Spring 3-13-2024

Final 2024 Butte Priority Soils Operable Unit Type B Borrow Material Submittal #2

Pioneer Technical Services, Inc.

Atlantic Richfield Company

317 Anaconda Road
Butte MT 59701

Mike Mc Anulty
Liability Manager

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March 13, 2024

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

RE: Final 2024 Butte Priority Soils Operable Unit Type B Borrow Material Submittal #2

Agency Representatives:

I am writing to you on behalf of Atlantic Richfield Company to submit the *Final 2024 Butte Priority Soils Operable Unit Type B Borrow Material Submittal #2*. This submittal is in response to the Agencies' March 13, 2024, approval letter of the Draft Final submittal. The report and appendices may be downloaded at the following link:

https://pioneertechnicalservices.sharepoint.com/:f:/s/submitted/El6hs7BygRtEsnzjHl_l5s4BZMgY82kkLv5LQ3cl6Hc0zQ.

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

Sincerely,

Mike McAnulty

Mike Mc Anulty
Liability Manager
Remediation Management Services Company
An affiliate of **Atlantic Richfield Company**

Atlantic Richfield Company

317 Anaconda Road
Butte MT 59701

Mike Mc Anulty
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Irene Montero / Atlantic Richfield – email
Tim Hilmo / Atlantic Richfield – email
David A. Gratson / Environmental Standards – email
Carolina Balliew / EPA – email
Mave Gasaway / DGS – email
Adam Cohen / DGS – email
Brianne McClafferty / Holland & Hart – email
David Shanight / CDM – email
Curt Coover / CDM – email
James Freeman / DOJ – email
Amy Steinmetz / DEQ – email
Dave Bowers / DEQ – email
Katie Garcin-Forba / DEQ – email
Jim Ford / NRDP – email
Pat Cunneen / NRDP – email
Katherine Hausrath / NRDP – email
Doug Martin / NRDP – email
Ted Duaime / MBMG – email
Gary Icopini / MBMG – email
Becky Summerville / MR – email
John DeJong / UP – email
Robert Bylsma / UP – email
John Gilmour / Kelley Drye – email
Leo Berry / BNSF – email
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Brooke Kuhl / BNSF – email
Lauren Knickrehm / BNSF – email
Doug Brannan / Kennedy Jenks – email
Matthew Mavrinac / RARUS – email
Harrison Roughton / RARUS – email
Brad Gordon / RARUS – email
Mark Neary / BSB – email
Eric Hassler / BSB – email
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Abigail Peltomaa / BSB – email
Eileen Joyce / BSB – email
Sean Peterson/BSB – email

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Andy White / Aspect – email
Ian Magruder/ CTEC – email
CTEC of Butte – email
Scott Juskiewicz / Montana Tech – email

File: RMO – upload
BPSOU SharePoint – upload

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

Final

2024 Butte Priority Soils Operable Unit
Type B Borrow Material Submittal #2

Atlantic Richfield Company

March 13, 2024

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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Helena, MT 59626-0096
Phone 866-457-2690
www.epa.gov/region8

Ref: 8MO

March 13, 2024

Mr. Mike McAnulty
Liability Manager
Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

Re: Approval letter for the Butte Priority Soils Operable Unit (BPSOU) Draft Final 2024 Type B Borrow Material Submittal #2 (dated February 14, 2024)

Dear Mike:

The U. S. Environmental Protection Agency (EPA), in consultation with the Montana Department of Environmental Quality (DEQ), is approving the *Butte Priority Soils Operable Unit (BPSOU) Draft Final 2024 Type B Borrow Submittal #2 (dated February 14, 2024).* Please attach the EPA and DEQ signature pages and distribute as final. If you have any questions or concerns, please call me at (406) 457-5021.

Sincerely,

Molly Roby
Remedial Project Manager

Attachments: Butte Hill Cover Soil Approval Submittal (electronic version only)

cc: Butte File
Chris Greco / Atlantic Richfield
Josh Bryson / Atlantic Richfield
Loren Burmeister / Atlantic Richfield
Dave Griffis / Atlantic Richfield
Jean Martin / Atlantic Richfield
Irene Montero / Atlantic Richfield
David A. Gratson / Environmental Standards
Mave Gasaway / DGS
Adam Cohen / DGS

cc: continued...

