, cadmium, copper, lead, zinc, and mercury. Out of the 15 collected soil samples, 12 were submitted to Pace Analytic Services, LLC for laboratory confirmation (per Section 3.2.4, Table 5 of the QAPP) and one sample was submitted for laboratory QA and QC. The DSR in Appendix A details the total XRF samples collected, confirmation laboratory samples submitted, and the QA and QC laboratory samples submitted. Four historical¹ sample locations were collected in 1987 (Butte Railbed Analysis Letter Report), 1991 (Butte Area NPL Site), and 1993 (TCRA sample results) for XRF analysis on arsenic, cadmium, copper, lead, and zinc. Based on the data quality conclusions in the DSR, all data analyzed in the 2021 sampling event were deemed usable.

For samples analyzed by both XRF and laboratory, the laboratory results were used for the evaluation of the Site. For samples analyzed only by XRF, the XRF results were used for the evaluation of the Site.

3.2 Human Health Action Levels

Table 2 lists the historical data, Table 3 lists the new data, and Table 4 describes the exceedances related to the following findings of the Site investigation:

- The lead result from the surface sample collected from UR-05-SS-03 (1,980 milligrams per kilogram [mg/kg]) exceeded the human health action level (1,200 mg/kg).

3.3 Screening Criteria for Storm Water

Table 2 lists the historical data, Table 3 lists the new data, and Table 4 describes the exceedances related to the following findings of the Site investigation:

- Sample BPSOU-UR05SS03-110421-1 (0- to 2-inch interval) and BPSOU-UR05SS03-110421-2 (2- to 6- inch interval for the same sample station) exceeded the screening criteria for storm water for copper, lead, and zinc.

Two samples collected in 2021 exceeded 3 of the 6 contaminant screening level criteria listed in Table 1. One of the same 2 samples (BPSOU-UR05SS03-110421-2) exceeded 5,000 mg/kg; therefore, it is recommended the Site be further analyzed to determine the materiality of the load

¹ All historical data was derived from the Atlantic Richfield Company Geocortex Database ([Geocortex Viewer for HTML5 \(woodardcurran.com\)](https://www.woodardcurran.com)). Source documents for historical data are referenced if available.

and the possible contribution to the degradation of surface water per the requirements of the QAPP (Section 2.4, Step 5, page 8).

3.4 Sedimentation Analysis

Contribution to degradation of surface water quality or metals-impacted sediment is determined by evaluating the presence of rills, concentrated outflow, and metals-impacted sediment in downstream infrastructure; determining sediment contribution loading upgradient of the Site; and linkage to surface water features (Figure 2).

Presence of Rills:

Minor rills have been documented at the UR-05 Site. There is potential for further developed rills in the south-central portion where vehicles and recreational trailers have been parked. The north and east portions of the Site lack vegetation and have potential for sheet erosion off-Site into the residential areas down gradient. There are bare areas where the public access the Site, via foot traffic, from the walking trail. Evidence of minor intermittent outflow has been observed at the UR-05 Site across the southern boundary and primarily through the residential property on to Empire Street.

Concentrated Outflow:

There is no existing storm water infrastructure within the UR-05 Site boundary. The Site has minimal outflow, directed south, depositing sediment on the nearby private parcel and little evidence showing consistent transportation of sediment off the private parcel onto Empire Street. Due to the presence of fine sediments and barren areas, a high flow event may result in material that would be transported west on Empire Street to an unnamed storm water inlet at the corner of Empire Street and Tullamore Street. This unmarked inlet likely routes storm water downgradient west to the Superfund structure Catch Basin (CB) 1 (Syndicate Pit or CB-1) via East Inlet to CB-1 where it is connected to the Missoula Gulch drainage. During high storm water events, it is possible for storm water and sediments to reach a well-vegetated gully running north to southwest through the reclaimed Site New Era 1&2 – Downey Shafts (Source Area No. 72). This gully would transport storm water from Empire Street down gradient to West Boardman Street. The storm water inlet structure on West Boardman St, MG-I-5308, was inspected² and bricks were found blocking the flow and did not report sediment deposit. From inlet MG-I-5308 storm water and sediment is routed downgradient west to MG-I-0987 where water reaches the Missoula Gulch drainage via BSB Storm Drain Ditch.

Evaluate Metals-Impacted Sediment in Downstream Infrastructure:

Metals-impacted sediment is present in a localized area on the UR-05 Site. As stated above, storm water and sediment are routed to the Missoula Gulch drainage via BSB maintained Superfund storm water structures.

CB-1, CB-8, and CB-9 are maintained under the *Missoula Gulch Catch Basins (CB-1, CB-8, and CB-9) Operations and Maintenance Plan* (Atlantic Richfield Company, 2018). Personnel from BSB Reclamation and Environmental Services monitor conditions of CB-1, CB-8, and CB-9 on

² Inspection notes were obtained from a Butte Silver Bow Utilities geodatabase. Access to the database can be provided upon request.

a year-round basis and perform all maintenance tasks, unless severe winter weather prevents access. Based on estimated accumulation models in the Missoula Gulch Catch Basins Operations and Maintenance Plan (Atlantic Richfield Company, 2018), approximately 53 cubic yards (cy) of sediment is expected to accumulate annually in CB-1. Sediment removed estimates provided by BSB Reclamation and Environmental Services for the CB-8 system: A monthly average of 8 cy of sediment are removed from the CB-8 bypass system, which carries the normal flow of Missoula Gulch; additionally, a monthly average of 24 cy of sediment are removed from the CB-8 forebay. The forebay receives storm flows from the Missoula Gulch drainage and provides an area for sediment to drop out before reaching the actual CB-8. The infrastructure is in good condition, and sediment buildup does not impede flow rates.

Evaluate Contributing Sediment Loading Above the Site:

There does not appear to be sediment loading contributed by Sites upslope of the UR-05 Site.

Direct Linkage to Surface Water Features:

The Site exhibits a potentially complete pathway to SBC through the Missoula Gulch drainage as shown on Figure 2 during storm water a 100-year storm event. The CB-8 and CB-9 are designed to route a 100-year storm event through the Missoula Gulch drainage and retain a 10-year, 24-hour storm event. These CBs reduce peak storm water runoff rates and sedimentation discharge to SBC when properly operated and maintained. The stored runoff water is then dissipated by infiltration and evaporation and rarely flows to SBC. Retained storm water discharges to SBC only when surface water levels within the CBs rise above the discharge level of the outlet structures, and surface water within the discharge channel cannot be infiltrated into groundwater. As provided in the Missoula Gulch CB Operation and Maintenance Plan (Atlantic Richfield Company, 2018), discharge from the CBs is managed to prevent unmitigated discharge to SBC. Water discharged from CB-9 enters the Lower Missoula Gulch Channel to SBC (grass-lined channel), a Superfund storm water structure, and is diverted around the Butte Reduction Works area at Lower Area One until it is eventually discharged into SBC west of the existing slag tunnel. The Lower Missoula Gulch Channel to SBC is the only discharge point from Missoula Gulch storm water to SBC. Due to the length of the ditch and low gradient, discharge from CB-9 typically infiltrates fully prior to reaching the discharge point. Infiltrated water is captured via the Hydraulic Control Channel along the northern perimeter of the Butte Treatment Lagoons and treated prior to discharge to SBC.

4.0 DECLARATION CONCLUSION

Two samples collected in 2021, from sample station UR-05-SS-03, exceeded 3 of the 6 contaminant screening level criteria listed in Table 1. Sample BPSOU-UR05SS03-110421-2 (from the same sample station) exceeded 5,000 mg/kg. The surface sample collected from UR-05-SS-03 exceeded the human health action level for lead. The sedimentation analysis (Section 3.4) indicates:

- Minor evidence of rills and soil loss from the Site onto nearby private parcels.
- Evidence of localized metals-impacted sediment within the UR Site boundary.

- Existing downstream Superfund storm water infrastructure at CB-1, CB-8, and CB-9 captures potentially impacted surface water and is designed to retain sediment migration from Missoula Gulch drainage mitigating potential surface water degradation.

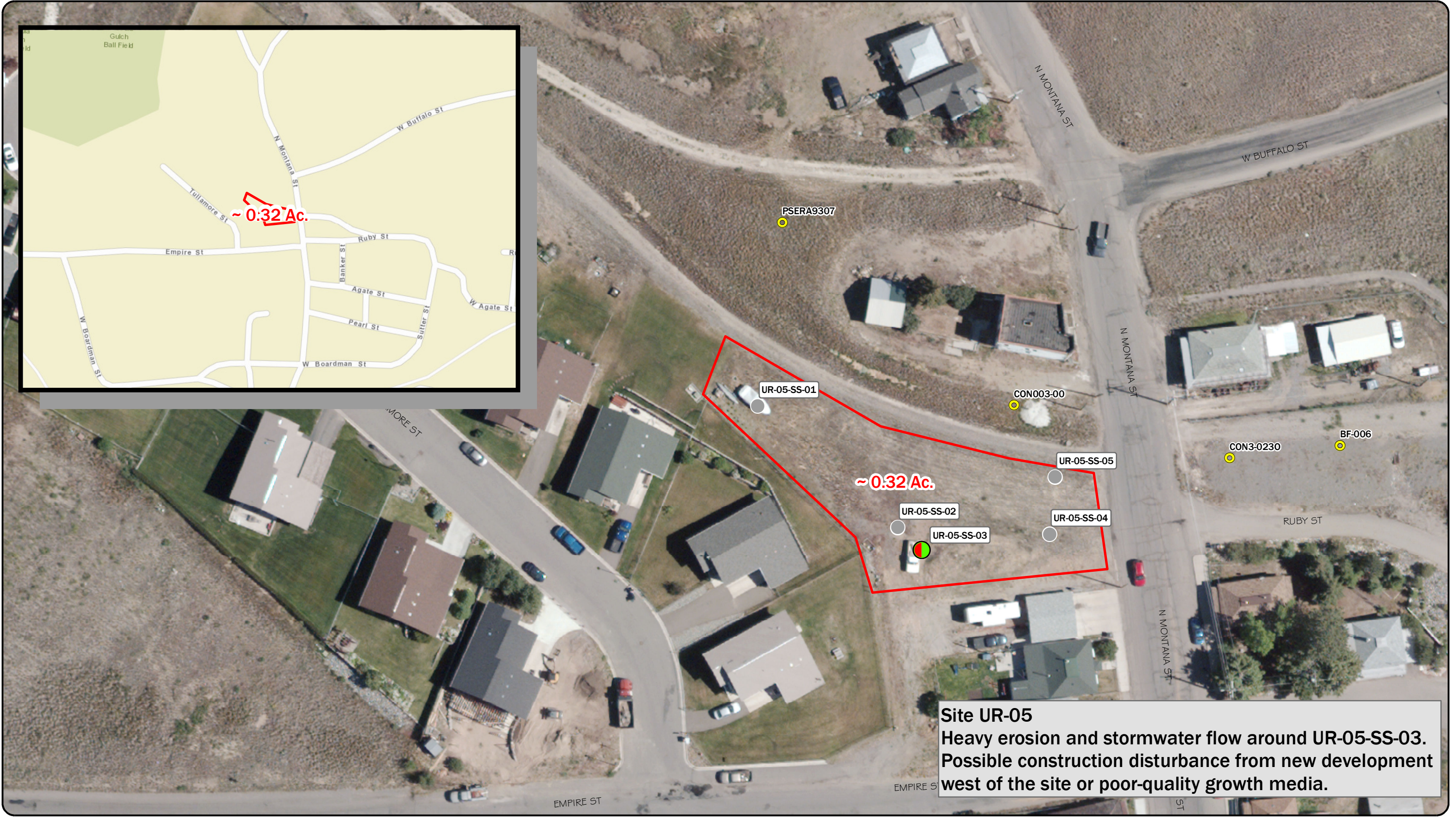
The Site exhibits a potentially complete pathway to SBC through the Missoula Gulch during a 100-year storm event. Localized human health and storm water exceedances from UR-05-SS-03 were observed, near the southwest corner of the UR-05 boundary. Based on the criteria identified in the QAPP, localized remedial action may be warranted to address surface exceedance of the human health standard for lead.

5.0 REFERENCES

- Atlantic Richfield Company, 2018. Butte Priority Soils Operable Unit (BPSOU) Final Missoula Gulch Catch Basins (CB-1, CB-8, and CB-9) Operations and Maintenance Plan. Atlantic Richfield Company, July 24, 2018.
- Atlantic Richfield Company, 2021. Unreclaimed Sites Quality Assurance Project Plan. Atlantic Richfield Company, June 2021.
- EPA, 2020. Consent Decree for the Butte Priority Soils Operable Unit. Partial Remedial Design/Remedial Action and Operation and Maintenance. U.S. Environmental Protection Agency. February 13, 2020. Available at <https://www.co.silverbow.mt.us/2161/ButtePriority-Soils-Operable-Unit-Conse>. Appendix A of the Consent Decree contains the 2006 Record of Decision.

Figures

- Figure 1. Unreclaimed Sites UR-05 2021 Samples and Exceedances**
- Figure 2. Unreclaimed Sites UR-05 Storm Water Features**



Site UR-05
 Heavy erosion and stormwater flow around UR-05-SS-03.
 Possible construction disturbance from new development west of the site or poor-quality growth media.

- HUMAN HEALTH EXCEEDANCE
- STORM WATER EXCEEDANCE
- NO EXCEEDANCE
- UNRECLAIMED SITE BOUNDARY
- HISTORIC SAMPLE STATION

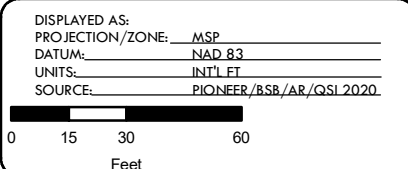
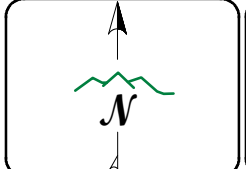
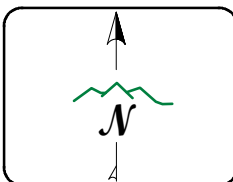
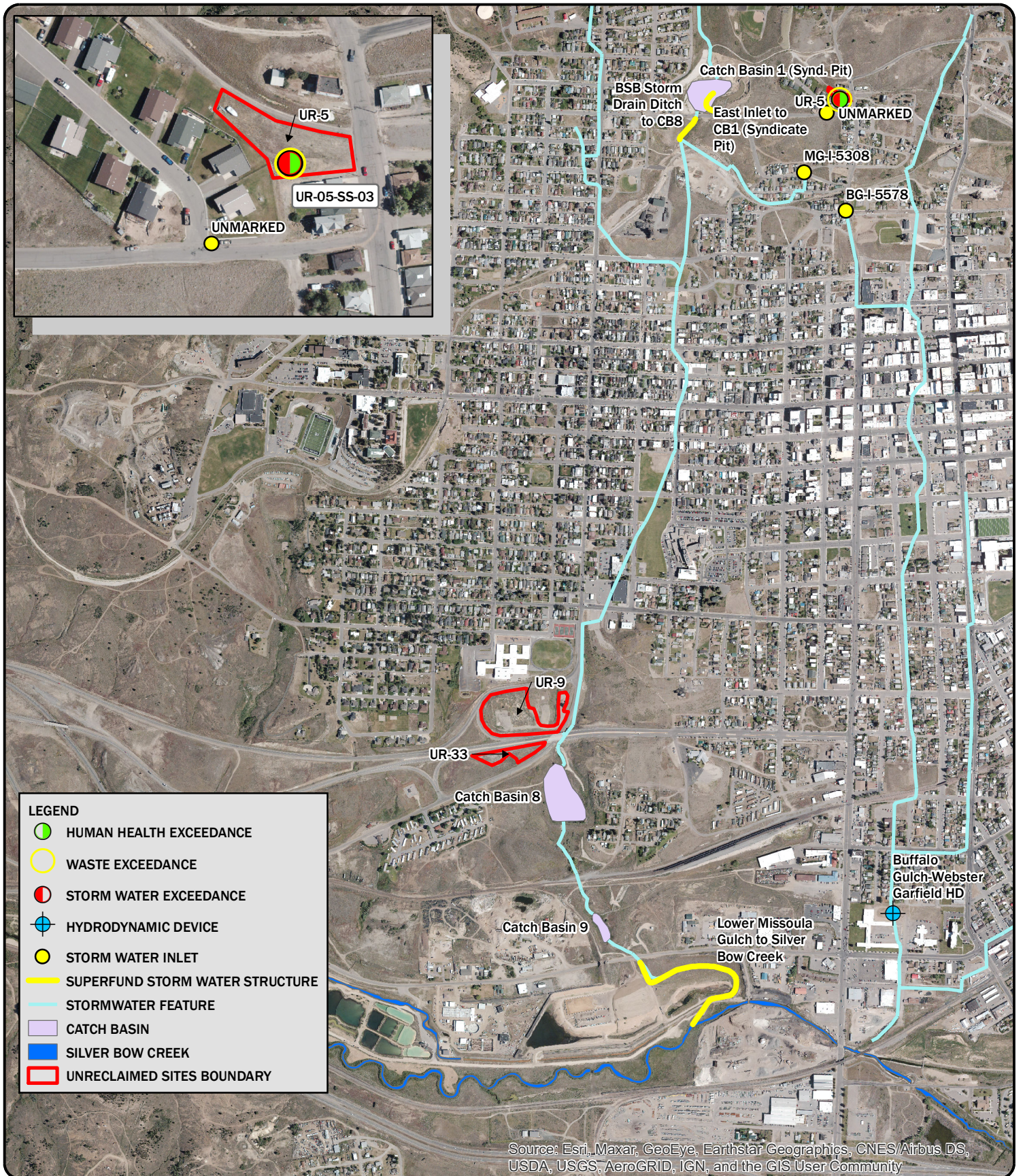


FIGURE 1

UR-05
 2021 UR SITES
 SAMPLING AND
 EXCEEDANCES

DATE: 3/21/2022



DISPLAYED AS: _____
 PROJECTION/ZONE: MSP
 DATUM: NAD_83
 UNITS: INTL FT
 SOURCE: PIONEER/B/SB/QSI 2020

0 625 1,250 2,500
Feet

FIGURE 2

Unreclaimed Sites
UR-05
Storm Water Features

PIONEER
TECHNICAL SERVICES, INC.

DATE: 2/23/2022

Tables

- Table 1. BPSOU Soil Screening Criteria**
- Table 2. Historical Data Summary**
- Table 3. New Data Summary**
- Table 4. Exceedances**

Table 1. BPSOU Soil Screening Criteria

Analyte	Solid Media	Action/Screening Levels
Lead₁	Residential	1,200 mg/kg
Arsenic₁	Residential	250 mg/kg
Mercury₁	Residential	147 mg/kg
Cadmium²		20 mg/kg
Copper²		1,000 mg/kg
Zinc²		1,000 mg/kg
Lead²		1,000 mg/kg
Arsenic²		200 mg/kg
Mercury²		10 mg/kg


1. From EPA Record of Decision (ROD) BPSOU, Table 12-1 (EPA, 2006a).

2. Waste Identification Criteria in Table 1 in Appendix 1 of the BPSOU Consent Decree (EPA, 2020).

mg/kg: milligrams per kilogram

Table 2: Historic Data Summary

COC (mg/kg)	Sample CON003-00	Sample CON3-0230	Sample PSERA9307	Sample BF-006
Arsenic	92	105 J	190	283 J
Cadmium	4	5	5	18
Copper	579 J	643	825	1200
Lead	294	1,360	555	1,330
Zinc	1,370 J	1,100	1,490	3,500

 Storm Water Screening Criteria Exceedance


 Human Health Action Level Exceedance

Table 3: New Data Summary

Station	FieldSampleID	Result Type	Arsenic (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Zinc (mg/kg)	1+ >HH std	3+ >SW std	1+ >5000	Exceed SW	Exceed
UR-05-SS-01	BPSOU-UR05SS01-110421-1	XRF	64.82	7.79 U	496.09	188.28	8.56 UJ	992.23					
UR-05-SS-01	BPSOU-UR05SS01-110421-2	XRF	19.69	7.23 U	172.85	41.01	6.56 UJ	146.68					
UR-05-SS-01	BPSOU-UR05SS01-110421-3	XRF	20.05	7.38 U	108.93	48.98	6.49 UJ	174.20					
UR-05-SS-02	BPSOU-UR05SS02-110421-1	Lab	161.00	4.70	359.00 J	636.00	0.25 J-	1,520.00					
UR-05-SS-02	BPSOU-UR05SS02-110421-2	Lab	145.00	3.60	658.00	639.00	0.31 J-	1,380.00					
UR-05-SS-02	BPSOU-UR05SS02-110421-3	Lab	62.30	3.80	235.00	756.00	0.26 J-	1,500.00					
UR-05-SS-03	BPSOU-UR05SS03-110421-1	Lab	234.00	8.70	1,120.00	1,980.00	0.80 J-	2,450.00	TRUE	TRUE		TRUE	TRUE
UR-05-SS-03	BPSOU-UR05SS03-110421-2	Lab	145.00	5.30	49,500.00	1,190.00	0.45 J-	1,840.00		TRUE	TRUE	TRUE	TRUE
UR-05-SS-03	BPSOU-UR05SS03-110421-3	Lab	117.00	4.00	426.00	944.00	0.65 J-	1,630.00					
UR-05-SS-04	BPSOU-UR05SS04-110421-1	Lab	37.90	1.60	248.00	216.00	0.15 J-	506.00					
UR-05-SS-04	BPSOU-UR05SS04-110421-2	Lab	35.50	1.60	250.00	571.00	0.16 J-	646.00					
UR-05-SS-04	BPSOU-UR05SS04-110421-3	Lab	47.30	3.30	238.00	812.00	0.26 J-	1,180.00					
UR-05-SS-05	BPSOU-UR05SS05-110421-1	Lab	12.20	0.68	214.00	43.20	0.029 J-	206.00					
UR-05-SS-05	BPSOU-UR05SS05-110421-2	Lab	9.30	0.27	151.00	26.60	0.038 J-	58.30					
UR-05-SS-05	BPSOU-UR05SS05-110421-3	Lab	19.90	0.32	146.00	28.30	0.068 J-	85.00					

Storm Water Screening Criteria Exceedance

Human Health Action Level Exceedance

Table 4: Exceedances

Station	Arsenic (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Zinc (mg/kg)	1+ >HH std	3+ >SW std	1+ >5000
UR-05-SS-03	234.00	8.70	1,120.00	1,980.00	0.80 J-	2,450.00	TRUE	TRUE	
UR-05-SS-03	145.00	5.30	49,500.00	1,190.00	0.45 J-	1,840.00		TRUE	TRUE
	Storm Water Screening Criteria Exceedance								
	Human Health Action Level Exceedance								

Appendix A
Data Summary Report
(includes Data Validation Report)

**SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT**

Draft Final

*2021 Unreclaimed Sites Sampling
UR-05 Data Summary Report (DSR)*

Atlantic Richfield Company

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BUTTE PRIORITY SOILS OPERABLE UNIT**

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Attachment A Data Validation Report (DVR)

Attachment B Field Forms and Related Documents

Attachment C Laboratory Data Packages

Attachment D Electronic Data Deliverable File

ABBREVIATIONS AND ACRONYMS

ACRONYM	DEFINITION	ACRONYM	DEFINITION
Atlantic Richfield	Atlantic Richfield Company	FSP	Field Sampling Plan
BPSOU	Butte Priority Soils Operable Unit	Pace	Pace Analytical Services
CD	Consent Decree	Pioneer	Pioneer Technical Services, Inc.
CFRSSI	Clark Fork River Superfund Site Investigation	QA	Quality Assurance
DI	Deionized	QAPP	Quality Assurance Project Plan
DM/DV	Data Management/Data Validation	QC	Quality Control
DQA	Data Quality Assessment	SOP	Standard Operation Procedures
DSR	Data Summary Report	UR	Unreclaimed
DVR	Data Validation Report	XRF	X-ray Fluorescence
EPA	Environmental Protection Agency		

ABSTRACT

This Butte Priority Soils Operable Unit (BPSOU) Unreclaimed (UR) Sites Data Summary Report (DSR) presents results of the subsurface soil sampling conducted on November 4, 2021, at the UR source area UR-05 within the BPSOU.

For the event, 5 sample stations were sampled by collecting 3-point composite samples at 3 depth intervals. Each sample was analyzed in the field for pH and by X-ray fluorescence (XRF) for arsenic, cadmium, copper, lead, mercury, and zinc; 12 soil samples of the 15 collected were analyzed by the laboratory for arsenic, cadmium, copper, lead, mercury, zinc, and percent moisture. One field duplicate was submitted to the laboratory for the sampling event.

This DSR was prepared by Pioneer Technical Services, Inc. (Pioneer), 1101 S. Montana Street, Butte, Montana, 59701 for:

Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

The information presented in this DSR includes laboratory analytical results from the sampling events.

STATEMENT OF AUTHENTICITY

Consistent with the provisions described in the 2020 U.S. Environmental Protection Agency (EPA) BPSOU Consent Decree (CD) (EPA, 2020a), the data sets referenced in this document are considered to be final data generated or evaluated. Data have been designated as enforcement quality and screening quality as described in the *Clark Fork River Superfund Site Investigations (CFRSSI) Quality Assurance Project Plan (QAPP)* (ARCO, 1992a) and *CFRSSI Data Management/Data Validation (DM/DV) Plan* (ARCO, 1992b) as supplemented by the *CFRSSI DM/DV Plan Addendum* (AERL, 2000a). Consistent with the aforementioned orders, the signatories below hereby stipulate the authenticity and accuracy of the data and hereby waive any evidentiary or other objection as to the authenticity and accuracy of reference in endangerment assessments, public health evaluations, feasibility studies, and remedial design/remedial action documents.

Approved by: _____
Mike Mc Anulty
Liability Manager
Atlantic Richfield Company
Date _____

Approved by: _____
Nikia Greene
Remedial Project Manager
U.S. Environmental Protection Agency
Region VIII
Date _____

Approved by: _____
Daryl Reed
State Project Officer
Montana Department of Environmental Quality
Date _____

Approved by: _____
Scott Sampson
Project Manager
Pioneer Technical Services, Inc.
Date _____

EXECUTIVE SUMMARY

This BPSOU UR Sites DSR presents the results of the subsurface soil sampling conducted on November 4, 2021, at the UR source area UR-05 within the BPSOU.

Sampling was conducted under the guidelines of the BPSOU *UR Sites Final Field Sampling Plan (FSP) #6: UR-05, UR-27, UR-28, UR-29, UR-30, and UR-34* (Atlantic Richfield Company, 2021a) (referred to herein as FSP) and the 2021 *Final UR Sites QAPP* (Atlantic Richfield Company, 2021b) (referred to herein as QAPP). Information and data from the sampling efforts will be used to characterize the potential contamination at the Site and evaluate potential human health and ecological risks.

This DSR includes all field XRF and soil pH data, laboratory analytical data, and DV packages. This DSR does not include any analysis or interpretation of the data by Atlantic Richfield Company (Atlantic Richfield).

Paste pH and natural soil samples were collected from 5 sample stations (Figure 1). Each sample station was determined based on preliminary Site investigations and Agency approval.

In total, 5 sample stations were sampled by collecting 3-point composite samples at 3 depth intervals. Each sample was analyzed in the field for pH and by XRF for arsenic, cadmium, copper, lead, mercury, and zinc; 12 soil samples of the 15 collected were analyzed by the laboratory for arsenic, cadmium, copper, lead, mercury, zinc, and percent moisture. One field duplicate was submitted to the laboratory for the sampling event. Pioneer submitted soil samples to Pace Analytical Services, LLC (Pace) Minneapolis, MN.

Analytical results were reported in a standard data package.

A DV system was implemented consistent with the procedures described in the CFRSSI DM/DV Plan (ARCO, 1992b) and subsequent addendum (AERL, 2000a). The format for this DSR is consistent with the format established in the *CFRSSI Pilot Data Report Addendum* (AERL, 2000b).

1.0 INTRODUCTION

This report presents the results of soil sampling and analysis for the UR Sites investigation conducted on November 4, 2021, at the UR source area UR-05 within the Silver Bow Creek/Butte Area National Priorities List Site BPSOU area. Activities were consistent with the provisions described in Appendix D of the BPSOU CD (EPA, 2020a). Historical results from previous investigations are summarized in the BPSOU UR Sites – Final FSP. The information contained in this report was gathered according to objectives and procedures documented in the FSP and according to the overall soil sampling, analysis objectives, and requirements outlined in the 2021 Final UR Sites QAPP.

Information referenced throughout this DSR is included in the appendices below:

- Attachment A Data Validation Report (DVR)
- Attachment B Field Forms and Related Documents
- Attachment C Laboratory Data Packages
- Attachment D Electronic Data Deliverable File (included separately)

This investigation's field notebook and datasheets are located at the Atlantic Richfield Contractor (Pioneer) office in Butte, Montana.

All characterization activities and procedures in 2021 followed the QAPP. Sample stations were determined based on preliminary site investigations and Agency approval. The QAPP describes the quality assurance (QA) and quality control (QC) policies and procedures used during sample collection and analysis. Samples were obtained from the sample stations identified in Table 1 and listed below, following the FSP.

Station Field Identification	Sample Identification
UR-05-SS-01	BPSOU-UR05SS01-110421-X
UR-05-SS-02	BPSOU-UR05SS02-110421-X
UR-05-SS-03	BPSOU-UR05SS03-110421-X
UR-05-SS-04	BPSOU-UR05SS04-110421-X
UR-05-SS-05	BPSOU-UR05SS05-110421-X

*X indicates sample depth interval.

Samples collected were analyzed by XRF. A subset of the samples was sent to Pace in Minneapolis, MN for laboratory analyses as listed in Section 3.1.4, Table 5 of the QAPP. The data verification and DV for the XRF and laboratory results are included in Attachment A. All data included in this report are provided as final.

Personnel from Pioneer completed the soil sampling activities. The soil data collected had to undergo rigorous sampling and analysis procedures and meet QA/QC protocols and documentation requirements to be designated as enforcement quality. All metals data underwent a Stage 2A verification and DV according to EPA *National Functional Guidelines for Inorganic Superfund*

Data Review (EPA, 2020b) and *EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA, 2009). All metals data presented herein have undergone DV according to the CFRSSI DM/DV Plan Addendum (AERL, 2000a). Section 3.0 and Attachment A provide information about data quality and DV.

This DSR contains the following information:

- Investigation objectives (Section 1.1).
- Site description and background (Sections 1.2 and 1.3).
- Data quality assessment (DQA) (Section 2.0).
- Project objectives and sampling design review (Section 2.1).
- Preliminary data review (Section 2.2).
- Conclusions on the quality of the data (Section 2.3).
- Sampling and analysis summary (Section 3.0).
- Deviations (Section 4.0).

The Standard Operating Procedures (SOPs) followed were developed by Pioneer according to the *CFRSSI SOPs* (ARCO, 1992c) and are included in the QAPP. The SOPs were followed for sampling, data collection, and field/office protocols.

1.1 Investigation Objectives

The QAPP listed the following two objectives:

- The Site will be sampled at 3 depth intervals (1) 0 to 2 inches, (2) 2 to 6 inches, and (3) 6 to 12 inches at the Site-specific approved sample stations.
- Opportunistic samples may be obtained in the field at the discretion of field sampling personnel or Agency oversight representative(s). The field team leader will be responsible for determining the appropriate sampling protocol as dictated by the location of the opportunistic sample(s).

The results of the investigation will supplement existing data contained within the Atlantic Richfield Geocortex historical database cited in the FSP. This data will be used to make a Site declaration specifying any areas that do not meet the human health or storm water criteria per Table 1 and Table 2 in the QAPP.

1.2 Investigation Site Description

The UR Sites within the BPSOU could pose a threat to human health or surface water quality due to the presence of historical mine waste. Although many source areas have been previously reclaimed, areas still exist in which soil has not yet been evaluated; such Sites may provide a pathway for human exposure or impact surface water quality via storm water runoff. The UR-05 Site was assessed per the QAPP.

This DSR describes the activities conducted for soil sampling and characterization at the UR-05 Site. Supplemental information provided in the FSP described the 2021 investigation. Sample

stations were determined based on preliminary Site investigations and Agency approval to quantify the potential of human health impacts and/or storm water impacts at depth intervals of 6 to 12 inches, 2 to 6 inches, and 0 to 2 inches.

The following figure summarizes the 2021 sampling effort:

- Figure 1 displays proposed and sampled stations for the 2021 sampling event.

1.3 Background

Site UR-05 is approximately 0.3 acres. It is located just west of the intersection of North Montana Street and Ruby Street and on the east side of the Tullamore residential subdivision (Figure 1). The Site is owned by Butte-Silver Bow and the adjacent property south of the Site is privately owned. The Site is bordered on the north by a walking trail, west and south by private residences, and east by North Montana Street. Site UR-05 is vacant and has a moderate amount of established grass with weeds around the boundary. The north boundary of the Site contains sandy and dry soil. The south boundary of the Site has bare areas with visible light staining (potentially from manganese and iron). There is an abandoned vehicle on the Site. The area east of the vehicle contains light, yellow-colored soil with rilling draining to the south.

2.0 DATA QUALITY OBJECTIVES AND ASSESSMENT

The objective of the DQA process (EPA, 2000) is to determine whether the project-specific objectives have been satisfied and if the analytical results are acceptable for project decision making. The DQA process consists of five steps that relate the quality of the results to the intended use of the data:

Step 1: Review sampling design (Section 2.1).

Step 2: Conduct preliminary data review (Section 2.2).

Step 3: Select statistical test(s) as appropriate to evaluate data quality (not applicable).

Step 4: Verify assumptions (not applicable).

Step 5: Draw conclusions about the quality of the data (Section 2.3).

2.1 Project Objectives and Sampling Design Review

Project-specific objectives were defined in the FSP to cover the sampling design requirements outlined in the QAPP.

2.2 Preliminary Data Review

A preliminary data review was conducted to determine if any problems or anomalies were present in the sample collection and analysis procedures. This was completed by evaluating data quality indicators (Section 2.2.1) followed by data verification and DV (Attachment A).

2.2.1 Data Quality Indicators

The DQA process evaluates the results against data quality indicators of precision, accuracy, representativeness, comparability, completeness, and sensitivity. An evaluation of each data quality indicator is included in the DVR (Attachment A).

2.3 Data Quality Conclusions

The laboratory samples were collected using standard sampling methods and relevant Pioneer SOPs. The sampling design, SOPs, and laboratory analytical methods were based on EPA and other industry-standard practices. Laboratory analytical methods are provided in Table 5 of the QAPP. Sample collection was completed by professionals properly trained in following SOPs and using the equipment. Proper chain of custody and sample handling activities were observed during sample collection, delivery to the laboratory, and analysis. The analytical laboratories performed the sample analyses using industry-standard methods. The DV checklists are included in the DVR (Attachment A), all data met the Level A and Level B criteria.

Data generated from the samples collected were examined to ensure that project objectives were met. The data quality objectives for the investigation are listed in the QAPP Section 2.4. A data QA/QC review was completed for the sampling event.

For the 2021 Site sampling event, a total of 15 natural soil samples were collected. All samples were analyzed by XRF, and 12 samples were sent to Pace for laboratory analysis. This resulted in a total of 90 natural data points generated by the XRF analyses and 84 natural data points generated by the laboratory analysis. Of the points, 16 (18%) XRF natural data points were designated screening quality, and 74 (82%) XRF natural data points were designated as enforcement quality. For the laboratory natural data points, 14 (17%) were designated screening quality, and 70 (83%) laboratory natural data points were designated as enforcement quality. No data were rejected. The DVR (Attachment A) includes a summary of the analysis. Please note that 15 of the 16 (94%) screening quality XRF data points were qualifications made to the mercury results due to the lack of a calibration check sample (Section 2.2.3 of the DVR). Based on the data quality conclusions in the DSR, all data analyzed in the 2021 sampling event were deemed usable.

3.0 SAMPLING AND ANALYSIS SUMMARY

This section summarizes completed tasks that addressed the monitoring objectives described in the QAPP, including sampling methods, field analysis methods, and analytical results for the UR soil sampling.

3.1 Soil Sample Collection

Samples were collected following procedures detailed in the QAPPs referenced in Section 1.0, except where modifications of the sampling design or procedures were required. Any modifications are listed in Section 4.0. Sample station locations were selected in cooperation and agreement with Agency oversight personnel.

The general sampling approach consisted of hand-dug pits. The UR Site sampling proceeded as follows.

Sample stations were determined based on preliminary Site investigations and the Agency approved FSP. Field personnel and representatives from the Agencies (when present) made decisions regarding collection of additional “opportunistic” samples to characterize the Site conditions and characteristics accurately. A minimum of 3 combination samples (9 subsamples) were collected in a 3-point (triangular) pattern. At each point, a subsample of predetermined depth was collected. As a rule, the diagonal distance between the points was 10 feet, depending on the area of soil homogeneity. The diagonal distance could be adjusted in the field to account for soil differences and the presence of obstacles. Three discrete aliquots of equal amounts of soil from each designated subsample location were composited into 1 sample. Materials such as plant matter, debris, and large rocks were removed, to a reasonable extent, prior to placing the sample in the sample container for laboratory analysis. A portion of the natural sample was placed into a #10 (2 millimeter) disposable sieve screen prior to running the XRF analysis and a portion was used for pH analysis. After XRF analysis was complete, the sample was archived in the Pioneer Butte, MT office. Samples were collected from the 0- to 12-inch depth at 0- to 2-inch, 2- to 6-inch, and 6- to 12-inch intervals.

3.1.1 Sample Analysis

3.1.1.1 pH

The general UR Site pH analysis proceeded as follows per SOP-SFM-01 in Attachment B of the QAPP:

Composite paste pH samples were collected using disposable trowel scoops, plastic cups, and deionized (DI) water. Roughly 1 inch of fine material was scooped from the sieved material into the bottom of the cup. The DI water was added to the sample, and the cup was swirled until a paste was made. Soil pH are included in Attachment B. The Hanna Instruments HI 99121 meter was used to measure the paste pH sample. The meter was decontaminated with DI water after each use. The collected soil was returned to the area where the sample was collected, and the tools were discarded.

3.1.1.2 XRF

The general XRF analysis proceeded as follows per SOP-SFM-02 in Attachment B of the QAPP:

Field personnel thoroughly homogenized the natural sample in the bag by kneading the soil, split roughly 1 disposable trowel scoop from the natural sample, and placed the split sample into a #10 sieve inside a gallon resealable plastic bag (i.e., Ziploc™). The sieved sample was transferred into an additional 1-quart resealable plastic bag so that it fit in the analyzer measurement stand. The material was compacted so that there was a flat surface on the area to be analyzed and visually inspected to ensure that only fines were present. The sample bag was placed on the XRF stand and analyzed. The results were recorded for the selected metals on the XRF field datasheet. Field

personnel completed duplicate and replicate XRF analyses on at least 5% of the samples analyzed in the XRF unit.

Soil samples for arsenic, cadmium, copper, mercury, lead, zinc, percent moisture, and associated QA/QC samples were packaged and shipped to Pace for analysis. Field forms are in Attachment B, analytical reports are in Attachment C, data deliverable files are in Attachment D, and soil results (including QA/QC samples), applicable laboratory flags, DV qualifiers, and reason codes are included in the tables in the DVR in Attachment A.

3.1.1.3 Laboratory Samples

The general laboratory sampling proceeded as follows per SOP-S-01 and SOP-SA-01 in Attachment B of the QAPP:

Composite soil samples were collected in a labeled plastic bag and homogenized after each subsample was collected. After the sample was collected from the 3-point composite, a portion of the sample was removed and placed in a #10 disposable sieve within a separate resealable plastic bag (XRF analysis described in Section 3.1.1.2 above). Field personnel then sent every 1 per 10 samples, with additional samples sent to the laboratory for confirmation if the field results were within the contaminant of concern action/screening levels (Table 1 and Table 2 within the QAPP) at 35% above and 35% below. Laboratory samples were analyzed for arsenic, cadmium, copper, lead, mercury, zinc, and percent moisture.

4.0 DEVIATIONS

During the sampling event, there were no deviations to the QAPP or FSP.





5.0 REFERENCES

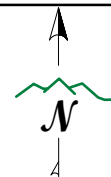
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- EPA, 2020b. U.S. Environmental Protection Agency National Functional Guidelines for Inorganic Superfund Data Review, January 2017.

Figures

Figure 1. Unreclaimed Sites UR-05 Sample Stations



-  2021 SAMPLED STATIONS
-  PROPOSED SAMPLE STATIONS
-  HISTORIC SAMPLE STATION
-  UNRECLAIMED SITES BOUNDARY



DISPLAYED AS: _____
 PROJECTION/ZONE: MSP
 DATUM: NAD 83
 UNITS: INT'L FT
 SOURCE: PIONEER/BSB/AR/QSI 2020

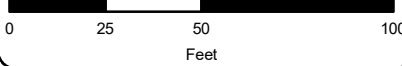



FIGURE 1
Unreclaimed Sites
UR-05
2021 Sample Stations
 DATE: 3/21/2022

Tables

Table 1. Coordinates for Sample Stations and Identification

Table 1. Coordinates for Sample Stations and Identification			
Station Field Identification	Sample Identification	Northing	Easting
UR-05-SS-01	BPSOU-UR05SS01-110421-X	660597.744	1196534.608
UR-05-SS-02	BPSOU-UR05SS02-110421-X	660530.73	1196612.038
UR-05-SS-03	BPSOU-UR05SS03-110421-X	660518.404	1196625.059
UR-05-SS-04	BPSOU-UR05SS04-110421-X	660526.911	1196695.892
UR-05-SS-05	BPSOU-UR05SS05-110421-X	660558.538	1196698.811

*Datum used is NAD83

Attachment A
Data Validation Report (DVR)

**SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT**

Draft Final

*2021 Unreclaimed Sites Sampling UR-05
Data Validation Report*

Atlantic Richfield Company

May 2022

**SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT**

Draft Final

***2021 Unreclaimed Sites Sampling UR-05
Data Validation Report***

Prepared for:

Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

Prepared by:

Pioneer Technical Services, Inc.
1101 South Montana Street
Butte, Montana 59701

May 2022

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- Table A2. Field Duplicate Pair Samples with Results, Laboratory Qualifiers, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Assessment
- Table A3. Sample Identification
- Table A4. Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Codes; and Reason Codes Definitions
- Table A5. XRF SiO₂ Standard and Calibration Check Sample Results
- Table A6. XRF Duplicate and Replicate Sample Results and QC Criteria Assessment

LIST OF ATTACHMENTS

- Attachment 1 Data Validation Checklists
- Attachment 1.1 Data Validation Checklists for XRF Analyses
 - Attachment 1.2 Data Validation Checklists for Laboratory Analyses
- Attachment 2 Level A/B Assessment Checklist
- Attachment 3 Data Validation Quality Control Criteria

ACRONYMS AND ABBREVIATIONS

Acronym	Definition
%R	Percent Recovery
BPSOU	Butte Priority Soils Operable Unit
CCS	Calibration Check Sample
CFRSSI	Clark Fork River Superfund Site Investigation
COC	Contaminants Of Concern
DM/DV	Data Management/Data Validation
DV	Data Validation
DVR	Data Validation Report
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LMS	Laboratory Matrix Spike
LMSD	Laboratory Matrix Spike Duplicate
LOD	Limit of Detection
MB	Method Blank
MDL	Method Detection Limit
mg/kg	milligram per kilogram
NFG	National Functional Guidelines
Pace	Pace Analytical Services, LLC
Pioneer	Pioneer Technical Services, Inc.
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference
SiO ₂	Silicon Dioxide
SOP	Standard Operating Procedure
UR	Unreclaimed
XRF	X-Ray Fluorescence

DOCUMENT MODIFICATION SUMMARY

Revision No.	Author	Version	Description	Date
Rev 0	Sara Ward	Draft	Issued for Internal Review	3/17/2022
Rev 1	Sara Ward	Draft Final	Submitted for Agency Review	05/24/2022

1.0 DATA VALIDATION REPORT SUMMARY

This Data Validation Report (DVR) summarizes the X-ray fluorescence (XRF) and laboratory analytical results from samples collected from the Unreclaimed (UR) UR-05 Site (referred to as Site). The samples were collected per the Final Butte Priority Soils Operable Unit (BPSOU) *Unreclaimed Sites Field Sampling Plan (FSP) Package #6: UR-05, UR-27, UR-28, UR-29, UR-30, and UR-34* (Atlantic Richfield Company, 2021a) (referred to herein as the FSP). The 2021 UR-05 sampling event included samples collected under the *2021 Unreclaimed Sites Quality Assurance Project Plan (QAPP)* (Atlantic Richfield Company, 2021b) (referred to herein as the QAPP).