Brianne McClafferty / Holland & Hart
Daryl Reed / DEQ
Logan Dudding / DEQ
Kevin Stone / DEQ
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Dave Bowers / DEQ
Katie Garcin-Forba / DEQ
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John Gilmour / Kelley Drye
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Robert Lowry / BNSF
Brooke Kuhl / BNSF
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Randa Colling / Pioneer
Scott Sampson / Pioneer
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Ian Magruder/ CTEC
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Chapin Storrar / CDM Smith
Erin Agee / EPA
Will Lindsey / EPA
Andrew Schmidt / EPA
Carolina Balliew / EPA
Emma Rott / EPA
Chris Wardell / EPA
Charles Van-Otten / EPA
Charlie Partridge / EPA

BUTTE HILL COVER SOIL APPROVAL SUBMITTAL

2/13/2024

Source: ***ARWW&S RDU 8 South Borrow Area***
Sample #: ***24-RMAP-TypeB-6***

Description		Specification		Sample	Specification Met: Yes	Specification Met: No
Chemical (mg/kg)						
	As	<	97	13.1	X	
	Cd	<	4	0.5	X	
	Cu	<	250	22.0	X	
	Hg	<	5	0.02	X	
	Pb	<	100	10.0	X	
	Zn	<	250	178.0	X	
pH (s.u.)		>	5.5	**N/A**		
		<	8.5			
SAR		<	12	**N/A**		
Saturation (%)		<	85	**N/A**		
		>	25			
EC (mmhos/cm)		<	4	**N/A**		
Textural Classification (USDA) <2.0 mm				**N/A**		
	Loam					
	Sandy loam					
	Sandy clay loam					
	Sandy clay					
	Clay loam					
	Silty clay					
	Silty clay loam					
	Silt loam					
	Silt					
	*Per EPA Approval (Loamy sand)					
Rock Content (%) (by volume)		<	45	**N/A**		

Other Information Requested	
Organic Matter (%)	**N/A**
Soil Nutrients	
N (mg/kg)	**N/A**
P (mg/kg)	**N/A**
K (mg/kg)	**N/A**
Particle Size	
Sand (%)	**N/A**
Silt (%)	**N/A**
Clay (%)	**N/A**

Legend:

# Value	- Criteria met
# Value	- Does not meet Criteria
N/A	- Not Applicable

Atlantic Richfield Representative: Mike McInulty ate: 02/14/24

EPA Representative: Date: 3/13/2024

MT DEQ Representative: Date: 3/7/2024

BUTTE HILL COVER SOIL APPROVAL SUBMITTAL

2/13/2024

Source: ***ARWW&S RDU 8 South Borrow Area***
Sample #: ***24-RMAP-TypeB-7***

Description	Specification	Sample	Specification Met Yes	Specification Met No	Other Information Requested
Chemical (mg/kg)					**Organic Matter (%)**
As	< 97	12.9	X		N/A
Cd	< 4	0.3	X		
Cu	< 250	21.9	X		**Soil Nutrients**
Hg	< 5	0.01	X		
Pb	< 100	9.9	X		N (mg/kg) N/A
Zn	< 250	173.0	X		P (mg/kg) N/A
					K (mg/kg) N/A
pH (s.u.)	> 5.5 < 8.5	N/A			
SAR	< 12	N/A			
Saturation (%)	< 85 > 25	N/A			
EC (mmhos/cm)	< 4	N/A			
Textural Classification (USDA) <2.0 mm		N/A			**Particle Size**
Loam					Sand (%) N/A
Sandy loam					Silt (%) N/A
Sandy clay loam					Clay (%) N/A
Sandy clay					
Clay loam					
Silty clay					
Silty clay loam					
Silt loam					
Silt					
*Per EPA Approval (Loamy sand)					
Rock Content (%) (by volume)	< 45	N/A			

Legend:

# Value	- Criteria met
# Value	- Does not meet Criteria
N/A	- Not Applicable

Atlantic Richfield Representative: Mike McInulty Date: 02/14/24

EPA Representative: Date: 3/13/2024

MT DEQ Representative: Date: 3/7/2024

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

Final

2024 Butte Priority Soils Operable Unit
Type B Borrow Material Submittal #2

Prepared for:

Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

Prepared by:

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

March 13, 2024

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FIGURES

LIST OF TABLES

LIST OF ATTACHMENTS

REVISION SUMMARY

Revision No.	Author	Version	Description	Date
Rev 0	Jesse Schwarzrock	Draft Final	Issued for Agency Review	02/14/2023
Rev 0	Jesse Schwarzrock	Final	Issued for Agency Records	03/13/2024

1.0 INTRODUCTION

Atlantic Richfield Company (Atlantic Richfield) has ongoing Butte Priority Soils Operable Unit (BPSOU) sampling investigations under both the Insufficiently Reclaimed and Unreclaimed (IR/UR) programs and the non-residential portion of the Residential Metals Abatement Program (RMAP) within the Butte, Montana, area. Many of these IR/UR and RMAP sites will ultimately require fill material (i.e., non-growth medium backfill) as a part of their final remedial strategies. Past precedent requires that fill material meet the metals concentrations requirements of the Butte Hill Cover Soil specification criteria. Table 1 lists these criteria, which are further defined in Appendix B.3 of the *Final Butte Reclaimed Areas Maintenance and Monitoring (M&M) Plan in Accordance with Butte Reclamation Evaluation System (BRES)* (Atlantic Richfield Company, 2022), which is provided in Attachment A.