All data have undergone a Stage 2A data validation (DV) as defined in the U.S. Environmental Protection Agency (EPA) *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA, 2009). The DV was conducted in accordance with the QAPP, the *Clark Fork River Superfund Site Investigation (CFRSSI) Data Management (DM)/DV Plan* (ARCO, 1992a) and *CFRSSI DM/DV Plan Addendum* (AERL, 2000), the *CFRSSI QAPP* (ARCO, 1992b), EPA *National Functional Guidelines (NFG) for Inorganic Methods Superfund Data Review* (EPA, 2020), analytical methods, and laboratory standard operating procedures (SOPs). The 2020 EPA National Functional Guidelines for Inorganic Methods Superfund Data Review was followed since it is the most current version. This report details the evaluation of field XRF and laboratory data for the purpose of usability.

This document refers to the tables and attachments below.

- Table A1 contains the natural sample results with laboratory qualifiers; DV qualifiers; enforcement, screening, and rejected classifications; and DV reason codes.
- Table A2 contains the field duplicate pair samples with results, laboratory qualifiers, DV qualifiers, DV reason codes, and quality control (QC) criteria assessment.
- Table A3 contains sample identification information including the field sample name, sample type, sample location, laboratory sample name, sample date, analytical methods, and analytes.
- Table A4 contains the definitions for the laboratory qualifiers; DV qualifiers; enforcement, screening, and rejected classification codes; and DV reason codes.
- Table A5 contains the XRF Silicon Dioxide (SiO₂) Standard and Calibration Check Sample (CCS) results.
- Table A6 contains the XRF duplicate and replicate sample results and QC criteria assessment.
- Attachment 1 contains the DV checklists. Attachment 1.1 and Attachment 1.2 contain the checklists for XRF analysis and laboratory analysis, respectively.
- Attachment 2 contains the Level A/B Assessment Checklist.
- Attachment 3 contains the QC criteria used in the DV process.

The instrument output for XRF data, produced by Pioneer Technical Services, Inc. (Pioneer), was used to perform the DV of the XRF results, and the standard data packages received from Pace Analytical Services, LLC (Pace) were used to perform the DV of the laboratory results.

All data met the Level A and B criteria. Based on the DV process outlined in the CFRSSI DM/DV Plan (ARCO, 1992a), the quality of the data is ranked as enforcement quality, screening quality, or it is rejected. Enforcement quality data are defined in the CFRSSI DM/DV Plan as data that meet the Level A and B criteria (Attachment 2) and are not qualified as estimated or rejected after the DV process. For sample results qualified as estimated “J” by the laboratory because the reported result is between the method detection limit (MDL) and analytical reporting limit (RL), values are considered enforcement data if no other qualifiers were required during DV. Enforcement quality data may be used for all purposes under the Superfund program including the following: site characterization, health and safety, Engineering Evaluation/Cost Analysis, remedial investigation/feasibility studies, evaluation of alternatives, confirmational purposes, risk assessments, and engineering design. As all samples met the Level A and B documentation criteria, the results that were not qualified as estimated (e.g., J, J+, J-, or UJ) or rejected for some exceedance of quality assurance (QA)/QC criteria were considered “enforcement” quality data and were assigned an “E” in Table A1. Screening quality data, as defined in the CFRSSI DM/DV Plan, are those samples that do not meet the Level B criteria and/or were qualified as estimated (e.g., J, J+, J-, or UJ) during the DV process. Potential uses of screening quality data, depending on their quality, include site characterization, determining the presence or absence of contaminants, developing or refining sampling and analysis techniques, determining relative concentrations, scoping and planning for future studies, engineering studies and engineering design, and monitoring during implementation of the response action. Sample results that were qualified as estimated during the DV process were considered “screening” quality data and assigned an “S” in Table A1.

Data rejected during DV cannot be used for any Superfund activities. No results were rejected.

The summary of data points in this DVR includes only the natural samples and does not include the field QC samples (the field duplicate). Note that the field QC samples underwent the same DV procedures as the natural samples and the results are included on the DV checklists in Attachment 1. The qualifications made to field QC samples are listed in Table A2; however, the qualifications made to these samples are not included in the summary of qualifications made to natural data points, and the field QC samples are not included in Table A1.

For the 2021 Site sampling event, a total of 15 natural soil samples were collected. All samples were analyzed in the field by XRF, and 12 samples were sent to Pace for laboratory analysis of metals. This resulted in a total of 90 natural data points generated by the XRF analyses and 84 natural data points generated by the laboratory analysis. A summary by analysis type is shown below:

Analysis Type	Natural Samples	Data Points	Enforcement Quality Data Points (% of total)	Screening Quality Data Points (% of total)	Rejected Data Points (% of total)
XRF	15	90	74 (82%)	16 (18%)	0 (0%)
Pace	12	84	70 (83%)	14 (17%)	0 (0%)

Please note that 15 of the 16 (94%) screening quality XRF data points were qualifications made to the mercury results due to the lack of a CCS with a known amount of mercury, as discussed in Section 2.2.3.

Table A1 shows the laboratory qualifiers, DV qualifiers, enforcement or screening designators, and the reason code for the qualification for each natural data point.

2.0 QUALITY ASSURANCE/QUALITY CONTROL REVIEW OF INORGANIC DATA

The QC criteria used during the DV process are listed in Attachment 3.

For XRF data, the QC criteria were derived from the QAPP, the CFRSSI DM/DV Plan (ARCO, 1992a) and DM/DV Plan Addendum (AERL, 2000), the CFRSSI QAPP (ARCO, 1992b), the *Niton XL3 Mining QC Sheet* (ThermoFisher Scientific, 2014), and the Pioneer SOP for operating the XL3 XRF analyzer (SOP-SFM-02) (included in the QAPP).

For laboratory data, the QC criteria were derived from the QAPP, CFRSSI DM/DV Plan Addendum (AERL, 2000), the NFG for Inorganic Superfund Data Review (EPA, 2020), analytical methods, and method-specific laboratory SOPs.

The DV checklists derived from the CFRSSI DM/DV Addendum (AERL, 2000) were completed for the XRF data and each laboratory report (Attachment 1). Below are the deviations made to the checklists provided in the CFRSSI DM/DV Addendum guidance document:

- The Laboratory DV Checklist for Metals Analysis by Spectrace XRF was revised slightly to more accurately reflect the information provided by the XRF Analyzer (Niton XL3). The checklist is included in Attachment 1.1. The guidelines for XRF QA and QC are listed in Section 3.6 (Quality Assurance/Quality Control) of the QAPP.
- The Laboratory DV Checklist for Metals Analysis by Inductively Coupled Plasma or Graphite Furnace Atomic Absorption Spectrometry was revised slightly to more accurately reflect the information provided in the full data packages provided by Pace and the requirements listed in the NFG (EPA, 2020). The checklist is included in Attachment 1.2.
- The DV Checklist for Field QC was not filled out for each data package. Sections on field duplicates were added to each Laboratory DV Checklist worksheet.

The relevant DV checklists were completed for each sample delivery group and included the DV performed for the methods and analytes listed below:

Data Validation Checklist	Method	Analyte(s)
XRF	XRF	Arsenic, cadmium, copper, lead, mercury, and zinc
Laboratory: Pace	EPA 6010D	Arsenic, cadmium, copper, lead, and zinc
	EPA 7471B	Mercury
	ASTM D2974	Percent Moisture

One Level A/B Assessment was completed for the Site (Attachment 2).

2.1 Field Quality Control Samples

The QAPP requirement for field duplicate collection frequency is 1 field duplicate sample per 20 natural samples or once per sampling event, whichever is more frequent. Disposable sampling equipment was used to collect soil samples; therefore, equipment rinsate blanks were not collected.

Any qualifications required based on the field QC sample results are detailed in the DV checklists (Attachment 1) and are listed in Table A1 and Table A2.

Please note that although the field QC samples (field duplicate samples) may receive a qualifier during the DV process, the enforcement and screening quality summaries and the precision and accuracy assessment summaries do not include the field QC sample results. Only the results of the natural samples are included in the data quality assessment summaries.

2.1.1 Field Duplicate

During the sampling event, 1 field duplicate sample was collected for the 12 natural samples submitted to Pace for analysis (8.3%); therefore, the collection frequency requirement for field duplicates (5%) was met.

The analytical RLs presented in the laboratory reports were used to evaluate the field duplicates. The field duplicate QC criteria assessments are listed in Table A2.

For the 15 natural XRF samples collected at the Site, 1 field duplicate sample (6.7%) was analyzed; therefore, the collection frequency requirement for field duplicates (5%) was met.

The QC criteria used to assess field duplicate pair results during DV are listed in Attachment 3. The field duplicate sample pairs and QC criteria assessments are listed in Table A2. If a field duplicate result was outside the control limit, the parent sample and any samples considered sufficiently similar were qualified as specified in Attachment 3. Any qualifications made to natural samples based on the field duplicate sample results are detailed in the DV checklists (Attachment 1) and are listed in Table A1 and Section 4.1.

2.1.2 Equipment Rinsate Blank

Disposable sampling equipment was used to collect soil samples; therefore, equipment rinsate blanks were not collected.

2.2 XRF Quality Control Samples

This section summarizes the XRF QC samples evaluated during the DV of the XRF results.

2.2.1 Energy Calibration Check

The energy calibration check determines whether the characteristic X-ray lines are shifting, which would indicate drift within the instrument. The requirement set forth in the QAPP was the performance of the preprogrammed energy calibration check on the equipment at the beginning of each working day. During the sampling event, the energy calibration check was performed at the beginning of each working day.

2.2.2 Silicon Dioxide Standard

The SiO₂ standard, as provided by Niton, is a "clean" quartz or silicon dioxide matrix that contains concentrations of selected analytes near or below the machine's lower limit of detection. Analysis results with the XRF instrument of this SiO₂ standard are used to monitor for cross contamination. The frequency requirement for SiO₂ standard sample analysis set forth in the QAPP is to complete analysis of this sample at the beginning of each day, once per every 20 samples, and at the end of each day's run sequence.

During the sampling event, the frequency requirement for SiO₂ standard samples was met. Results are listed on Table A5.

The SiO₂ standard sample results were within the control limits.

2.2.3 Calibration Check Samples

The CCSs helps check the accuracy of the XRF instrument and assess the stability and consistency of the analysis for the analytes of interest. The CCSs used were the Niton-provided Standard Reference Materials: NIST 2709a- Joaquin Soil (NIST 2709a) sample and a Resource Conservation and Recovery Act sample.

The frequency requirement for CCS analysis set forth in the QAPP is to complete analysis of at least 1 CCS at the start of each day, once per every 20 samples, and as the last analysis each day. The frequency requirement for CCS analyses was met. Results are listed on Table A5.

- The CCS results were within the control limits. However, there was no CCS that had a known amount of mercury greater than the limit of detection (LOD) for mercury. Therefore, all detected mercury results have been qualified "J" and all non-detected

mercury results have been qualified “UJ.” This resulted in 15 mercury results qualified “UJ” due to the lack of an appropriate CCS.

Qualification due to lack of an appropriate CCS standard are listed in Table A1.

2.2.4 XRF Duplicate and XRF Replicate Samples

The XRF duplicate and XRF replicate samples help check the precision of the XRF sampling method and instrument. The XRF duplicate sample was analyzed by removing the sample bag from the analytical stand, kneading it once or twice, and analyzing a second time. The XRF replicate sample was analyzed immediately following the primary sample analysis by restarting the XRF to analyze the same sample a second time with the same soil in the XRF aperture.

The frequency requirement for XRF duplicate and XRF replicate samples set forth in the QAPP is the analysis of each sample once per every 20 samples (5%).

For the 15 natural XRF samples collected at the Site, 1 duplicate sample (6.7%) and 1 replicate sample (6.7%) were analyzed. Therefore, the frequency requirement for XRF duplicate and XRF replicate samples (5%) was met for the Site.

Table A6 contains the XRF duplicate and XRF replicate sample pair results with the parent sample results and the QC criteria assessment. If the results were outside the control limit, the parent sample and any sample considered sufficiently similar were qualified “J” if the result was detected and “UJ” if the result was not detected.

The XRF duplicate and XRF replicate sample results were within the control limits.

2.3 Laboratory Quality Control Samples

The laboratory QC sample types vary depending on analytical method. The QC criteria used during DV to evaluate the applicable laboratory QC samples are listed in Attachment 3 and Section 3.6 of the QAPP.

The Stage 2A DV includes the evaluation of the following laboratory QC items as applicable per analytical method:

- Holding Times.
- Preservation.
- Method Blanks (MB).
- Laboratory Control Sample (LCS) and LCS Duplicates (LCSD).
- Laboratory Duplicate Samples.
- Laboratory Matrix Spike (LMS) and LMS Duplicates (LMSD).

The analytical RLs produced by each laboratory were used to evaluate the laboratory duplicates. The laboratory MDLs were used for the data review and DV of laboratory MB samples.

The appropriate laboratory QC samples were analyzed with each sample group. Any qualifications required based on the laboratory QC sample results are detailed in the DV checklists (Attachment 1) and are listed in Table A1. Also refer to Section 4.1 and Section 4.2.

3.0 LEVEL A/B ASSESSMENT SUMMARY

Data that meet the Level A and Level B criteria and are not qualified as estimated or rejected are assessed as enforcement quality data and can be used for all Superfund purposes and activities. Data that meet only the Level A criteria and are not rejected can be assessed as screening quality data.

Screening quality data can be used only for certain activities, which include engineering studies and design. Data that do not meet both the Level A and Level B criteria are designated as unusable. The Level A/B Assessment Checklist for all samples collected for the Site are included as Attachment 2. Sample collection information was recorded in the field logbook, including sample collection date, location, and collection method. This information was reviewed for the Level A/B criteria.

As shown in Attachment 2, all the samples met both Level A and Level B criteria. No data were designated screening quality or rejected based on the results of Level A/B assessment.

4.0 PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, COMPLETENESS, AND SENSITIVITY DATA SUMMARY

This section provides the precision, accuracy, representativeness, comparability, completeness, and sensitivity assessment for the XRF and laboratory data generated from samples collected during the 2021 Site sampling event.

4.1 Precision

Precision is the amount of scatter or variance that occurs in repeated measurements of a particular analyte.

4.1.1 XRF Precision

The precision control limit used for XRF soil samples was a relative percent difference (RPD) less than 35% when both sample results were detections. For XRF data, the precision assessment is based on the RPD of XRF duplicate, XRF replicate, and field duplicate sample pairs. If an RPD was outside the control limit, the parent sample and samples considered sufficiently similar to the parent sample were qualified. No natural samples were considered sufficiently similar enough to each other to require additional qualifications based on the variability of soil matrices. If the parent sample was a duplicate sample, the duplicate sample's parent sample was considered sufficiently similar and was qualified when applicable.

There was 1 instance where the field duplicate pair results did not meet the control limit. There were no qualifications made to the natural data points because the XRF duplicate or XRF

replicate pair results did not meet the control limit. This resulted in qualification of 1 natural data point due to XRF precision.

The natural sample qualified for poor field duplicate precision (DV Reason Code = FD) is listed below:

Field Sample ID	Method	Analyte	DV Qualifier	DV Reason Code
BPSOU-UR05SS02-110421-1	XRF	Lead	J	FD

This resulted in 1 (1%) of the 90 natural XRF data points that did not meet the precision requirements, and 89 (99%) of the 90 natural XRF data points that did meet the precision requirements.

4.1.2 Laboratory Precision

Acceptance or rejection of precision measurements is based on the RPD of the laboratory and field duplicates. For example, perfect precision would be a 0% RPD between duplicate samples (both samples have the same analytical result) for results that are greater than 5 times the laboratory RL. For total metals analysis, when both results are greater than 5 times the RL, acceptable precision is an RPD of plus or minus 35% in soil samples. For samples with 1 or both results less than 5 times the RL (including non-detect), acceptable precision is met if the absolute difference between the 2 sample results is less than 2 times the RL. This precision requirement is from Section 2.4.1 of the CFRSSI QAPP (ARCO, 1992b).

There were two instances where the field duplicate pair results from Pace did not meet the control limit. There were no qualifications made to the natural data points because laboratory duplicate pair results did not meet the control limit. This resulted in the qualification of two natural data points due to field duplicate precision.

The natural samples qualified for poor field duplicate precision (DV Reason Code = FD) are listed below:

Field Sample ID	Method	Analyte	DV Qualifier	DV Reason Code
BPSOU-UR05SS02-110421-1	SW-846 6010D	Copper	J	FD
BPSOU-UR05SS02-110421-1	ASTM D2974	Moisture, Percent	J	FD

This resulted in 2 (2%) of the 84 natural laboratory data points that did not meet the precision requirements, and 82 (98%) of the 84 natural laboratory data points that did meet the precision requirements.

4.2 Accuracy

Accuracy is the ability of the analytical procedure to determine the actual or known quantity of a particular substance in a sample.

4.2.1 XRF Accuracy

For the XRF data, the SiO₂ standard and CCS are used to assess accuracy. The control limit for these samples is summarized in Attachment 3. If a SiO₂ standard or CCS result was outside the control limit, the natural sample results analyzed in the same run sequence were qualified.

If a SiO₂ standard had a detected result greater than the control limit, the natural sample results analyzed in the same analytical run were qualified “J+” if the natural sample result was a detected result less than 10 times the SiO₂ standard result.

All SiO₂ standard results were within control limits.

If the CCS result was outside the control limits summarized in Attachment 3, the natural sample results in the same analytical run as these CCS results were qualified as “J” for detected results or “UJ” for non-detected results.

All CCS analysis results were within the control limit.

For the XRF results, 90 (100%) of the 90 natural XRF data points did meet the accuracy requirements.

4.2.2 Laboratory Accuracy

For the laboratory data, MB, LCS, LCSD, LMS, and LMSD were used to assess accuracy. The QC criteria used during DV for each QC sample are summarized in Attachment 3.

Laboratory blanks were analyzed to assess artifacts introduced during analyses that may affect the accuracy of the data. In accordance with the CFRSSI QAPP (ARCO, 1992b), a data point is qualified as “U” if it is less than 5 times an associated blank result (MB) that does not meet the control limit.

The percent recoveries (%R) of the LCS, LCSD, LMS, and LMSD are used to measure accuracy. The LCS and LCSD measure sample preparation and analysis accuracy. The LMS and LMSD measure the effect that the sample matrix has on accuracy. Perfect %R would be 100% (the analysis result is exactly the known concentration of the spike amount in the LMS, LMSD, LCS or LCSD).

For the 2021 Site sampling event, there were no qualifications made due to indicators of accuracy.

For the laboratory results, 84 (100%) of the 84 natural laboratory data points did meet the accuracy requirements.

4.3 Representativeness

Representativeness is a qualitative parameter that is addressed through proper design of the sampling program. Samples for XRF analysis and laboratory analysis were collected in accordance with the QAPP and FSP.

The XRF and laboratory results were reviewed, and a Stage 2A DV completed. Based on information provided by Pace, the chain of custody requirements were met for the sample event. All samples were analyzed within the appropriate holding times. Twelve natural laboratory data points were qualified due to not meeting the preservation requirement (<6°C) for mercury (DV Reason Code = Pres) as listed below:

Field Sample ID	Method	Analyte	DV Qualifier	DV Reason Code
BPSOU-UR05SS02-110421-1	SW-846 7471B	Mercury	J-	Pres
BPSOU-UR05SS02-110421-2	SW-846 7471B	Mercury	J-	Pres
BPSOU-UR05SS02-110421-3	SW-846 7471B	Mercury	J-	Pres
BPSOU-UR05SS03-110421-1	SW-846 7471B	Mercury	J-	Pres
BPSOU-UR05SS03-110421-2	SW-846 7471B	Mercury	J-	Pres
BPSOU-UR05SS03-110421-3	SW-846 7471B	Mercury	J-	Pres
BPSOU-UR05SS04-110421-1	SW-846 7471B	Mercury	J-	Pres
BPSOU-UR05SS04-110421-2	SW-846 7471B	Mercury	J-	Pres
BPSOU-UR05SS04-110421-3	SW-846 7471B	Mercury	J-	Pres
BPSOU-UR05SS05-110421-1	SW-846 7471B	Mercury	J-	Pres
BPSOU-UR05SS05-110421-2	SW-846 7471B	Mercury	J-	Pres
BPSOU-UR05SS05-110421-3	SW-846 7471B	Mercury	J-	Pres

These data points are considered usable with the recognition that the preservation requirement for mercury was not met. The representativeness goals were met.

4.4 Comparability

Comparability is assessed to determine if one set of data can be compared to another set of data. Comparisons are made by examining and comparing the laboratory and field methods used to acquire sample data for different distinct data sets. The data summarized in this report includes soil samples collected and analyzed by Pioneer and Pace.

4.4.1 XRF Comparability

The soil samples were collected using standard sampling methods and Pioneer SOPs. The sampling design, SOPs, and XRF methods are based on EPA and other industry standard practices and were documented in the field logbook. Sample collection was completed by professionals who were properly trained in using the SOPs and equipment. Proper sample handling was observed during sample collection and analysis.

Consequently, data from past and future soil sampling events at the Site using comparable sampling and XRF analysis may be used in concert with this data set.

4.4.2 Laboratory Comparability

The samples were collected using standard sampling methods and Pioneer SOPs. The sampling design, SOPs, and laboratory analytical methods are based on EPA and other industry standard practices and were documented in the field logbook. Sample collection was completed by professionals who were properly trained in using the SOPs and equipment. Proper chain of custody and sample handling were observed during sample collection, delivery to the laboratory, and analysis. The analytical laboratories performed the sample analysis using industry standard methods.

Consequently, data from past and future sampling events at the Site using comparable sampling and analytical methods may be used in concert with this data set.

4.5 Completeness

Completeness is assessed to determine if enough valid data have been collected to meet the investigation needs. Completeness is assessed by comparing the number of valid sample results to the number of sample results planned for the investigation. The completeness target for this investigation was 95% or greater as designated in the CFRSSI QAPP (ARCO, 1992b).

The completeness for XRF and laboratory samples and results are summarized below:

Analysis Type	Collected Samples vs Planned Samples	Valid Data Points vs Total Data Points
XRF	100%	100%
Laboratory	100%	100%

4.5.1 XRF Completeness

The QAPP and FSP include the planned soil sample locations and list the planned analytical techniques including XRF analysis.

Samples were collected at 5 sample locations during the 2021 Site sampling event as specified in the FSP. All samples that were outlined in the FSP were collected for the Site. The completeness for XRF data based on sample collection was 100% and the completeness goal was met.

In total, 90 XRF data points were generated. All data points are considered usable because no results were rejected. The 15 XRF samples collected were analyzed by XRF for arsenic, cadmium, copper, lead, mercury, and zinc. Therefore, the completeness for XRF data based on sample analysis was 100% and the completeness goal was met.

4.5.2 Laboratory Completeness

The requirement for confirmation samples sent to the laboratory per the QAPP is at a rate of 1 per 10 natural XRF samples (10%), with additional samples sent to the laboratory for

confirmation if the field results show the contaminant of concern (COC) levels at 35% above or 35% below established action/screening levels to limit decision errors.

For the 2021 Site sampling event, 12 of the 15 natural samples collected and analyzed by XRF were sent to Pace for analysis (80%). All natural samples collected with XRF results requiring confirmation were sent to Pace for analysis. The frequency requirement for the confirmation samples sent to the laboratory for analysis were met. Therefore, the completeness for laboratory samples based on sample collection was 100% and the completeness goal was met.

In total, 84 natural laboratory data points were generated by the sampling event. The 12 laboratory samples collected were analyzed for arsenic, cadmium, copper, lead, mercury, zinc, and percent moisture. All the natural data points were usable as no sample results were rejected. Therefore, the completeness for laboratory data based on sample analysis was 100%, and the completeness goal was met.

4.6 Sensitivity

Sensitivity is a quantitative measure and is evaluated by comparing the detection limit to the project-specific sensitivity requirements.

4.6.1 XRF Sensitivity

The non-detected XRF results were reported as less than the LOD associated with each result.

The QAPP does not specify sensitivity requirements for XRF analyses; therefore, the action/screening levels in the QAPP were used to evaluate sensitivity for each analyte. The QAPP specified that samples must be sent to the laboratory for confirmation if the field results show the COC levels at 35% above or 35% below established action/screening levels to limit decision errors. Therefore, a value of 35% below the BPSOU Soil Screening Criteria for Storm Water COCs listed on Table 2 of the QAPP were used to evaluate sensitivity because they are less than the BPSOU Soil Action Level for Human Health listed in Table 1 of the QAPP. The required detection limit for XRF results is summarized below:

Analyte	Criteria	Units	Action/Screening Level	35% below
Arsenic	Storm Water	mg/kg	200	130
Cadmium	Storm Water	mg/kg	20	13
Copper	Storm Water	mg/kg	1,000	650
Lead	Storm Water	mg/kg	1,000	650
Mercury	Storm Water	mg/kg	10	6.5
Zinc	Storm Water	mg/kg	1,000	650

mg/kg: milligrams per kilogram.

The detection limit for the non-detected XRF results was less than 35% below the minimum action/screening level for each analyte except for the following results:

Field Sample ID	Method	Analyte	Units	Result (<LOD)
BPSOU-UR05SS04-110421-1	XRF	Mercury	mg/kg	<7.64
BPSOU-UR05SS04-110421-2	XRF	Mercury	mg/kg	<8.1
BPSOU-UR05SS04-110421-3	XRF	Mercury	mg/kg	<8.42
BPSOU-UR05SS02-110421-1	XRF	Mercury	mg/kg	<9.27
BPSOU-UR05SS02-110421-2	XRF	Mercury	mg/kg	<8.43
BPSOU-UR05SS02-110421-3	XRF	Mercury	mg/kg	<9.01
BPSOU-UR05SS03-110421-1	XRF	Mercury	mg/kg	<9.79
BPSOU-UR05SS03-110421-2	XRF	Mercury	mg/kg	<10.28
BPSOU-UR05SS03-110421-3	XRF	Mercury	mg/kg	<8.74
BPSOU-UR05SS01-110421-1	XRF	Mercury	mg/kg	<8.56
BPSOU-UR05SS01-110421-2	XRF	Mercury	mg/kg	<6.56
BPSOU-UR05SS05-110421-1	XRF	Mercury	mg/kg	<6.81
BPSOU-UR05SS05-110421-2	XRF	Mercury	mg/kg	<6.69
BPSOU-UR05SS05-110421-3	XRF	Mercury	mg/kg	<6.99

mg/kg: milligrams per kilogram. LOD: limit of detection.

These data points are considered usable with the recognition that the LOD for the non-detected results is higher than 35% below the lowest action/screening level.

4.6.2 Laboratory Sensitivity

All sample results from Pace had detections for all analytes.

4.7 Overall Data Summary

The following list shows an overall summary of the DV performed on the data generated by Pioneer for the samples collected during the 2021 Site sampling event.

Analysis Type	Total Natural		Level A/B	DV Qual J, J+, J-, or UJ	DV Qual R	DV Qual U or A	Enforcement Quality	Screening Quality	Rejected
	Samples	Data Points	A/B	Data Points	Data Points	Data Points	Data Points (% of total)	Data Points (% of Total)	Data Points (% of Total)
XRF	15	90	B	16	0	0	74 (82%)	16 (18%)	0 (0%)
Pace	12	84	B	14	0	0	70 (83%)	14 (17%)	0 (0%)

5.0 REFERENCES

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TABLES

Table A1. Natural Sample Results with Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Classifications; and Data Validation Reason Codes

Table A2. Field Duplicate Pair Samples with Results, Laboratory Qualifiers, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Assessment

Table A3. Sample Identification

Table A4. Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Codes; and Reason Codes Definitions

Table A5. XRF SiO₂ Standard and Calibration Check Sample Results

Table A6. XRF Duplicate and Replicate Sample Results and QC Criteria Assessment

Table A1. Natural Sample Results with Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Classifications; and Data Validation Reason Codes

Station (Depth Interval)			UR-05-SS-01(0-2)					UR-05-SS-01(2-6)					UR-05-SS-01(6-12)					UR-05-SS-02(0-2)					UR-05-SS-02(2-6)					UR-05-SS-02(6-12)					UR-05-SS-03(0-2)				
Field Sample ID			BPSOU-UR05SS01-110421-1					BPSOU-UR05SS01-110421-2					BPSOU-UR05SS01-110421-3					BPSOU-UR05SS02-110421-1					BPSOU-UR05SS02-110421-2					BPSOU-UR05SS02-110421-3					BPSOU-UR05SS03-110421-1				
Lab Sample ID			N/A					N/A					N/A					10587273001					10587273003					10587273004					10587273005				
Sample Date			11/4/2021					11/4/2021					11/4/2021					11/4/2021					11/4/2021					11/4/2021									
Sample Type			Natural					Natural					Natural					Natural					Natural					Natural									
Method	Analyte	Units	Result	Lab Qual	DV Qual	S/E	Reason Code	Result	Lab Qual	DV Qual	S/E	Reason Code	Result	Lab Qual	DV Qual	S/E	Reason Code	Result	Lab Qual	DV Qual	S/E	Reason Code	Result	Lab Qual	DV Qual	S/E	Reason Code	Result	Lab Qual	DV Qual	S/E	Reason Code	Result	Lab Qual	DV Qual	S/E	Reason Code
XRF	Arsenic	mg/kg	64.82			E		19.69			E		20.05			E		284.08			E		225.63			E		105.68			E		313.89			E	
XRF	Cadmium	mg/kg	<7.79	<LOD		E		<7.23	<LOD		E		<7.38	<LOD		E		<7.88	<LOD		E		<7.78	<LOD		E		<7.96	<LOD		E		12.07			E	
XRF	Copper	mg/kg	496.09			E		172.85			E		108.93			E		763.22			E		1,009.67			E		435.64			E		1,216.20			E	
XRF	Lead	mg/kg	188.28			E		41.01			E		48.98			E		816.97		J	S	FD	740.92			E		671.16			E		1,170.94			E	
XRF	Mercury	mg/kg	<8.56	<LOD	UJ	S	CX	<6.56	<LOD	UJ	S	CX	<6.49	<LOD	UJ	S	CX	<9.27	<LOD	UJ	S	CX	<8.43	<LOD	UJ	S	CX	<9.01	<LOD	UJ	S	CX	<9.79	<LOD	UJ	S	CX
XRF	Zinc	mg/kg	992.23			E		146.68			E		174.20			E		2,477.02			E		1,784.01			E		2,289			E		3,031.58			E	
ASTM D2974	Moisture, Percent	%																13.4	N2	J	S	FD	5.7	N2		E		26.8	N2		E		23.0	N2		E	
SW-846 6010D	Arsenic	mg/kg																161			E		145			E		62.3			E		234			E	
SW-846 6010D	Cadmium	mg/kg																4.7			E		3.6			E		3.8			E		8.7			E	
SW-846 6010D	Copper	mg/kg																359		J	S	FD	658			E		235			E		1,120			E	
SW-846 6010D	Lead	mg/kg																636			E		639			E		756			E		1,980			E	
SW-846 6010D	Zinc	mg/kg																1,520			E		1,380			E		1,500			E		2,450			E	
SW-846 7471B	Mercury	mg/kg																0.25		J-	S	Pres	0.31		J-	S	Pres	0.26		J-	S	Pres	0.80		J-	S	Pres

Notes:

Depth intervals are inches below ground surface.

Qualification (Qual) and Reason Codes are defined in Table A4.

< - Not detected at the detection limit.

Abbreviations:

mg/kg - milligram per kilogram

Table A1. Natural Sample Results with Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Classifications; and Data Validation Reason Codes

Station (Depth Interval)			UR-05-SS-03(2-6)					UR-05-SS-03(6-12)					UR-05-SS-04(0-2)					UR-05-SS-04(2-6)					UR-05-SS-04(6-12)					UR-05-SS-05(0-2)					UR-05-SS-05(2-6)				
Field Sample ID			BPSOU-UR05SS03-110421-2					BPSOU-UR05SS03-110421-3					BPSOU-UR05SS04-110421-1					BPSOU-UR05SS04-110421-2					BPSOU-UR05SS04-110421-3					BPSOU-UR05SS05-110421-1					BPSOU-UR05SS05-110421-2				
Lab Sample ID			10587273006					10587273007					10587273008					10587273009					10587273010					10587273011					10587273012				
Sample Date			11/4/2021					11/4/2021					11/4/2021					11/4/2021					11/4/2021					11/4/2021									
Sample Type			Natural					Natural					Natural					Natural					Natural					Natural									
Method	Analyte	Units	Result	Lab Qual	DV Qual	S/E	Reason Code	Result	Lab Qual	DV Qual	S/E	Reason Code	Result	Lab Qual	DV Qual	S/E	Reason Code	Result	Lab Qual	DV Qual	S/E	Reason Code	Result	Lab Qual	DV Qual	S/E	Reason Code	Result	Lab Qual	DV Qual	S/E	Reason Code	Result	Lab Qual	DV Qual	S/E	Reason Code
XRF	Arsenic	mg/kg	117.58			E		222.28			E		91.92			E		91.33			E		79.55			E		12.78			E		19.68			E	
XRF	Cadmium	mg/kg	17.63			E		11.51			E		<7.45	<LOD		E		10.20			E		<8.02	<LOD		E		<7.73	<LOD		E		<7.33	<LOD		E	
XRF	Copper	mg/kg	1,024.87			E		1,051.54			E		390.21			E		345.69			E		305.56			E		219.27			E		240.93			E	
XRF	Lead	mg/kg	869.47			E		1,308.11			E		456.39			E		694.04			E		734.69			E		46.79			E		27.23			E	
XRF	Mercury	mg/kg	<10.28	<LOD	UJ	S	CX	<8.74	<LOD	UJ	S	CX	<7.64	<LOD	UJ	S	CX	<8.1	<LOD	UJ	S	CX	<8.42	<LOD	UJ	S	CX	<6.81	<LOD	UJ	S	CX	<6.69	<LOD	UJ	S	CX
XRF	Zinc	mg/kg	1,553.31			E		2,267.83			E		1,192.12			E		1,638.76			E		1,765.97			E		239.00			E		126.44			E	
ASTM D2974	Moisture, Percent	%	7.8	N2		E		17.0	N2		E		4.0	N2		E		15.9	N2		E		10.0	N2		E		5.9	N2		E		3.9	N2		E	
SW-846 6010D	Arsenic	mg/kg	145			E		117			E		37.9			E		35.5			E		47.3			E		12.2			E		9.3			E	
SW-846 6010D	Cadmium	mg/kg	5.3			E		4.0			E		1.6			E		1.6			E		3.3			E		0.68			E		0.27			E	
SW-846 6010D	Copper	mg/kg	49,500			E		426			E		248			E		250			E		238			E		214			E		151			E	
SW-846 6010D	Lead	mg/kg	1,190			E		944			E		216			E		571			E		812			E		43.2			E		26.6			E	
SW-846 6010D	Zinc	mg/kg	1,840			E		1,630			E		506			E		646			E		1,180			E		206			E		58.3			E	
SW-846 7471B	Mercury	mg/kg	0.45		J-	S	Pres	0.65		J-	S	Pres	0.15		J-	S	Pres	0.16		J-	S	Pres	0.26		J-	S	Pres	0.029		J-	S	Pres	0.038		J-	S	Pres

Notes:

Depth intervals are inches below ground surface.

Qualification (Qual) and Reason Codes are defined in Table A4.

< - Not detected at the detection limit.

Abbreviations:

mg/kg - milligram per kilogram

Table A1. Natural Sample Results with Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Classifications; and Data Validation Reason Codes

Station (Depth Interval)			UR-05-SS-05(6-12)				
Field Sample ID			BPSOU-UR05SS05-110421-3				
Lab Sample ID			10587273013				
Sample Date			11/4/2021				
Sample Type			Natural				
Method	Analyte	Units	Result	Lab Qual	DV Qual	S/E	Reason Code
XRF	Arsenic	mg/kg	28.13			E	
XRF	Cadmium	mg/kg	<7.69	<LOD		E	
XRF	Copper	mg/kg	196.23			E	
XRF	Lead	mg/kg	39.26			E	
XRF	Mercury	mg/kg	<6.99	<LOD	UJ	S	CX
XRF	Zinc	mg/kg	167.24			E	
ASTM D2974	Moisture, Percent	%	3.5	N2		E	
SW-846 6010D	Arsenic	mg/kg	19.9			E	
SW-846 6010D	Cadmium	mg/kg	0.32			E	
SW-846 6010D	Copper	mg/kg	146			E	
SW-846 6010D	Lead	mg/kg	28.3			E	
SW-846 6010D	Zinc	mg/kg	85.0			E	
SW-846 7471B	Mercury	mg/kg	0.068		J-	S	Pres

Notes:

Depth intervals are inches below ground surface.

Qualification (Qual) and Reason Codes are defined in Table A4.

< - Not detected at the detection limit.

Abbreviations:

mg/kg - milligram per kilogram

Table A2. Field Duplicate Pair Samples with Results, Laboratory Qualifiers, Data Validation Qualifiers, Data Validation Reason Codes, and QC Criteria Assessment

Station (Depth Interval)			UR-05-SS-02(0-2)						UR-05-SS-02(0-2)-FD									
Field Sample ID			BPSOU-UR05SS02-110421-1						BPSOU-UR05SS02-110421-1-FD									
Lab Sample ID			10587273001						10587273002									
Sample Date			11/4/2021						11/4/2021									
Sample Type			Natural Sample						Field Duplicate									
Method	Analyte	Units	Result	Lab Qual	DV Qual	Reason Code	DF	RL	Result	Lab Qual	DV Qual	Reason Code	DF	RL	Control Limit ¹	ABS DIF	RPD	Meets Control Limit?
XRF	Arsenic	mg/kg	284.08				1	N/A	220.14				1	N/A	RPD≤35%		25%	Yes
XRF	Cadmium	mg/kg	<7.88	<LOD			1	N/A	9.75				1	N/A	N/A		-	-
XRF	Copper	mg/kg	763.22				1	N/A	559.10				1	N/A	RPD≤35%		31%	Yes
XRF	Lead	mg/kg	816.97		J	FD	1	N/A	565.05		J	FD	1	N/A	RPD≤35%		36%	RPD>35%
XRF	Mercury	mg/kg	<9.27	<LOD	UJ	CX	1	N/A	<8.69	<LOD	UJ	CX	1	N/A	N/A		-	-
XRF	Zinc	mg/kg	2,477.02				1	N/A	2,285.46				1	N/A	RPD≤35%		8%	Yes
ASTM D2974	Moisture, Percent	%	13.4	N2	J	FD	1	0.1	5.1	N2	J	FD	1	0.1	RPD≤35%		89%	RPD>35%
SW-846 6010D	Arsenic	mg/kg	161				2	2.2	203	P6			2	2.0	RPD≤35%		23%	Yes
SW-846 6010D	Cadmium	mg/kg	4.7				2	0.34	4.6				2	0.30	RPD≤35%		2%	Yes
SW-846 6010D	Copper	mg/kg	359		J	FD	2	1.1	519	P6	J	FD	2	1.0	RPD≤35%		36%	RPD>35%
SW-846 6010D	Lead	mg/kg	636				2	1.1	630	P6			2	1.0	RPD≤35%		1%	Yes
SW-846 6010D	Zinc	mg/kg	1,520				2	4.5	1,720	P6			2	4.1	RPD≤35%		12%	Yes
SW-846 7471B	Mercury	mg/kg	0.25		J-	Pres	1	0.021	0.20		J-	Pres	1	0.019	RPD≤35%		22%	Yes

Notes:

Qualification (Qual) and Reason Codes are defined in Table A4.

< - Not detected at the detection limit.

The qualifications made to the field duplicate samples (DV Qual/Reason Code) are not included in the summary of qualifications made to natural samples discussed in the Data Validation Report.

Depth intervals are inches below ground surface.

Abbreviations:

DF - dilution factor

RL - reporting limit

ABS DIF - absolute difference

RPD - relative percent difference

mg/kg - milligram per kilogram

Footnotes:

1. If the control limit is an absolute difference less than 2 times the reporting limit, the minimum adjusted reporting limit will be used.

Table A3. Sample Identification

Station ID	Field Sample ID	Sample Type	Depth Interval (in bgs)	Sample Date	XRF	Lab ID	ASTM D2974	SW-846 6010D	SW-846 7471B
UR-05-SS-01	BPSOU-UR05SS01-110421-1	Natural	0 - 2	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	N/A			
UR-05-SS-01	BPSOU-UR05SS01-110421-2	Natural	2 - 6	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	N/A			
UR-05-SS-01	BPSOU-UR05SS01-110421-3	Natural	6 - 12	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	N/A			
UR-05-SS-02	BPSOU-UR05SS02-110421-1	Natural	0 - 2	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273001	moisture	As, Cd, Cu, Pb, Zn	Hg
UR-05-SS-02	BPSOU-UR05SS02-110421-1-FD	Field Duplicate	0 - 2	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273002	moisture	As, Cd, Cu, Pb, Zn	Hg
UR-05-SS-02	BPSOU-UR05SS02-110421-2	Natural	2 - 6	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273003	moisture	As, Cd, Cu, Pb, Zn	Hg
UR-05-SS-02	BPSOU-UR05SS02-110421-3	Natural	6 - 12	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273004	moisture	As, Cd, Cu, Pb, Zn	Hg
UR-05-SS-03	BPSOU-UR05SS03-110421-1	Natural	0 - 2	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273005	moisture	As, Cd, Cu, Pb, Zn	Hg
UR-05-SS-03	BPSOU-UR05SS03-110421-2	Natural	2 - 6	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273006	moisture	As, Cd, Cu, Pb, Zn	Hg
UR-05-SS-03	BPSOU-UR05SS03-110421-3	Natural	6 - 12	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273007	moisture	As, Cd, Cu, Pb, Zn	Hg
UR-05-SS-04	BPSOU-UR05SS04-110421-1	Natural	0 - 2	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273008	moisture	As, Cd, Cu, Pb, Zn	Hg
UR-05-SS-04	BPSOU-UR05SS04-110421-2	Natural	2 - 6	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273009	moisture	As, Cd, Cu, Pb, Zn	Hg
UR-05-SS-04	BPSOU-UR05SS04-110421-3	Natural	6 - 12	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273010	moisture	As, Cd, Cu, Pb, Zn	Hg
UR-05-SS-05	BPSOU-UR05SS05-110421-1	Natural	0 - 2	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273011	moisture	As, Cd, Cu, Pb, Zn	Hg
UR-05-SS-05	BPSOU-UR05SS05-110421-2	Natural	2 - 6	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273012	moisture	As, Cd, Cu, Pb, Zn	Hg
UR-05-SS-05	BPSOU-UR05SS05-110421-3	Natural	6 - 12	11/4/2021	As, Cd, Cu, Pb, Hg, Zn	10587273013	moisture	As, Cd, Cu, Pb, Zn	Hg

Abbreviations:

in bgs - inches below ground surface
 As - arsenic
 Cd - cadmium
 Cu - copper
 Pb - lead
 Hg - mercury
 Zn - zinc

Table A4. Laboratory Qualifiers; Data Validation Qualifiers; Enforcement, Screening, and Rejected Codes; and Reason Codes Definitions

Lab Qual (Pace Analytical Services [Pace] Qualifiers)

N2 = The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply.

P6 = Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

XRF Qual (XRF Qualifiers)

<LOD = Not detected at the reporting limit.

DV Qual (Data Validation Qualifiers)

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

J- = The result is an estimated quantity, but the result may be biased low

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

S/E (Screening/Enforcement Quality Designation)

E = Enforcement quality.

S = Screening quality.

R = Unusable (Rejected) quality.

Reason Code (Data Validation Reason Codes)

FD = Qualified due to field duplicate results outside of control limits.

Pres = Qualified because preservation requirement was not met.

CX = Qualified because frequency of check samples was not satisfied.

Table A5. XRF SiO2 Standard and Calibration Check Sample Results

Analyte			Arsenic		Cadmium		Copper		Lead		Mercury		Zinc	
Standard Type	Sample ID	Analysis Date	Result (mg/kg)	Meets Control Limit (<10 mg/kg)	Result (mg/kg)	Meets Control Limit (<50 mg/kg)	Result (mg/kg)	Meets Control Limit (<20 mg/kg)	Result (mg/kg)	Meets Control Limit (<10 mg/kg)	Result (mg/kg)	Meets Control Limit (<10 mg/kg)	Result (mg/kg)	Meets Control Limit (<10 mg/kg)
SiO2	P_20211104_98052_283	11/4/2021	3.12	Yes	11.59	Yes	<11.31	Yes	<3.28	Yes	<4.73	Yes	<5.42	Yes
SiO2	P_20211104_98052_305	11/4/2021	2.60	Yes	<6.39	Yes	<11.32	Yes	<3.25	Yes	<4.67	Yes	<5.36	Yes

Analyte			Arsenic		Cadmium		Copper		Lead		Mercury		Zinc	
Standard Type	Sample ID	Analysis Date	Result (mg/kg)	Meets Control Limit (0-35 mg/kg)	Result (mg/kg)	Meets Control Limit (0-60 mg/kg)	Result (mg/kg)	Meets Control Limit (0-60 mg/kg)	Result (mg/kg)	Meets Control Limit (0-35 mg/kg)	Result (mg/kg)	Meets Control Limit (0-12 mg/kg)	Result (mg/kg)	Meets Control Limit (50-160 mg/kg)
NIST 2709a	P_20211104_98052_284	11/4/2021	16.32	Yes	13.32	Yes	27.37	Yes	11.92	Yes	<6.27	Yes	83.34	Yes
NIST 2709a	P_20211104_98052_306	11/4/2021	14.31	Yes	13.04	Yes	30.57	Yes	12.09	Yes	<6.48	Yes	94.32	Yes

Analyte			Arsenic		Cadmium		Copper		Lead		Mercury		Zinc	
Standard Type	Sample ID	Analysis Date	Result (mg/kg)	Meets Control Limit (400-600 mg/kg)	Result (mg/kg)	Meets Control Limit (400-600 mg/kg)	Result (mg/kg)	Meets Control Limit (N/A)	Result (mg/kg)	Meets Control Limit (400-600 mg/kg)	Result (mg/kg)	Meets Control Limit (N/A)	Result (mg/kg)	Meets Control Limit (N/A)
RCRA	P_20211104_98052_285	11/4/2021	494.48	Yes	513.37	Yes	<15.12	N/A	455.94	Yes	<6.75	N/A	42.33	N/A
RCRA	P_20211104_98052_308	11/4/2021	508.94	Yes	530.94	Yes	20.63	N/A	475.90	Yes	<6.93	N/A	47.70	N/A

Notes:

< - Not detected value is the XRF error for analysis.

Abbreviations:

mg/kg - milligram per kilogram

SiO2 - Silicon Dioxide standard

NIST 2709a - NIST 2709a- Joaquin Soil sample

RCRA - Resource Conservation and Recovery Act Sample

Table A6. XRF Duplicate and Replicate Sample Results and QC Criteria Assessment

Standard Type	Sample ID	Sample Name	Parent Sample	Analyte	Arsenic		Cadmium		Copper		Lead		Mercury		Zinc	
					Result (mg/kg)	RPD	Result (mg/kg)	RPD	Result (mg/kg)	RPD	Result (mg/kg)	RPD	Result (mg/kg)	RPD	Result (mg/kg)	RPD
Natural	P_20211104_98052_302	BPSOU-UR05SS05-110421-3		11/4/2021	28.13		<7.69		196.23		39.26		<6.99		167.24	
XRF Replicate	P_20211104_98052_304	BPSOU-UR05SS05-110421-3-R	BPSOU-UR05SS05-110421-3	11/4/2021	33.48	17.4%	<8.32	ND	199.01	1.4%	41.93	6.6%	<7.51	ND	151.03	10.2%
XRF Duplicate	P_20211104_98052_303	BPSOU-UR05SS05-110421-3-D	BPSOU-UR05SS05-110421-3	11/4/2021	35.21	22.4%	<8.25	ND	204.95	4.4%	44.52	12.6%	<7.82	ND	144.18	14.8%

Notes:

< - Not detected value is the XRF error for analysis.

Abbreviations:

mg/kg - milligram per kilogram

ND = non-detected

RPD = relative percent difference

Attachment 1
Data Validation Checklists

Attachment 1.1
Data Validation Checklists for XRF Analyses

Data Validation Checklist XRF Sample Analysis

Site: Butte Priority Soils Operable Unit
Project: Unreclaimed Sites 2021
Sample Date: 11/4/2021
Data Validator: Josie McElroy

Case No: P_20211104
Sample Matrix: Soil
Analysis Dates: 11/4/2021
Validation Dates: 12/13/2021

Laboratory: Pioneer Technical Services, Inc.
Analyses: Arsenic; Cadmium; Copper; Lead; Mercury; Zinc

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times	Collection Date	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
As, Cd, Cu, Pb, Hg, Zn	Pioneer	Soil	XRF	N/A	11/4/2021	11/4/2021	N/A	N/A
<p>Were any data flagged because of holding time? Y <input type="checkbox"/> N <input checked="" type="checkbox"/></p> <p>What sample preparation steps were performed (i.e. drying, sieving etc.)? Drying and sieving</p> <p>Were the samples prepped according to the SAP/QAPP? Y <input checked="" type="checkbox"/> N <input type="checkbox"/></p> <p>Describe Any Actions Taken: None required</p> <p>Comments:</p>								

2. Energy Calibration (System Check)

Was the energy calibration performed at the frequency of once per day?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Was the energy calibration Resolution below 195?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Did the energy calibration run for at least 50 seconds?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Describe Any Actions Taken:	None required			
Comments:				

3. SiO₂ Standards

Was the SiO ₂ Standard analyzed at the beginning of analysis?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Was the SiO ₂ Standard analyzed at the frequency of 1 per 20 samples?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Were the SiO ₂ Standard results within the control limits?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Were any data flagged because of the SiO ₂ Standard results?	Y	<input type="checkbox"/>	N	<input checked="" type="checkbox"/>
Describe Any Actions Taken:	None required			
Comments:				

4. Calibration Check Samples

Were the appropriate Calibration Check Samples (CCS) analyzed at the beginning of analysis?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Were the appropriate CCS analyzed at the frequency of 1 per 20 natural samples?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Were CCS results within the control limits?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Were any data flagged because of CCS problems?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Describe Any Actions Taken:	There were no calibration check samples that had a known amount (true value) of mercury greater than the limit of detection (LOD). Therefore, all mercury results have been qualified "UJ".			
Comments:				

5. Duplicate Sample Results

Were Duplicate Samples analyzed at the frequency of 1 per 20 natural samples?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Were Duplicate Sample results within the control window?	Y	<input type="checkbox"/>	N	<input checked="" type="checkbox"/>
Were any data flagged because of duplicate sample results?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>

Describe Any Actions Taken: The following XRF field duplicate sample was analyzed on 11/4/2021:

XRF Field Duplicate Sample	Primary Sample
BPSOU-UR05SS02-110421-1-FD	BPSOU-UR05SS02-110421-1

For the BPSOU-UR05SS02-110421-1-FD and BPSOU-UR05SS02-110421-1 duplicate pair, the RPD for lead (36%) was outside control limits (35%). BPSOU-UR05SS02-110421-1-FD and BPSOU-UR05SS02-110421-1 were qualified "J" for lead.

Comments: The following XRF duplicate sample was analyzed on 11/4/2021:

XRF Duplicate Sample	Primary Sample
BPSOU-UR05SS05-110421-3-D	BPSOU-UR05SS05-110421-3

6. Replicate Sample Results

Were Replicate Samples analyzed at the frequency of 1 per 20 natural samples?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Were replicate sample results within the control window?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Were any data flagged because of replicate sample results?	Y	<input type="checkbox"/>	N	<input checked="" type="checkbox"/>

Describe Any Actions Taken: None required

Comments: The following XRF replicate sample was analyzed on 11/4/2021:

XRF Replicate Sample	Primary Sample
BPSOU-UR05SS05-110421-3-R	BPSOU-UR05SS05-110421-3

7. Overall Assessment

Are there analytical limitations of the data that users should be aware of?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
---	---	-------------------------------------	---	--------------------------


If so, explain: On this WO P_20211104, the following qualifications were made:


Two (2) lead results were qualified "J" due to an elevated XRF field duplicate RPD.
Fifteen (15) mercury results have been qualified "UJ" due to the lack of an appropriate calibration check sample.

Comments:

8. Authorization of Data Validation

Data Validator
Name: Josie McElroy

Signature:  Date: 12/13/2021

Reviewed by:  Date: 12/20/2021

Attachment 1.2
Data Validation Checklists for Laboratory Analyses

Stage 2A Data Validation Checklist for Sample Analysis

Site: Butte Priority Soils Operable Unit
Project: Unreclaimed Sites 2021
Sample Date(s): 11/03/2021, 11/04/2021
Data Validator: Sara Ward

Case No: 10587273
Sample Matrix: Soil
Analysis Date(s): 11/16/2021, 11/17/2021,
 11/18/2021, 11/21/2021
Validation Date(s): 12/1/2021

Laboratory: Pace Analytical
Analyses: As, Cd, Cu, Pb, Zn (EPA 6010D), Hg (SW7471B), and Percent Moisture (ASTM D2974)

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times	Collection Date(s)	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
As, Cd, Cu, Pb, and Zn	Pace	Soil	EPA 6010D	6 months	11/03/2021, 11/04/2021	11/17/2021, 11/18/2021	Y	N/A
Hg			SW7471B	28 days		11/21/2021	Y	N/A
Percent Moisture			ASTM D2974	N/A		11/16/2021	Y	N/A

Were any data flagged because of holding time? Y N

Were any data flagged because of preservation problems? Y N

The receiving temperature as reported by the laboratory was 8.4°C. Since the receiving temperature was greater than 6.0°C, the mercury results were qualified "UJ/J-". The samples were shipped on ice and analyzed within holding time.

Describe Any Actions Taken:

Sample ID	Mercury Results (mg/kg)	Qualifier
BPSOU-UR05SS02-110421-1	0.25	J-
BPSOU-UR05SS02-110421-1-FD	0.20	J-
BPSOU-UR05SS02-110421-2	0.31	J-
BPSOU-UR05SS02-110421-3	0.26	J-
BPSOU-UR05SS03-110421-1	0.80	J-
BPSOU-UR05SS03-110421-2	0.45	J-
BPSOU-UR05SS03-110421-3	0.65	J-
BPSOU-UR05SS04-110421-1	0.15	J-
BPSOU-UR05SS04-110421-2	0.16	J-
BPSOU-UR05SS04-110421-3	0.26	J-
BPSOU-UR05SS05-110421-1	0.029	J-
BPSOU-UR05SS05-110421-2	0.038	J-
BPSOU-UR05SS05-110421-3	0.068	J-
BPSOU-UR01SS07-110321-3	ND	UJ

Comments:

2. Blanks

Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch? Y N

Were MBs within the control window? Y N

Were any data flagged because of blank problems? Y N

Describe Any Actions Taken: None Required.

Comments: MBs for SW7471B and EPA 6010D were non-detect. A MB was not analyzed for ASTM D2974.

3. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch? Y N

Were LCS results within the control window? Y N

Were any data flagged because of LCS problems? Y N

Describe Any Actions Taken: None Required.

Comments: The LCS %R were within limits for EPA 6010D and SW7471B. An LCS was not analyzed for ASTM D2974.

4. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Were LDS results within the control window?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Were any data flagged because of LDS problems?	Y	<input type="checkbox"/>	N	<input checked="" type="checkbox"/>

Describe Any Actions Taken: None Required.

Comments: For method SW7471B batch 783306, an LMS/LMS Duplicate (LMSD) generated from a sample not from this work order was used for the LDS calculation. The RPD was within control limits.

For method SW7471B batch 783307, an LMS/LMS Duplicate (LMSD) generated from BPSOU-UR05SS02-110421-1-FD was used for the LDS calculation. The RPD was within control limits.

For method EPA 6010D batch 783304, an LMS/LMS Duplicate (LMSD) generated from a sample not from this work order was used for the LDS calculations. The RPDs were within control limits.

For method EPA 6010D batch 783305, an LMS/LMS Duplicate (LMSD) generated from BPSOU-UR05SS02-110421-1-FD was used for the LDS calculations. The RPDs were within control limits.

For ASTM D2974, a duplicate generated from BPSOU-UR05SS02-110421-1 and a duplicate generated from BPSOU-UR05SS05-110421-1 were used for the LDS calculations. The RPDs were within control limits.

5. Matrix Spike Sample Results

Were Laboratory Matrix Spike Samples (LMS) analyzed at the frequency of 1 per batch?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>
Were LMS results within the control window?	Y	<input type="checkbox"/>	N	<input checked="" type="checkbox"/>
Were any data flagged because of LMS problems?	Y	<input type="checkbox"/>	N	<input checked="" type="checkbox"/>

Describe Any Actions Taken: None Required.

Comments: For method SW7471B batch 783306, an LMS/LMSD was generated from a sample not from this work order. The %R of the LMS/LMSD for mercury (78% and 76%, respectively) were outside control limits (80-120%). Since the parent sample was not from this work order, no qualifications were warranted.

For method SW7471B batch 783307, an LMS/LMSD was generated from BPSOU-UR05SS02-110421-1-FD. The %R of the LMS/LMSD for mercury were within control limits (80-120%).

For method EPA 6010D batch 783304, an LMS/LMSD was generated from a sample not from this work order. The %R of the LMSD for zinc (69%) was outside control limits (75-125%). Since the parent sample was not from this work order, no qualifications were warranted. All other %R were within limits.

For method EPA 6010D batch 783305, an LMS/LMSD was generated from BPSOU-UR05SS02-110421-1-FD. The %R of the LMS/LMSD for arsenic (49% and 67%, respectively), copper (-72% and -115%, respectively), lead (204% and 126%, respectively), and zinc (776% and 318%, respectively) were outside control limits (75-125%). Per the NFG *“Spike recovery limits does not apply when the original sample concentration is ≥ 4 times the spike added. In such an event the data shall be reported unflagged, even if the %r does not meet the acceptance criteria.” (EPA, 2017).* The original sample concentrations for arsenic, copper, lead, and zinc were greater than 4 times the spike added; therefore, no qualifications were warranted. All %R for cadmium were within limits.

An LMS was not analyzed for ASTM D2974.

6. Field Blanks

Were field blanks submitted as specified in the QAPP?	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	N/A	<input checked="" type="checkbox"/>
Were field blanks within the control window?	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	N/A	<input checked="" type="checkbox"/>
Were any data qualified because of field blank problems?	Y	<input type="checkbox"/>	N	<input type="checkbox"/>	N/A	<input checked="" type="checkbox"/>

Describe Any Actions Taken: None Required.

Comments: Field blanks were not required as there is no sampling equipment re-used.

7. Field Duplicates

Were field duplicates submitted as specified in the QAPP?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>	N/A	<input type="checkbox"/>
Were results for field duplicates within the control window?	Y	<input type="checkbox"/>	N	<input checked="" type="checkbox"/>	N/A	<input type="checkbox"/>
Were any data qualified because of field duplicate problems?	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>	N/A	<input type="checkbox"/>

Describe Any Actions Taken: One field duplicate pair was submitted on this work order, BPSOU-UR05SS02-110421-1 and BPSOU-UR05SS02-110421-1-FD. The results for copper and percent moisture were greater than 5 times the reporting limit, but the RPD was greater than 35%. The copper and percent moisture results for BPSOU-UR05SS02-110421-1 and BPSOU-UR05SS02-110421-1-FD were qualified "J". Per the NFG, "For a duplicate sample analysis that does not meet the technical criteria, apply the action to all samples of the same matrix if the samples are considered sufficiently similar." (EPA, 2017). No samples are considered sufficiently similar; therefore, no additional qualifications are warranted.

Comments: The precision for the remaining analytes was within control limits.

8. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y N

If so, explain: On this WO 10587273, the following qualifications were made:

In addition to the qualifications outlined in the sections above, results which were reported between the method detection limit and the reporting limit were qualified "A" when no additional qualifications were warranted.

The table below lists the qualifications on the natural samples:

Field ID	Analyte	Final Qualification	Reason Code
BPSOU-UR05SS02-110421-1	Mercury	J-	Pres
BPSOU-UR05SS02-110421-2	Mercury	J-	Pres
BPSOU-UR05SS02-110421-3	Mercury	J-	Pres
BPSOU-UR05SS03-110421-1	Mercury	J-	Pres
BPSOU-UR05SS03-110421-2	Mercury	J-	Pres
BPSOU-UR05SS03-110421-3	Mercury	J-	Pres
BPSOU-UR05SS04-110421-1	Mercury	J-	Pres
BPSOU-UR05SS04-110421-2	Mercury	J-	Pres
BPSOU-UR05SS04-110421-3	Mercury	J-	Pres
BPSOU-UR05SS05-110421-1	Mercury	J-	Pres
BPSOU-UR05SS05-110421-2	Mercury	J-	Pres
BPSOU-UR05SS05-110421-3	Mercury	J-	Pres
BPSOU-UR01SS07-110321-3	Mercury	UJ	Pres
BPSOU-UR05SS02-110421-1	Copper	J	FD
BPSOU-UR05SS02-110421-1	Percent Moisture	J	FD
BPSOU-UR01SS07-110321-3	Cadmium	A	<RL


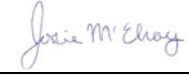
The table below lists the qualifications on the field quality control samples:

Field ID	Analyte	Final Qualification	Reason Code
BPSOU-UR05SS02-110421-1-FD	Mercury	J-	Pres
BPSOU-UR05SS02-110421-1-FD	Copper	J	FD
BPSOU-UR05SS02-110421-1-FD	Percent Moisture	J	FD

Reason for qualification:
 Pres = The receipt temperature was outside of required range.
 FD = Field duplicate precision was outside control limits.
 <RL = The result is above the method detection limit and below the reporting limit.

Comments:

9. Authorization of Data Validation

Data Validator Name: Sara Ward	Reviewed by: Josie McElroy
Signature: 	
Date: 12/1/2021	12/1/2021

Attachment 2

Level A/B Assessment Checklist

Level A/B Assessment Checklist

1. General Information

Site: Butte Priority Soils Operable Unit
 Project: Unreclaimed Sites 2021
 Client: Atlantic Richfield Company
 Sample Matrix: Soil

2. Screening Result

Data are:

1. Unusable
2. Level A
3. Level B 10587273, and P_20211104_98052

I. Level A

Criteria – The following must be fully documented.	Yes/No	Comments
1. Sampling date	Yes	Logbook
2. Sampling team or leader	Yes	Logbook
3. Physical description of sampling location	Yes	Logbook
4. Sample depth (soils)	Yes	Logbook
5. Sample collection technique	Yes	Logbook
6. Field preparation technique	Yes	Logbook
7. Sample preservation technique	Yes	Logbook
8. Sample shipping records	Yes	Logbook and Chain of Custody (CoC)

II. Level B

Criteria – The following must be fully documented.	Yes/No	Comments
1. Field instrumentation methods and standardization complete	Yes	Logbook
2. Sample container preparation	Yes	Logbook
3. Collection of field replicates (1/20 minimum)	Yes	Logbook
4. Proper and decontaminated sampling equipment	Yes	Logbook
5. Field custody documentation	Yes	Logbook and CoC
6. Shipping custody documentation	Yes	Logbook and CoC
7. Traceable sample designation number	Yes	Logbook Lab Report, and CoC
8. Field notebook(s), custody records in secure repository	Yes	
9. Completed field forms	Yes	Logbook and Field Data Sheets

Attachment 3

Data Validation Quality Control Criteria

XRF							
Quality Control	Frequency	Acceptance Criteria	Criteria	Action			Reference
				Associated Sample Result Detected	Associated Sample Result Non-Detected	Reason Code	
System Check	Performed daily, prior to sample analysis	Performed daily, prior to sample analysis	System Check not performed	Professional Judgment J/R	Professional Judgment UJ/R	CX	SOP-SFM-02
		Resolution < 195	Resolution ≥ 195	Professional Judgment J/R	Professional Judgment UJ/R	SC	
SiO ₂ Standard	Performed daily, prior to sample analysis, at least 1 for every 20 sample analyses, and at end of each day of analysis	Performed daily, prior to sample analysis, at least 1 for every 20 sample analyses, and at end of each day of analysis	Frequency criteria not met	J	UJ	CX	SOP-SFM-02 Niton XL3 Soil QC Sheet
		Arsenic ≤10 mg/kg Cadmium ≤50 mg/kg Copper ≤20 mg/kg Lead ≤10 mg/kg Mercury ≤10 mg/kg Zinc ≤10 mg/kg	>10 mg/kg >50 mg/kg >20 mg/kg >10 mg/kg >10 mg/kg >10 mg/kg	Results < 10x the SiO ₂ result - J+	No Qualification	B	
Calibration Check Samples	Performed daily, prior to sample analysis, at least 1 for every 20 sample analyses, and at end of each day of analysis	Performed daily, prior to sample analysis, at least 1 for every 20 sample analyses, and at end of each day of analysis	Frequency criteria not met	J	UJ	CX	SOP-SFM-02 Niton XL3 Soil QC Sheet
		NIST Standard Arsenic 0 - 35 mg/kg Cadmium 0 - 60 mg/kg Copper 0 - 60 mg/kg Lead 0 - 35 mg/kg Mercury 0 - 12 mg/kg Zinc 50 - 160 mg/kg	< Lower Control Limit	J-	UJ	CSS	
		RCRA Standard Arsenic 400 - 600 mg/kg Cadmium 400 - 600 mg/kg Lead 400 - 600 mg/kg	> Upper Control Limit	J+	No Qualification		
XRF Duplicate	1 per 20 samples	RPD ≤ 35% for detected results	Frequency criteria not met	J	UJ	DX	SOP-SFM-02 UR QAPP
			RPD ≤ 35%	No Qualification	No Qualification	D%	
			RPD > 35%	J	UJ		
XRF Replicate	1 per 20 samples	RPD ≤ 35% for detected results	Frequency criteria not met	J	UJ	RX	SOP-SFM-02 UR QAPP
			RPD ≤ 35%	No Qualification	No Qualification	R%	
			RPD > 35%	J	UJ		
Field Duplicate	1 per 20 samples	RPD ≤ 35% for detected results	Frequency criteria not met	J	UJ	FDX	UR QAPP
			RPD ≤ 35%	No Qualification	No Qualification	FD	
			RPD > 35%	J	UJ		

Laboratory							
Quality Control	Frequency	Acceptance Criteria	Criteria	Data Validation Action			Reference
				Associated Sample Result -Detected	Associated Sample Result - Non-Detected	Reason Code	
Laboratory Quality Control Samples							
Holding Time	Every Sample	EPA 6010D (metals/metalloids)	≤ 6 months	J-	Professional Judgement UJ or R	H	NFG
		EPA 7471B (mercury)	≤ 28 days	J-	Professional Judgement UJ or R		
Preservation	Every Sample	EPA 6010D (metals/metalloids)	N/A (solids)	No Qualification	No Qualification	Pres	NFG
		EPA 7471B (mercury)	≤ 6 °C	No Qualification	No Qualification		
			≥ 6 °C but ≤ 10 °C	Professional Judgement J	Professional Judgement UJ		
			> 10 °C	J-	Professional Judgement UJ or R		
Method Blank (MB)	One per batch of up to 20 samples.	≤ 1/2 RL (6010D) ≤ Absolute Value of RL (7471B)	≤ 1/2 RL (6010D) or Absolute Value of RL (7471B)	No Qualification	No Qualification	MB	CFRSSI QAPP Pace SOP
			> 1/2 RL (6010D) or Absolute Value of RL (7471B)	sample result < 10x blank detection: U	No Qualification		
Laboratory Control Sample (LCS)	One per batch of up to 20 samples.	%R 80-120% (all methods)	%R < 40%	J-	R	L%	CFRSSI QAPP NFG Pace SOP
			%R 40-79%	J-	UJ		
			%R 80-120%	No Qualification	No Qualification		
			%R > 120%	J+	No Qualification		
			%R > 150%	R	No Qualification		
Laboratory Duplicate Sample (LDS) ³	One per batch of up to 20 samples.	All methods: 1. If both original sample and duplicate sample results are ≥ 5x the RL, then RPD ≤ 20% (LCSD/MSD), RPD ≤ 35% (soil); 2. If original sample or duplicate sample result < 5x the RL, then absolute difference between sample and duplicate ≤ 2x RL (soils)	Both original and duplicate sample results are ≥ 5x the RL and RPD ≤ 20% (LCSD/MSD), RPD ≤ 35% (soil).	No Qualification	No Qualification	D%	CFRSSI QAPP NFG Pace SOP
			Both original and duplicate sample results are ≥ 5x the RL and RPD is > 20% (LCSD/MSD), > 35% (soil).	J	UJ		
			RPD > 100%	Professional Judgement	Professional Judgement		
			Original sample or duplicate sample result < 5x the RL, and absolute difference between sample and duplicate ≤ 2x RL (soils)	No Qualification	No Qualification		
			Original sample or duplicate sample result is < 5x the RL and absolute difference between the sample and duplicate > 2x RL (soil).	J	UJ		
Laboratory Matrix Spike (LMS)	One per batch of up to 20 samples.	6010D - %R 75-125% 7471B - %R 80-120% if sample analyte concentration < 4x spike concentration	%R < 30%	J-	R	S%	CFRSSI QAPP NFG Pace SOP
			%R 30-74% (6010D) %R 30-79% (7471B)	J-	UJ		
			%R 75-125% (6010D) %R 80-120% (7471B)	No Qualification	No Qualification		
			%R >125% (6010D) %R >120% (7471B)	J+	No Qualification		
			sample analyte concentration ≥ 4x spike concentration	No Qualification	No Qualification		

Field Quality Control Samples							
Field Duplicate Sample	One per 20 samples collected.	All methods: 1. If both original sample and duplicate sample results are $\geq 5x$ the RL, RPD $\leq 35\%$ (soil); 2. If original sample or duplicate sample result $< 5x$ the RL, then absolute difference between sample and duplicate $\leq 2x$ RL (soils)	Both original and duplicate sample results are $\geq 5x$ the RL and RPD $\leq 35\%$ (soil).	No Qualification	No Qualification	FD	CFRSSI QAPP NFG
			Both original and duplicate sample results are $\geq 5x$ the RL and RPD is $> 35\%$ (soil).	J	UJ		
			RPD $> 100\%$	Professional Judgement	Professional Judgement		
			Original sample or duplicate sample result $< 5x$ the RL, and absolute difference between sample and duplicate $\leq 2xRL$ (soils)	No Qualification	No Qualification		
			Original sample or duplicate sample result is $< 5x$ the RL and absolute difference between the sample and duplicate $> 2xRL$ (soil).	J	UJ		

Notes:

- Associated sample results:
 - For Field Blank results that do not meet technical criteria, apply action to all samples in the SDG.
 - For Field Duplicate results that do not meet technical criteria, apply action to field duplicate pair and any samples from the same sample location in the SDG.
 - For MB and LCS results that do not meet technical criteria, apply action to all samples in the analytical batch.
 - For LDS or LMS/MSD results that do not meet technical criteria, apply action to the parent sample and, per the NFG, "apply the action to all samples of the same matrix if the samples are considered sufficiently similar."
 - For holding time and preservation that do not meet technical criteria, apply action to sample.
- For consistency in validations between validators, if a sample result is reported as non-detect, the MDL is used for the duplicate absolute difference calculations.
- An LCS, an LMS, or an original sample may all be used to perform a laboratory duplicate. If a LCS Duplicate or LMS Duplicate is used, the QC sample must also meet the applicable %R technical criteria.

Qualifications:

- U - Non-detect
- UJ - Estimated non-detect
- J - Estimated

- J+ - Estimated high
- J- - Estimated low
- R - Rejected

Abbreviations:

- MDL - method detection limit
- RL - reporting limit
- %R - percent recovery
- RPD - relative percent difference

References:

- CFRSSI QAPP - ARCO, 1992. Clark Fork River Superfund Site Investigations (CFRSSI) Quality Assurance Project Plan (QAPP). Prepared for ARCO by PTI Environmental Services, Bellevue, Washington. May 1992.
- NFG - EPA, 2020. National Functional Guidelines for Inorganic Superfund Methods Data Review. November 2020.
-- Available at EPA's Superfund Analytical Services and Contract Laboratory Program website: <https://www.epa.gov/clp/contract-laboratory-program-national-functional-guidelines-data-review>
- SOP-SFM-02 - Operating XL3-X-Ray Fluorescence Analyzer General. Pioneer Technical Services, Inc. January 2018.
- UR QAPP - Silver Bow Creek/Butte Area NPL Site Butte Priority Soils Operable Unit 2022 Final Unrelaimed Sites Quality Assurance Project Plan (QAPP). Prepared for Atlantic Richfield Company by Pioneer Technical Services, Inc, Butte, Montana. June 2021.
- Niton XL3 Soil QC Sheet - Niton XL3 Soil QC Certificate of Calibration. Thermo Fisher Scientific. June 2014.
- Pace SOP -
 - EPA 6010D - ENV-SOP-MIN4-0052: Metals Analysis by ICP - Method 6010 and 200.7
 - EPA 7471B - ENV-SOP-MIN4-0054: Mercury in Liquid and Solid/Semi-Solid Waste by 7470A, 7471, 7471B, and 245.1

Attachment B
Field Forms and Related Documents

BPSOU: Unreclaimed Sites Field XRF and Soil pH Results

Site Number: VR05 Operator: VS
 Land Use: Residential/Residential XRF Unit #: 98050
 pH probe #: 1

*Reference 2021 UR Confirmation Sample Decision Tree for more information on declaring the need for a confirmation sample.

Soil Action/Screening Levels (mg/kg)						
Residential	250			1,200		10
Non-Residential				2,300		
Recreational	1,000					
Commercial	500					
Storm Water	200	20	1000	1000	1000	10

XRF Reading #	Sample Name	Depth (inches)	Soil pH (s.u.)	Date Collected	Time Collected	Date Analysed	XRF Results (mg/kg)						Lab Sample
							As	Cd	Cu	Pb	Zn	Hg	
282	BPSOU-UR SYSTEM Checks	---	---	11/4/21	---	---	Time	56.1		RES	174		
283	BPSOU-UR SIO2	---	---	---	---	---	3	12	211	23	25	25	
284	BPSOU-UR NIST	---	---	---	---	---	16	13	27	12	83	26	
285	BPSOU-UR RCRA	---	---	---	---	---	494	513	215	456	42	27	
286	BPSOU-UR USGS	---	---	---	---	---	90	21	208	785	722	27	
287	BPSOU-UR 055504-110421-1	0-2	7.23	0910			92	27	390	456	(1192)	(28)	Yes
288	BPSOU-UR 055504-110421-2	2-6	7.37	0905			91	10	346	(694)	1639	(28)	Yes
289	BPSOU-UR 055504-110421-3	6-12	7.10	0900			80	28	306	(735)	1766	(28)	Yes
290	BPSOU-UR 055502-110421-1	0-2	6.09	0920			(284)	28	(763)	(817)	2477	(29)	Yes
291	BPSOU-UR 055502-110421-1-FD	0-2	5.55	0925			(220)	10	559	565	2285	(29)	Yes
292	BPSOU-UR 055502-110421-2	2-6	5.17	0915			(226)	28	(1010)	(741)	1784	(28)	Yes
293	BPSOU-UR 055502-110421-3	6-12	4.73	0910			106	28	436	(671)	2289	(29)	Yes
294	BPSOU-UR 055503-110421-1	0-2	5.09	0945			(314)	12	(1216)	(1171)	3032	(210)	Yes
295	BPSOU-UR 055503-110421-2	2-6	3.88	0940			118	(18)	(1025)	(864)	1553	(210)	Yes
296	BPSOU-UR 055503-110421-3	6-12	4.30	0935			(222)	12	(1052)	(1308)	2268	(29)	Yes
297	BPSOU-UR 055501-110421-1	0-2	6.80	0930			65	28	496	188	(992)	(29)	Yes ^{NS}
298	BPSOU-UR 055501-110421-2	2-6	7.44	0925			20	27	173	41	147	(27)	Yes ^{NS}
299	BPSOU-UR 055501-110421-3	6-12	7.53	0920			20	27	109	49	174	26	NO
300	BPSOU-UR 055505-110421-1	0-2	7.76	1010			20 ^{NS}	27 ^{NS}	241 ^{NS}	27 ^{NS}	126 ^{NS}	27 ^{NS}	Yes
301	BPSOU-UR 055505-110421-2	2-6	7.44	1005			13	28	219	47	239	(27)	Yes
302	BPSOU-UR 055505-110421-3	6-12	7.20	1000			20	27	241	27	126	(27)	Yes

Change SS05 to SS04 on XRF

[28 28 196 39 167 (27)]

NS
NS
NS

11/3/21

UR-01

All Decon ~~Lab~~³ follows pg 3+4
Crew off site @ 1230

Samples for UR-03 on 10/28/21

Shipped 11/1/21 Tracking #

705 4078 9934 6391

As, Cd, Cu, Pb, Zn with Gold and
Hg with 7471. All samples
shipped in 1 qt bag.

~~Baselland~~

UR-05

11/4/21

0730 | @ Promet Waste office
to collect equipment + and go
through Safety.

Sampling crew: Jesse S, Nathan, F.,
Justin H, and Matthew S.

Hanna pH probe cal Hradal

Live Reading	Buffer
3.98 @ 20.1°C	4.00
6.97 @ 20.1°C	7.00
10.07 @ 20.2°C	10.00

Cal with 0.1

DB bottle: CIS AFS

845 | on site @ UR-05 to
begin sampling and site character-
~~ization~~³ characterization per pg 3+4
2+3. Sample locations pinned with
GPS. Samples collected and
summarized per sample location
below.

Sample location SS-4

BPS0V-UR05SS04-110421-1 @ 910

Run XRF, Lab submitted for $\pm 35\%$ Hg human

BPS0V-UR05SS04-110421-2 @ 0905

Run XRF, Lab submitted for $\pm 35\%$ Hg human

BPS0V-UR05SS04-110421-3 @ 0900

Run XRF, Lab submitted for $\pm 35\%$ Hg human

Retain the Rain.

11/4/21

UR05

Sample location 2 SS-2

BPS0V-UR05SS02-110421-1 @ 0920

Lab submitted for $\pm 35^{ppb}$ Hg human, Run XRF
BPS0V-UR05SS02-110421-1-FD @ 0925Run XRF, Lab submitted for Field Duplicate
Parent ID: BPS0V-UR05SS02-110421-1

BPS0V-UR05SS02-110421-2 @ 0915

Run XRF, Lab submitted for $\pm 35^{ppb}$ Hg human

BPS0V-UR05SS02-110421-3 @ 0910

Run XRF, Lab submitted for $\pm 35^{ppb}$ Hg human

Sample location 3 SS-03

BPS0V-UR05SS03-110421-1 @ 0945

XRF Can, Lab submitted for $\pm 35^{ppb}$ Hg human

BPS0V-UR05SS03-110421-2 @ 0940

XRF Can, Lab submitted for $\pm 35^{ppb}$ Hg human

BPS0V-UR05SS03-110421-3 @ 0935

XRF Can, Lab submitted for $\pm 35^{ppb}$ Hg human

Sample location 5 SS-05

BPS0V-UR05SS05-110421-1 @ 1010

XRF Can, Lab submitted for $\pm 35^{ppb}$ Hg human

BPS0V-UR05SS05-110421-2 @ 1005

XRF Can, Lab submitted for $\pm 35^{ppb}$

BPS0V-UR05SS05-110421-3 @ 1000

XRF Can, Lab submitted for $\pm 35^{ppb}$ Hg human

Sample location 1 SS-01

BPS0V-UR05SS01-110421-1 @ 0930

XRF Can, No Lab

11/4/21

UR05

BPS0V-UR05SS01-110421-2 @ 0925

XRF Can, No Lab

BPS0V-UR05SS01-110421-3 @ 0920

XRF Can, No Lab

Rep, Dup, and Standards Can,
Off site @ 1050Sampling completed at UR-05
On site @ UR-05 Dave Swanson

on site at 1045 to walk through.

Samples are preserved @ Butte
office per pg 4. All data is
recorded on field sheets and electronic
copy. Equipment was decontam per
pg 344 Samples will be
shipped next week. 11/8/21.

On site @ UR-34 at 1115

to begin sampling and site

characterization. Sample locations

were marked using a GPS.

SS04 was moved to a new
location South East of the original
location. SS01 was first location

to be dug. Digger stuck

a 1/4 inch cable. Stop work

was enforced. The Chain of Command

Rite in the Rain

Attachment C

Laboratory Data Packages

November 22, 2021

Scott Sampson
Pioneer Technical Services
1101 S. Montana Street
Butte, MT 59701

RE: Project: BPSOU Unreclaimed Sampling
Pace Project No.: 10587273

Dear Scott Sampson:

Enclosed are the analytical results for sample(s) received by the laboratory on November 11, 2021. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 12.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Minneapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jennifer Anderson
jennifer.anderson@pacelabs.com
(612)607-6436
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Pace Analytical Services, LLC - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414

A2LA Certification #: 2926.01*

1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab

Alabama Certification #: 40770

Alaska Contaminated Sites Certification #: 17-009*

Alaska DW Certification #: MN00064

Arizona Certification #: AZ0014*

Arkansas DW Certification #: MN00064

Arkansas WW Certification #: 88-0680

California Certification #: 2929

Colorado Certification #: MN00064

Connecticut Certification #: PH-0256

EPA Region 8 Tribal Water Systems+Wyoming DW Certification #: via MN 027-053-137

Florida Certification #: E87605*

Georgia Certification #: 959

Hawaii Certification #: MN00064

Idaho Certification #: MN00064

Illinois Certification #: 200011

Indiana Certification #: C-MN-01

Iowa Certification #: 368

Kansas Certification #: E-10167

Kentucky DW Certification #: 90062

Kentucky WW Certification #: 90062

Louisiana DEQ Certification #: AI-03086*

Louisiana DW Certification #: MN00064

Maine Certification #: MN00064*

Maryland Certification #: 322

Michigan Certification #: 9909

Minnesota Certification #: 027-053-137*

Minnesota Dept of Ag Approval: via MN 027-053-137

Minnesota Petrofund Registration #: 1240*

Mississippi Certification #: MN00064

Missouri Certification #: 10100

Montana Certification #: CERT0092

Nebraska Certification #: NE-OS-18-06

Nevada Certification #: MN00064

New Hampshire Certification #: 2081*

New Jersey Certification #: MN002

New York Certification #: 11647*

North Carolina DW Certification #: 27700

North Carolina WW Certification #: 530

North Dakota Certification #: R-036

Ohio DW Certification #: 41244

Ohio VAP Certification (1700) #: CL101

Ohio VAP Certification (1800) #: CL110*

Oklahoma Certification #: 9507*

Oregon Primary Certification #: MN300001

Oregon Secondary Certification #: MN200001*

Pennsylvania Certification #: 68-00563*

Puerto Rico Certification #: MN00064

South Carolina Certification #:74003001

Tennessee Certification #: TN02818

Texas Certification #: T104704192*

Utah Certification #: MN00064*

Vermont Certification #: VT-027053137

Virginia Certification #: 460163*

Washington Certification #: C486*

West Virginia DEP Certification #: 382

West Virginia DW Certification #: 9952 C

Wisconsin Certification #: 999407970

Wyoming UST Certification #: via A2LA 2926.01

USDA Permit #: P330-19-00208

Please Note: Applicable air certifications are denoted with an asterisk ().

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10587273001	BPSOU-UR05SS02-110421-1	Solid	11/04/21 09:20	11/11/21 08:50
10587273002	BPSOU-UR05SS02-110421-1-FD	Solid	11/04/21 09:25	11/11/21 08:50
10587273003	BPSOU-UR05SS02-110421-2	Solid	11/04/21 09:15	11/11/21 08:50
10587273004	BPSOU-UR05SS02-110421-3	Solid	11/04/21 09:10	11/11/21 08:50
10587273005	BPSOU-UR05SS03-110421-1	Solid	11/04/21 09:45	11/11/21 08:50
10587273006	BPSOU-UR05SS03-110421-2	Solid	11/04/21 09:40	11/11/21 08:50
10587273007	BPSOU-UR05SS03-110421-3	Solid	11/04/21 09:35	11/11/21 08:50
10587273008	BPSOU-UR05SS04-110421-1	Solid	11/04/21 09:10	11/11/21 08:50
10587273009	BPSOU-UR05SS04-110421-2	Solid	11/04/21 09:05	11/11/21 08:50
10587273010	BPSOU-UR05SS04-110421-3	Solid	11/04/21 09:00	11/11/21 08:50
10587273011	BPSOU-UR05SS05-110421-1	Solid	11/04/21 10:10	11/11/21 08:50
10587273012	BPSOU-UR05SS05-110421-2	Solid	11/04/21 10:05	11/11/21 08:50
10587273013	BPSOU-UR05SS05-110421-3	Solid	11/04/21 10:00	11/11/21 08:50
10587273014	BPSOU-UR01SS07-110321-3	Solid	11/03/21 10:35	11/11/21 08:50

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10587273001	BPSOU-UR05SS02-110421-1	EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1
10587273002	BPSOU-UR05SS02-110421-1-FD	EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1
10587273003	BPSOU-UR05SS02-110421-2	EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1
10587273004	BPSOU-UR05SS02-110421-3	EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1
10587273005	BPSOU-UR05SS03-110421-1	EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1
10587273006	BPSOU-UR05SS03-110421-2	EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1
10587273007	BPSOU-UR05SS03-110421-3	EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1
10587273008	BPSOU-UR05SS04-110421-1	EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1
10587273009	BPSOU-UR05SS04-110421-2	EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1
10587273010	BPSOU-UR05SS04-110421-3	EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1
10587273011	BPSOU-UR05SS05-110421-1	EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1
10587273012	BPSOU-UR05SS05-110421-2	EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1
10587273013	BPSOU-UR05SS05-110421-3	EPA 6010D	DM	5

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SAMPLE ANALYTE COUNT

Project: BPSOU Unreclaimed Sampling
Pace Project No.: 10587273

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10587273014	BPSOU-UR01SS07-110321-3	EPA 7471B	LMW	1
		ASTM D2974	JDL	1
		EPA 6010D	DM	5
		EPA 7471B	LMW	1
		ASTM D2974	JDL	1

PASI-M = Pace Analytical Services - Minneapolis

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Method: EPA 6010D

Description: 6010D MET ICP

Client: BPAR-PIONEER-MT

Date: November 22, 2021

General Information:

14 samples were analyzed for EPA 6010D by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 783304

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10587272001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 4170175)
 - Zinc

QC Batch: 783305

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10587273002

P6: Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

- MS (Lab ID: 4170178)
 - Arsenic
 - Copper
 - Lead
 - Zinc
- MSD (Lab ID: 4170179)
 - Arsenic
 - Copper
 - Lead

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Method: EPA 6010D

Description: 6010D MET ICP

Client: BPAR-PIONEER-MT

Date: November 22, 2021

QC Batch: 783305

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10587273002

P6: Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

- Zinc

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Method: EPA 7471B

Description: 7471B Mercury

Client: BPAR-PIONEER-MT

Date: November 22, 2021

General Information:

14 samples were analyzed for EPA 7471B by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 7471B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 783306

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10587272001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 4170182)
 - Mercury
- MSD (Lab ID: 4170183)
 - Mercury

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling
Pace Project No.: 10587273

Sample: BPSOU-UR05SS02-110421-1 **Lab ID:** 10587273001 Collected: 11/04/21 09:20 Received: 11/11/21 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	161	mg/kg	2.2	0.34	2	11/12/21 14:18	11/17/21 13:12	7440-38-2	
Cadmium	4.7	mg/kg	0.34	0.076	2	11/12/21 14:18	11/17/21 13:12	7440-43-9	
Copper	359	mg/kg	1.1	0.16	2	11/12/21 14:18	11/17/21 13:12	7440-50-8	
Lead	636	mg/kg	1.1	0.23	2	11/12/21 14:18	11/17/21 13:12	7439-92-1	
Zinc	1520	mg/kg	4.5	0.50	2	11/12/21 14:18	11/17/21 13:12	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.25	mg/kg	0.021	0.0091	1	11/12/21 15:07	11/21/21 11:47	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	13.4	%	0.10	0.10	1		11/16/21 13:36		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Sample: BPSOU-UR05SS02-110421-1-FD **Lab ID:** 10587273002 Collected: 11/04/21 09:25 Received: 11/11/21 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	203	mg/kg	2.0	0.31	2	11/12/21 14:18	11/18/21 12:57	7440-38-2	P6
Cadmium	4.6	mg/kg	0.30	0.069	2	11/12/21 14:18	11/18/21 12:57	7440-43-9	
Copper	519	mg/kg	1.0	0.15	2	11/12/21 14:18	11/18/21 12:57	7440-50-8	P6
Lead	630	mg/kg	1.0	0.21	2	11/12/21 14:18	11/18/21 12:57	7439-92-1	P6
Zinc	1720	mg/kg	4.1	0.45	2	11/12/21 14:18	11/18/21 12:57	7440-66-6	P6
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.20	mg/kg	0.019	0.0081	1	11/12/21 15:07	11/21/21 10:47	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	5.1	%	0.10	0.10	1		11/16/21 13:37		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Sample: BPSOU-UR05SS02-110421-2 **Lab ID:** 10587273003 Collected: 11/04/21 09:15 Received: 11/11/21 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	145	mg/kg	2.0	0.30	2	11/12/21 14:18	11/18/21 13:09	7440-38-2	
Cadmium	3.6	mg/kg	0.30	0.068	2	11/12/21 14:18	11/18/21 13:09	7440-43-9	
Copper	658	mg/kg	0.99	0.14	2	11/12/21 14:18	11/18/21 13:09	7440-50-8	
Lead	639	mg/kg	0.99	0.20	2	11/12/21 14:18	11/18/21 13:09	7439-92-1	
Zinc	1380	mg/kg	4.0	0.44	2	11/12/21 14:18	11/18/21 13:09	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.31	mg/kg	0.020	0.0086	1	11/12/21 15:07	11/21/21 10:52	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	5.7	%	0.10	0.10	1		11/16/21 13:37		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Sample: BPSOU-UR05SS02-110421-3 **Lab ID:** 10587273004 Collected: 11/04/21 09:10 Received: 11/11/21 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	62.3	mg/kg	2.7	0.41	2	11/12/21 14:18	11/18/21 13:10	7440-38-2	
Cadmium	3.8	mg/kg	0.40	0.090	2	11/12/21 14:18	11/18/21 13:10	7440-43-9	
Copper	235	mg/kg	1.3	0.19	2	11/12/21 14:18	11/18/21 13:10	7440-50-8	
Lead	756	mg/kg	1.3	0.27	2	11/12/21 14:18	11/18/21 13:10	7439-92-1	
Zinc	1500	mg/kg	5.3	0.59	2	11/12/21 14:18	11/18/21 13:10	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.26	mg/kg	0.026	0.011	1	11/12/21 15:07	11/21/21 10:54	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	26.8	%	0.10	0.10	1		11/16/21 13:37		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling
Pace Project No.: 10587273

Sample: BPSOU-UR05SS03-110421-1 **Lab ID:** 10587273005 Collected: 11/04/21 09:45 Received: 11/11/21 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	234	mg/kg	2.5	0.38	2	11/12/21 14:18	11/18/21 13:12	7440-38-2	
Cadmium	8.7	mg/kg	0.37	0.084	2	11/12/21 14:18	11/18/21 13:12	7440-43-9	
Copper	1120	mg/kg	1.2	0.18	2	11/12/21 14:18	11/18/21 13:12	7440-50-8	
Lead	1980	mg/kg	1.2	0.25	2	11/12/21 14:18	11/18/21 13:12	7439-92-1	
Zinc	2450	mg/kg	4.9	0.55	2	11/12/21 14:18	11/18/21 13:12	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.80	mg/kg	0.024	0.010	1	11/12/21 15:07	11/21/21 10:55	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	23.0	%	0.10	0.10	1		11/16/21 13:37		N2

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Sample: BPSOU-UR05SS03-110421-
2 **Lab ID:** 10587273006 Collected: 11/04/21 09:40 Received: 11/11/21 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	145	mg/kg	2.1	0.32	2	11/12/21 14:18	11/18/21 13:14	7440-38-2	
Cadmium	5.3	mg/kg	0.31	0.070	2	11/12/21 14:18	11/18/21 13:14	7440-43-9	
Copper	49500	mg/kg	25.8	3.8	50	11/12/21 14:18	11/18/21 13:45	7440-50-8	
Lead	1190	mg/kg	1.0	0.21	2	11/12/21 14:18	11/18/21 13:14	7439-92-1	
Zinc	1840	mg/kg	4.1	0.46	2	11/12/21 14:18	11/18/21 13:14	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.45	mg/kg	0.020	0.0088	1	11/12/21 15:07	11/21/21 10:57	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	7.8	%	0.10	0.10	1		11/16/21 13:37		N2

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Sample: BPSOU-UR05SS03-110421-3 **Lab ID:** 10587273007 Collected: 11/04/21 09:35 Received: 11/11/21 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	117	mg/kg	2.3	0.34	2	11/12/21 14:18	11/18/21 13:15	7440-38-2	
Cadmium	4.0	mg/kg	0.34	0.077	2	11/12/21 14:18	11/18/21 13:15	7440-43-9	
Copper	426	mg/kg	1.1	0.16	2	11/12/21 14:18	11/18/21 13:15	7440-50-8	
Lead	944	mg/kg	1.1	0.23	2	11/12/21 14:18	11/18/21 13:15	7439-92-1	
Zinc	1630	mg/kg	4.5	0.50	2	11/12/21 14:18	11/18/21 13:15	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.65	mg/kg	0.023	0.010	1	11/12/21 15:07	11/21/21 11:02	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	17.0	%	0.10	0.10	1		11/16/21 13:38		N2

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling
Pace Project No.: 10587273

Sample: BPSOU-UR05SS04-110421-1 **Lab ID:** 10587273008 Collected: 11/04/21 09:10 Received: 11/11/21 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	37.9	mg/kg	2.0	0.31	2	11/12/21 14:18	11/18/21 13:17	7440-38-2	
Cadmium	1.6	mg/kg	0.30	0.069	2	11/12/21 14:18	11/18/21 13:17	7440-43-9	
Copper	248	mg/kg	1.0	0.15	2	11/12/21 14:18	11/18/21 13:17	7440-50-8	
Lead	216	mg/kg	1.0	0.21	2	11/12/21 14:18	11/18/21 13:17	7439-92-1	
Zinc	506	mg/kg	4.0	0.45	2	11/12/21 14:18	11/18/21 13:17	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.15	mg/kg	0.019	0.0082	1	11/12/21 15:07	11/21/21 11:04	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	4.0	%	0.10	0.10	1		11/16/21 13:38		N2

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Sample: BPSOU-UR05SS04-110421-
2 **Lab ID:** 10587273009 Collected: 11/04/21 09:05 Received: 11/11/21 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	35.5	mg/kg	2.3	0.35	2	11/12/21 14:18	11/18/21 13:19	7440-38-2	
Cadmium	1.6	mg/kg	0.34	0.078	2	11/12/21 14:18	11/18/21 13:19	7440-43-9	
Copper	250	mg/kg	1.1	0.17	2	11/12/21 14:18	11/18/21 13:19	7440-50-8	
Lead	571	mg/kg	1.1	0.24	2	11/12/21 14:18	11/18/21 13:19	7439-92-1	
Zinc	646	mg/kg	4.6	0.51	2	11/12/21 14:18	11/18/21 13:19	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.16	mg/kg	0.022	0.0097	1	11/12/21 15:07	11/21/21 11:05	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	15.9	%	0.10	0.10	1		11/16/21 13:38		N2

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling
Pace Project No.: 10587273

Sample: BPSOU-UR05SS04-110421-3 **Lab ID:** 10587273010 **Collected:** 11/04/21 09:00 **Received:** 11/11/21 08:50 **Matrix:** Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	47.3	mg/kg	2.2	0.33	2	11/12/21 14:18	11/18/21 13:20	7440-38-2	
Cadmium	3.3	mg/kg	0.32	0.074	2	11/12/21 14:18	11/18/21 13:20	7440-43-9	
Copper	238	mg/kg	1.1	0.16	2	11/12/21 14:18	11/18/21 13:20	7440-50-8	
Lead	812	mg/kg	1.1	0.22	2	11/12/21 14:18	11/18/21 13:20	7439-92-1	
Zinc	1180	mg/kg	4.3	0.48	2	11/12/21 14:18	11/18/21 13:20	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.26	mg/kg	0.020	0.0088	1	11/12/21 15:07	11/21/21 11:07	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	10	%	0.10	0.10	1		11/16/21 13:38		N2

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Sample: BPSOU-UR05SS05-110421-1 **Lab ID:** 10587273011 **Collected:** 11/04/21 10:10 **Received:** 11/11/21 08:50 **Matrix:** Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	12.2	mg/kg	2.0	0.31	2	11/12/21 14:18	11/18/21 13:22	7440-38-2	
Cadmium	0.68	mg/kg	0.30	0.069	2	11/12/21 14:18	11/18/21 13:22	7440-43-9	
Copper	214	mg/kg	1.0	0.15	2	11/12/21 14:18	11/18/21 13:22	7440-50-8	
Lead	43.2	mg/kg	1.0	0.21	2	11/12/21 14:18	11/18/21 13:22	7439-92-1	
Zinc	206	mg/kg	4.0	0.45	2	11/12/21 14:18	11/18/21 13:22	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.029	mg/kg	0.019	0.0081	1	11/12/21 15:07	11/21/21 11:08	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	5.9	%	0.10	0.10	1		11/16/21 13:38		N2

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Sample: BPSOU-UR05SS05-110421-
2 **Lab ID:** 10587273012 Collected: 11/04/21 10:05 Received: 11/11/21 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	9.3	mg/kg	0.99	0.15	1	11/12/21 14:18	11/18/21 13:41	7440-38-2	
Cadmium	0.27	mg/kg	0.15	0.034	1	11/12/21 14:18	11/18/21 13:41	7440-43-9	
Copper	151	mg/kg	0.50	0.072	1	11/12/21 14:18	11/18/21 13:41	7440-50-8	
Lead	26.6	mg/kg	0.99	0.20	2	11/12/21 14:18	11/18/21 13:27	7439-92-1	
Zinc	58.3	mg/kg	2.0	0.22	1	11/12/21 14:18	11/18/21 13:41	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.038	mg/kg	0.019	0.0082	1	11/12/21 15:07	11/21/21 11:10	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	3.9	%	0.10	0.10	1		11/16/21 13:39		N2

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Sample: BPSOU-UR05SS05-110421-3 **Lab ID:** 10587273013 Collected: 11/04/21 10:00 Received: 11/11/21 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	19.9	mg/kg	2.0	0.30	2	11/12/21 14:18	11/18/21 13:29	7440-38-2	
Cadmium	0.32	mg/kg	0.30	0.067	2	11/12/21 14:18	11/18/21 13:29	7440-43-9	
Copper	146	mg/kg	0.99	0.14	2	11/12/21 14:18	11/18/21 13:29	7440-50-8	
Lead	28.3	mg/kg	0.99	0.20	2	11/12/21 14:18	11/18/21 13:29	7439-92-1	
Zinc	85.0	mg/kg	3.9	0.44	2	11/12/21 14:18	11/18/21 13:29	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	0.068	mg/kg	0.019	0.0084	1	11/12/21 15:07	11/21/21 11:12	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	3.5	%	0.10	0.10	1		11/16/21 13:39		N2

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ANALYTICAL RESULTS

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Sample: BPSOU-UR01SS07-110321-
3 **Lab ID:** 10587273014 Collected: 11/03/21 10:35 Received: 11/11/21 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP									
Analytical Method: EPA 6010D Preparation Method: EPA 3050B									
Pace Analytical Services - Minneapolis									
Arsenic	2.3	mg/kg	1.0	0.15	1	11/12/21 14:18	11/18/21 13:43	7440-38-2	
Cadmium	0.093J	mg/kg	0.15	0.034	1	11/12/21 14:18	11/18/21 13:43	7440-43-9	
Copper	25.9	mg/kg	0.51	0.074	1	11/12/21 14:18	11/18/21 13:43	7440-50-8	
Lead	4.3	mg/kg	1.0	0.21	2	11/12/21 14:18	11/18/21 13:33	7439-92-1	
Zinc	38.6	mg/kg	2.0	0.23	1	11/12/21 14:18	11/18/21 13:43	7440-66-6	
7471B Mercury									
Analytical Method: EPA 7471B Preparation Method: EPA 7471B									
Pace Analytical Services - Minneapolis									
Mercury	<0.0083	mg/kg	0.019	0.0083	1	11/12/21 15:07	11/21/21 11:13	7439-97-6	
Dry Weight / %M by ASTM D2974									
Analytical Method: ASTM D2974									
Pace Analytical Services - Minneapolis									
Percent Moisture	7.6	%	0.10	0.10	1		11/16/21 13:39		N2

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QUALITY CONTROL DATA

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

QC Batch: 783306

Analysis Method: EPA 7471B

QC Batch Method: EPA 7471B

Analysis Description: 7471B Mercury Solids

Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10587273001

METHOD BLANK: 4170180

Matrix: Solid

Associated Lab Samples: 10587273001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/kg	<0.0079	0.018	0.0079	11/21/21 11:20	

LABORATORY CONTROL SAMPLE: 4170181

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.47	0.48	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4170182 4170183

Parameter	Units	10587272001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	<0.010	0.61	0.58	0.49	0.45	78	76	80-120	8	20	M1

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QUALITY CONTROL DATA

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

QC Batch: 783307

Analysis Method: EPA 7471B

QC Batch Method: EPA 7471B

Analysis Description: 7471B Mercury Solids

Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10587273002, 10587273003, 10587273004, 10587273005, 10587273006, 10587273007, 10587273008, 10587273009, 10587273010, 10587273011, 10587273012, 10587273013, 10587273014

METHOD BLANK: 4170184

Matrix: Solid

Associated Lab Samples: 10587273002, 10587273003, 10587273004, 10587273005, 10587273006, 10587273007, 10587273008, 10587273009, 10587273010, 10587273011, 10587273012, 10587273013, 10587273014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/kg	<0.0081	0.019	0.0081	11/21/21 10:44	

LABORATORY CONTROL SAMPLE: 4170185

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.47	0.48	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4170186 4170187

Parameter	Units	MS		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		10587273002 Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Mercury	mg/kg	0.20	0.51	0.5	0.70	0.70	99	101	80-120	1	20		

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QUALITY CONTROL DATA

Project: BPSOU Unreclaimed Sampling
Pace Project No.: 10587273

QC Batch: 783304 Analysis Method: EPA 6010D
QC Batch Method: EPA 3050B Analysis Description: 6010D Solids
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10587273001

METHOD BLANK: 4170172 Matrix: Solid
Associated Lab Samples: 10587273001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	<0.15	0.97	0.15	11/17/21 12:34	
Cadmium	mg/kg	<0.033	0.15	0.033	11/17/21 12:34	
Copper	mg/kg	<0.071	0.49	0.071	11/17/21 12:34	
Lead	mg/kg	<0.10	0.49	0.10	11/17/21 12:34	
Zinc	mg/kg	<0.22	1.9	0.22	11/17/21 12:34	

LABORATORY CONTROL SAMPLE: 4170173

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	46.7	42.8	92	80-120	
Cadmium	mg/kg	46.7	46.4	99	80-120	
Copper	mg/kg	46.7	45.2	97	80-120	
Lead	mg/kg	46.7	45.1	97	80-120	
Zinc	mg/kg	46.7	45.4	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4170174 4170175

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		10587272001 Result	Spike Conc.	Spike Conc.	Result						
Arsenic	mg/kg	3.7	65.2	64	54.5	53.2	78	77	75-125	2	20
Cadmium	mg/kg	0.23	65.2	64	53.5	52.4	82	82	75-125	2	20
Copper	mg/kg	68.6	65.2	64	123	122	84	83	75-125	1	20
Lead	mg/kg	13.8	65.2	64	71.8	74.0	89	94	75-125	3	20
Zinc	mg/kg	71.7	65.2	64	123	116	79	69	75-125	6	20 M1

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QUALITY CONTROL DATA

Project: BPSOU Unreclaimed Sampling
Pace Project No.: 10587273

QC Batch: 783305 Analysis Method: EPA 6010D
QC Batch Method: EPA 3050B Analysis Description: 6010D Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10587273002, 10587273003, 10587273004, 10587273005, 10587273006, 10587273007, 10587273008, 10587273009, 10587273010, 10587273011, 10587273012, 10587273013, 10587273014

METHOD BLANK: 4170176 Matrix: Solid
Associated Lab Samples: 10587273002, 10587273003, 10587273004, 10587273005, 10587273006, 10587273007, 10587273008, 10587273009, 10587273010, 10587273011, 10587273012, 10587273013, 10587273014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	<0.15	0.96	0.15	11/18/21 12:53	
Cadmium	mg/kg	<0.033	0.14	0.033	11/18/21 12:53	
Copper	mg/kg	<0.070	0.48	0.070	11/18/21 12:53	
Lead	mg/kg	<0.099	0.48	0.099	11/18/21 12:53	
Zinc	mg/kg	<0.21	1.9	0.21	11/18/21 12:53	

LABORATORY CONTROL SAMPLE: 4170177

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	48.5	46.5	96	80-120	
Cadmium	mg/kg	48.5	49.5	102	80-120	
Copper	mg/kg	48.5	48.0	99	80-120	
Lead	mg/kg	48.5	48.5	100	80-120	
Zinc	mg/kg	48.5	49.0	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4170178 4170179

Parameter	Units	MS		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		10587273002 Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Arsenic	mg/kg	203	49.7	50.7	227	237	49	67	75-125	4	20	P6	
Cadmium	mg/kg	4.6	49.7	50.7	50.7	50.5	93	91	75-125	0	20		
Copper	mg/kg	519	49.7	50.7	483	461	-72	-115	75-125	5	20	P6	
Lead	mg/kg	630	49.7	50.7	732	694	204	126	75-125	5	20	P6	
Zinc	mg/kg	1720	49.7	50.7	2110	1880	776	318	75-125	11	20	P6	

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QUALITY CONTROL DATA

Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

QC Batch:	783613	Analysis Method:	ASTM D2974
QC Batch Method:	ASTM D2974	Analysis Description:	Dry Weight / %M by ASTM D2974
		Laboratory:	Pace Analytical Services - Minneapolis

Associated Lab Samples: 10587273001, 10587273002, 10587273003, 10587273004, 10587273005, 10587273006, 10587273007, 10587273008, 10587273009, 10587273010, 10587273011, 10587273012, 10587273013, 10587273014

SAMPLE DUPLICATE: 4172321

Parameter	Units	10587273001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	13.4	13.7	2	30	N2

SAMPLE DUPLICATE: 4172322

Parameter	Units	10587273011 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	5.9	5.7	4	30	N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: BPSOU Unreclaimed Sampling

Peace Project No.: 10587273

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

WORKORDER QUALIFIERS

WO: 10587273

[1] The samples were received outside of required temperature range. Analysis was completed upon client approval.

ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

N2 The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

P6 Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

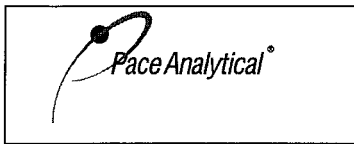
Project: BPSOU Unreclaimed Sampling

Pace Project No.: 10587273

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10587273001	BPSOU-UR05SS02-110421-1	EPA 3050B	783304	EPA 6010D	783590
10587273002	BPSOU-UR05SS02-110421-1-FD	EPA 3050B	783305	EPA 6010D	783589
10587273003	BPSOU-UR05SS02-110421-2	EPA 3050B	783305	EPA 6010D	783589
10587273004	BPSOU-UR05SS02-110421-3	EPA 3050B	783305	EPA 6010D	783589
10587273005	BPSOU-UR05SS03-110421-1	EPA 3050B	783305	EPA 6010D	783589
10587273006	BPSOU-UR05SS03-110421-2	EPA 3050B	783305	EPA 6010D	783589
10587273007	BPSOU-UR05SS03-110421-3	EPA 3050B	783305	EPA 6010D	783589
10587273008	BPSOU-UR05SS04-110421-1	EPA 3050B	783305	EPA 6010D	783589
10587273009	BPSOU-UR05SS04-110421-2	EPA 3050B	783305	EPA 6010D	783589
10587273010	BPSOU-UR05SS04-110421-3	EPA 3050B	783305	EPA 6010D	783589
10587273011	BPSOU-UR05SS05-110421-1	EPA 3050B	783305	EPA 6010D	783589
10587273012	BPSOU-UR05SS05-110421-2	EPA 3050B	783305	EPA 6010D	783589
10587273013	BPSOU-UR05SS05-110421-3	EPA 3050B	783305	EPA 6010D	783589
10587273014	BPSOU-UR01SS07-110321-3	EPA 3050B	783305	EPA 6010D	783589
10587273001	BPSOU-UR05SS02-110421-1	EPA 7471B	783306	EPA 7471B	783726
10587273002	BPSOU-UR05SS02-110421-1-FD	EPA 7471B	783307	EPA 7471B	783729
10587273003	BPSOU-UR05SS02-110421-2	EPA 7471B	783307	EPA 7471B	783729
10587273004	BPSOU-UR05SS02-110421-3	EPA 7471B	783307	EPA 7471B	783729
10587273005	BPSOU-UR05SS03-110421-1	EPA 7471B	783307	EPA 7471B	783729
10587273006	BPSOU-UR05SS03-110421-2	EPA 7471B	783307	EPA 7471B	783729
10587273007	BPSOU-UR05SS03-110421-3	EPA 7471B	783307	EPA 7471B	783729
10587273008	BPSOU-UR05SS04-110421-1	EPA 7471B	783307	EPA 7471B	783729
10587273009	BPSOU-UR05SS04-110421-2	EPA 7471B	783307	EPA 7471B	783729
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10587273012	BPSOU-UR05SS05-110421-2	EPA 7471B	783307	EPA 7471B	783729
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10587273014	BPSOU-UR01SS07-110321-3	EPA 7471B	783307	EPA 7471B	783729
10587273001	BPSOU-UR05SS02-110421-1	ASTM D2974	783613		
10587273002	BPSOU-UR05SS02-110421-1-FD	ASTM D2974	783613		
10587273003	BPSOU-UR05SS02-110421-2	ASTM D2974	783613		
10587273004	BPSOU-UR05SS02-110421-3	ASTM D2974	783613		
10587273005	BPSOU-UR05SS03-110421-1	ASTM D2974	783613		
10587273006	BPSOU-UR05SS03-110421-2	ASTM D2974	783613		
10587273007	BPSOU-UR05SS03-110421-3	ASTM D2974	783613		
10587273008	BPSOU-UR05SS04-110421-1	ASTM D2974	783613		
10587273009	BPSOU-UR05SS04-110421-2	ASTM D2974	783613		
10587273010	BPSOU-UR05SS04-110421-3	ASTM D2974	783613		
10587273011	BPSOU-UR05SS05-110421-1	ASTM D2974	783613		
10587273012	BPSOU-UR05SS05-110421-2	ASTM D2974	783613		
10587273013	BPSOU-UR05SS05-110421-3	ASTM D2974	783613		
10587273014	BPSOU-UR01SS07-110321-3	ASTM D2974	783613		

REPORT OF LABORATORY ANALYSIS

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Document Name:
Sample Condition Upon Receipt (SCUR) - ESI
 Document No.:
ENV-FRM-MIN4-0149 Rev.01

Document Revised: 12Aug2020
Page 1 of 1
 Pace Analytical Services -
Minneapolis

**Sample Condition
 Upon Receipt - ESI
 Tech Specs**

Client Name:

Project #:

bp rm (Lamp)

WO# : 10587273
 PM: JMA Due Date: 11/24/21
 CLIENT: BP-PIONEER

Courier: Fed Ex UPS USPS Client
 Pace Speedee Commercial

See Exceptions
 ENV-FRM-MIN4-0142

Tracking Number: 427899340128

Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No Biological Tissue Frozen? Yes No N/A

Packing Material: Bubble Wrap Bubble Bags None Other: _____ Temp Blank? Yes No

Thermometer: T1(0461) T2(1336) T3(0459) T4(0254) T5(0489)
 Type of Ice: Wet Blue None Dry Melted

Temp should be above freezing to 6°C Cooler Temp Read w/temp blank: 8.5 °C Average Corrected Temp (no temp blank only): _____ °C See Exceptions ENV-FRM-MIN4-0142 1 Container
 Correction Factor: -0.1 Cooler Temp Corrected w/temp blank: 8.4 °C

USDA Regulated Soil: (N/A, water sample/Other: _____)

Date/Initials of Person Examining Contents: JA 11-11-21

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? Yes No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? Yes No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present and Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.
Sampler Name and/or Signature on COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. <input type="checkbox"/> Fecal Coliform <input type="checkbox"/> HPC <input type="checkbox"/> Total Coliform/E coli <input type="checkbox"/> BOD/cBOD <input type="checkbox"/> Hex Chrome <input type="checkbox"/> Turbidity <input type="checkbox"/> Nitrate <input type="checkbox"/> Nitrite <input type="checkbox"/> Orthophos
Rush Turn Around Time Requested? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6.
Sufficient Sample Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7.
Triple Volume Provided for MS/MSD (if more than 10 samples)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.
-Pace Containers Used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
Field Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	10. Is sediment visible in the dissolved container? <input type="checkbox"/> Yes <input type="checkbox"/> No
Is sufficient information available to reconcile the samples to the COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. If no, write ID/ Date/Time on Container Below: <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
Matrix: <input type="checkbox"/> Water <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Oil <input type="checkbox"/> Other _____	12. Sample # <input type="checkbox"/> NaOH <input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Zinc Acetate Positive for Res. <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Chlorine? <input type="checkbox"/> No pH Paper Lot# <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142 Res. Chlorine 0-6 Roll 0-6 Strip 0-14 Strip
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , <2pH, NaOH >9 Sulfide, NaOH >10 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS *If adding preservative to a container it must be added to associated field and equipment blanks (verify with PM first) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> See Exception ENV-FRM-MIN4-0140
Extra labels present on soil VOA or WIDRO containers? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA Vials (greater than 6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14. Pace Trip Blank Lot # (if purchased): _____
3 Trip Blanks Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: <u>1500</u>	Temp: <u>8.3</u>	Corrected Temp: <u>8.4</u>
Time: <u>11/11/21</u> put in cooler		
Time: <u>9:10-15</u>	Temp: <u>8.3</u>	Corrected Temp: <u>8.4</u>

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? Yes No

Person Contacted:

Date/Time:

Comments/Resolution: Notified of temperature.

Project Manager Review:

Date: 11/15/2021

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Labeled by: JD

From: [Jennifer Anderson](#)
To: [Scott Sampson](#)
Cc: [Laura Moon](#)
Subject: RE: Temperature - BPSOU Unreclaimed Sampling Pace Projects 10587272 / 10587273
Date: Friday, November 12, 2021 4:14:00 PM
Attachments: [image001.png](#)
[image002.png](#)

Sounds good, thank you Scott! We will proceed with the analyses.

Jennifer Anderson, PMP

Project Manager | Pace Environmental Sciences
Direct 612.607.6436 | Main 612.607.6400

Pace Analytical Services will be closed Thursday, November 25th and Friday, November 26th for the Thanksgiving Holiday. Please coordinate with your project manager to schedule any rush or short hold analyses around these dates.

From: Scott Sampson <ssampson@Pioneer-technical.com>
Sent: Friday, November 12, 2021 11:18 AM
To: Jennifer Anderson <Jennifer.Anderson@pacelabs.com>
Cc: Laura Moon <lmoon@pioneer-technical.com>
Subject: RE: Temperature - BPSOU Unreclaimed Sampling Pace Projects 10587272 / 10587273

CAUTION: This email originated from outside Pace Analytical. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Jennifer,

Thank you for the notification. FedEx is making things challenging...

Please proceed with analysis of samples on both COCs.

Thanks,
Scott

From: Jennifer Anderson <Jennifer.Anderson@pacelabs.com>
Sent: Friday, November 12, 2021 6:41 AM
To: Scott Sampson <ssampson@Pioneer-technical.com>
Subject: Temperature - BPSOU Unreclaimed Sampling Pace Projects 10587272 / 10587273

Good Morning Scott,

We received the samples for the attached COCs yesterday and it was noted that the samples were over 6 degrees Celsius. The temperature was noted to be 8.4 degrees Celsius. The 6010 metals are not temperature sensitive, but mercury in soils is temperature sensitive.

We can plan to proceed and qualify accordingly, please let me know if it would be preferred to not

proceed with either of these.

Thank you,
Jennifer

Jennifer Anderson, PMP

Project Manager | Pace Environmental Sciences
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
Direct 612.607.6436 | Main 612.607.6400

Pace Analytical Services will be closed Thursday, November 25th and Friday, November 26th for the Thanksgiving Holiday. Please coordinate with your project manager to schedule any rush or short hold analyses around these dates.

Please let your Project Manager know if your project is related to a permit or if your permit has recently been updated.



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XRF Sample ID	Sample Type	Field Sample ID	Analysis Date	Units	Arsenic Result	Arsenic Error	Cadmium Result	Cadmium Error	Copper Result	Copper Error	Lead Result	Lead Error	Mercury Result	Mercury Error	Zinc Result	Zinc Error
P_20211104_98052_283	SiO2	SiO2	11/4/2021	mg/kg	3.12	1.77	11.59	4.43	<LOD	11.31	<LOD	3.28	<LOD	4.73	<LOD	5.42
P_20211104_98052_284	NIST 2709a	NIST 2709a	11/4/2021	mg/kg	16.32	3.76	13.32	5.31	27.37	11.08	11.92	4.02	<LOD	6.27	83.34	8.54
P_20211104_98052_285	RCRA	RCRA	11/4/2021	mg/kg	494.48	17.90	513.37	11.49	<LOD	15.12	455.94	17.49	<LOD	6.75	42.33	6.74
P_20211104_98052_286	USGS SdAR-M2	USGS SdAR-M2	11/4/2021	mg/kg	90.37	17.38	20.75	5.46	208.44	17.15	785.20	20.83	<LOD	7.35	721.85	22.35
P_20211104_98052_287	Natural	BPSOU-UR05SS04-110421-1	11/4/2021	mg/kg	91.92	14.21	<LOD	7.45	390.21	22.14	456.39	16.50	<LOD	7.64	1,192.12	29.31
P_20211104_98052_288	Natural	BPSOU-UR05SS04-110421-2	11/4/2021	mg/kg	91.33	16.99	10.20	5.09	345.69	21.31	694.04	20.23	<LOD	8.10	1,638.76	34.30
P_20211104_98052_289	Natural	BPSOU-UR05SS04-110421-3	11/4/2021	mg/kg	79.55	18.17	<LOD	8.02	305.56	21.67	734.69	21.84	<LOD	8.42	1,765.97	37.31
P_20211104_98052_290	Natural	BPSOU-UR05SS02-110421-1	11/4/2021	mg/kg	284.08	20.81	<LOD	7.88	763.22	30.65	816.97	22.85	<LOD	9.27	2,477.02	43.89
P_20211104_98052_291	Field Duplicate	BPSOU-UR05SS02-110421-1-FD	11/4/2021	mg/kg	220.14	17.41	9.75	5.46	559.10	26.58	565.05	18.87	<LOD	8.69	2,285.46	41.62
P_20211104_98052_292	Natural	BPSOU-UR05SS02-110421-2	11/4/2021	mg/kg	225.63	19.27	<LOD	7.78	1,009.67	34.02	740.92	21.50	<LOD	8.43	1,784.01	36.90
P_20211104_98052_293	Natural	BPSOU-UR05SS02-110421-3	11/4/2021	mg/kg	105.68	17.97	<LOD	7.96	435.64	25.14	671.16	21.17	<LOD	9.01	2,289.00	42.95
P_20211104_98052_294	Natural	BPSOU-UR05SS03-110421-1	11/4/2021	mg/kg	313.89	24.70	12.07	5.52	1,216.20	38.55	1,170.94	27.85	<LOD	9.79	3,031.58	49.59
P_20211104_98052_295	Natural	BPSOU-UR05SS03-110421-2	11/4/2021	mg/kg	117.58	22.14	17.63	6.35	1,024.87	39.54	869.47	26.29	<LOD	10.28	1,553.31	39.14
P_20211104_98052_296	Natural	BPSOU-UR05SS03-110421-3	11/4/2021	mg/kg	222.28	24.15	11.51	5.28	1,051.54	34.54	1,308.11	28.28	<LOD	8.74	2,267.83	41.33
P_20211104_98052_297	Natural	BPSOU-UR05SS01-110421-1	11/4/2021	mg/kg	64.82	10.90	<LOD	7.79	496.09	27.75	188.28	12.16	<LOD	8.56	992.23	29.87
P_20211104_98052_298	Natural	BPSOU-UR05SS01-110421-2	11/4/2021	mg/kg	19.69	5.10	<LOD	7.23	172.85	16.19	41.01	5.77	<LOD	6.56	146.68	11.07
P_20211104_98052_299	Natural	BPSOU-UR05SS01-110421-3	11/4/2021	mg/kg	20.05	5.33	<LOD	7.38	108.93	14.24	48.98	6.07	<LOD	6.49	174.20	11.78
P_20211104_98052_300	Natural	BPSOU-UR05SS05-110421-1	11/4/2021	mg/kg	12.78	5.19	<LOD	7.73	219.27	18.03	46.79	6.15	<LOD	6.81	239.00	13.89
P_20211104_98052_301	Natural	BPSOU-UR05SS05-110421-2	11/4/2021	mg/kg	19.68	4.58	<LOD	7.33	240.93	17.99	27.23	5.02	<LOD	6.69	126.44	10.47
P_20211104_98052_302	Natural	BPSOU-UR05SS05-110421-3	11/4/2021	mg/kg	28.13	5.42	<LOD	7.69	196.23	17.50	39.26	5.76	<LOD	6.99	167.24	12.06
P_20211104_98052_303	XRF Duplicate	BPSOU-UR05SS05-110421-3-D	11/4/2021	mg/kg	35.21	6.20	<LOD	8.25	204.95	19.35	44.52	6.45	<LOD	7.82	144.18	12.14
P_20211104_98052_304	XRF Replicate	BPSOU-UR05SS05-110421-3-R	11/4/2021	mg/kg	33.48	6.05	<LOD	8.32	199.01	19.14	41.93	6.31	<LOD	7.51	151.03	12.33
P_20211104_98052_305	SiO2	SiO2	11/4/2021	mg/kg	2.60	1.72	<LOD	6.39	<LOD	11.32	<LOD	3.25	<LOD	4.67	<LOD	5.36
P_20211104_98052_306	NIST 2709a	NIST 2709a	11/4/2021	mg/kg	14.31	3.72	13.04	5.30	30.57	11.29	12.09	4.07	<LOD	6.48	94.32	9.11
P_20211104_98052_307	USGS SdAR-M2	USGS SdAR-M2	11/4/2021	mg/kg	89.37	17.17	18.63	5.37	235.52	17.70	779.68	20.59	<LOD	7.10	714.54	22.04
P_20211104_98052_308	RCRA	RCRA	11/4/2021	mg/kg	508.94	18.68	530.94	11.95	20.63	10.76	475.90	18.31	<LOD	6.93	47.70	7.26

Notes:

¹ XRF Sample ID is P_ "Analysis Date" _ "XRF Instrument Number" _ "XRF Reading Number"

Abbreviations:

mg/kg - milligram per kilogram
SiO2 - Silicon Dioxide standard
NIST 2709a - NIST 2709a- Joaquin Soil sample
RCRA - Resource Conservation and Recovery Act Sample
<LOD - not detected (less than detection limit)

Attachment D

Electronic Data Deliverable File

Included separately

Appendix B

Site Photographs



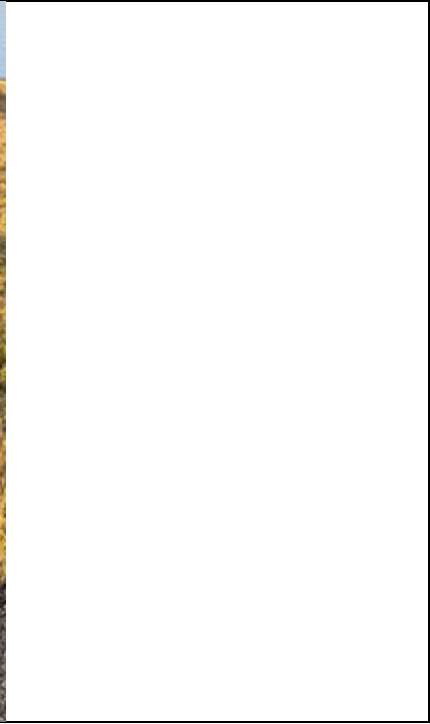
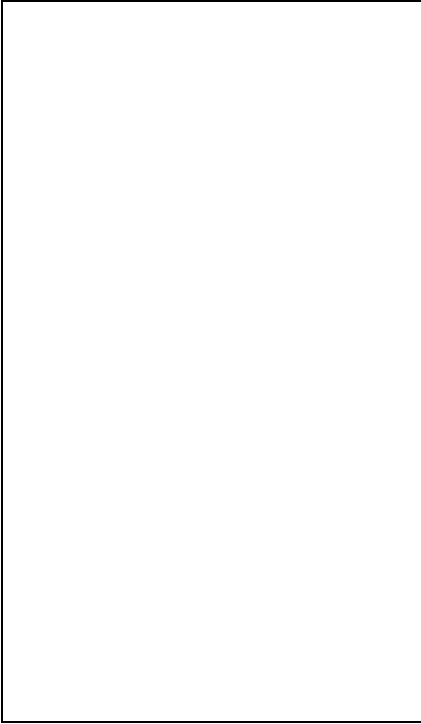
Atlantic Richfield Company

PhotoNumber: UR05-1	Photographer:
Date: 11/03/2021 12:20	Photo Direction: North West
Description: General looking northwest	
Project: BPSOU Unreclaimed and Insufficiently Reclaimed Sites 2021	



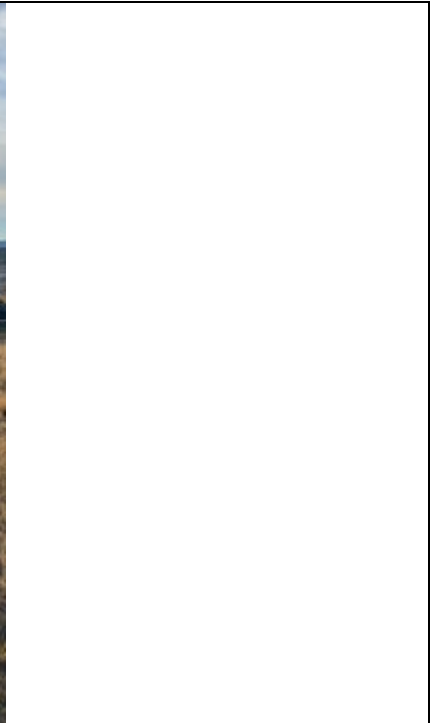
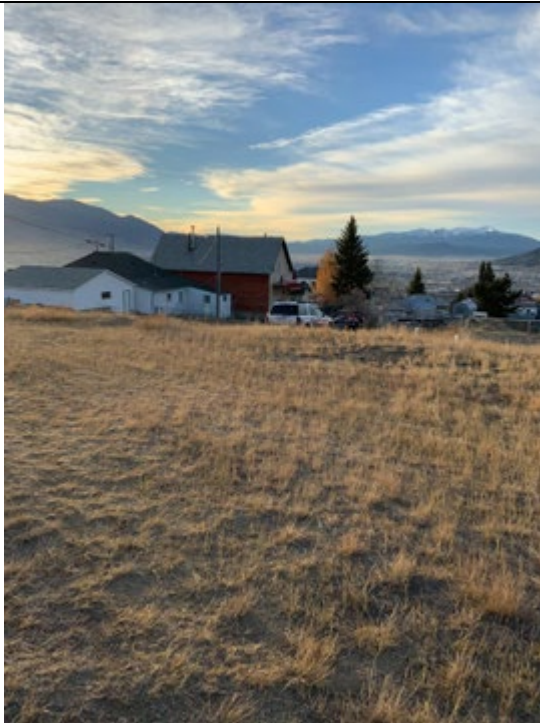
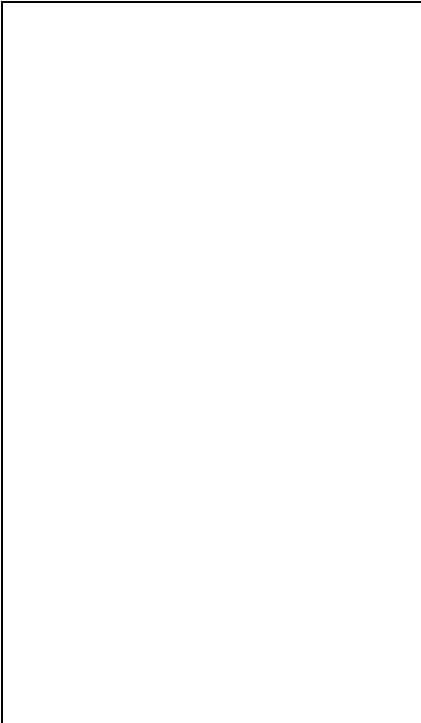
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PhotoNumber: UR05-2	Photographer:
Date: 11/04/2021	Photo Direction: South East
Description: Looking southeast	
Project: BPSOU Unreclaimed and Insufficiently Reclaimed Sites 2021	



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PhotoNumber: UR05-3	Photographer:
Date: 11/04/2021	Photo Direction: South West
Description: Utilities marked west side of location	
Project: BPSOU Unreclaimed and Insufficiently Reclaimed Sites 2021	



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PhotoNumber: UR05-4	Photographer:
Date: 11/04/2021	Photo Direction: South East
Description: Looking southeast	
Project: BPSOU Unreclaimed and Insufficiently Reclaimed Sites 2021	