2.0 OBJECTIVE

The project objective is to develop suitable fill material (i.e., non-growth medium) backfill for future IR/UR and RMAP remedial action construction projects. The objective of this submittal is to present data associated with recent Type B borrow material developed by Atlantic Richfield (see Table 2) and secure Agency approval to use this borrow source for upcoming remedial action construction projects. Project specific details around planned material use will be presented to the Agencies for their review and approval through forthcoming project specific Remedial Action Work Plans.

This submittal documents the quality assurance (QA) data collected on approximately 5,500 cubic yards of material on January 22, 2024. This is the second of what is anticipated to be multiple future borrow developments for this purpose.

3.0 BORROW DEVELOPMENT SITE/BACKGROUND

Atlantic Richfield developed this Type B borrow material within the South Borrow area of Remedial Design Unit (RDU) 8 of the Anaconda Smelter National Priorities List (NPL) Site in December 2023 and January 2024 (see Table 3, Figure 1, and Figure 2) and screened it to a 3-inch minus product. This site has historically been Agency approved and used extensively by Atlantic Richfield for use in Anaconda, Montana, area remedial projects for decades and on RMAP non-residential sites since 2021.

4.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLING

The Butte Hill Cover Soil specification criteria (Appendix B.3 of Attachment A) defines QA testing requirements for BPSOU cover soil as a minimum of three samples per source and 1 sample per 5,000 cubic yards developed. It also defines the specific analytical tests required. Because the Agencies have historically approved this source for use, two five-point composite QA samples were collected from the material stockpile to characterize the approximately 5,500 cubic yards of material represented by this submittal.

5.0 DATA ANALYSIS

As described in Section 4.0, in January 2024 two total soil samples were collected from the approximately 5,500 cubic yards of Type B borrow material developed by Atlantic Richfield. Both samples meet or exceed the metals concentrations requirements of the Butte Hill Cover Soil specification as required for non-growth medium backfill.

The Type B borrow material QA data (collected on January 22, 2024) is provided in Table 2 while the data approval submittal forms are provided in Attachment B and the corresponding laboratory data report in Attachment B.1.

6.0 DATA VALIDATION

The data validation reports associated with this fill material are provided in Attachment C.

7.0 PROPOSED USE

Upon approval by the Agencies, Atlantic Richfield proposes using this Type B borrow material on various BPSOU sites in 2024 and 2025, primarily RMAP and IR/UR sites. Specific proposed uses will be defined in forthcoming project specific submittals to the Agencies.

8.0 BORROW SCREENING

During the borrow development process, Atlantic Richfield used a screening plant to screen the final product to a 3-inch minus size.

9.0 CURRENT BORROW STOCKPILE LOCATION

The approximately 5,500 cubic yards of Type B borrow material addressed by this submittal is currently stockpiled within the South Borrow area of RDU 8 of the Anaconda Smelter NPL Site (see Figure 1 and Figure 2). Upon Agencies' approval of the material, this stockpile will be hauled to the BPSOU Interstate Pit stockpile area for future use on BPSOU sites.

10.0 REFERENCES

Atlantic Richfield Company, 2022. Silver Bow Creek/Butte Area NPL Site, Butte Priority Soils Operable Unit, Final Butte Reclaimed Areas Maintenance and Monitoring (M&M) Plan in Accordance with Butte Reclamation Evaluation System (BRES). August 1, 2022.

Figures

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD 83
UNITS: INT FEET
SOURCE: PIONEER

SCALE IN FEET
0 1500 3000

FIGURE 1

TYPE B DEVELOPMENT PLAN/STOCKPILE LOCATION

PIONEER TECHNICAL SERVICES, INC.
307 E. PARK AVE., SUITE 421
ANACONDA, MONTANA 59711
(406) 563-9371

DATE: 1/30/2024

1/30/2024 11:13:11 AM Z:\SHARED\ACTIVE PROJECTS\ARCO\BPSOU\RMAP\CADD\FIGURES\BORROW\TYPEB MATERIAL\RMAP-TYPEB-001-24.DWG

LEGEND:

- TYPE B DEVELOPMENT AREA
- TYPE B STOCKPILE
- 5 POINT COMPOSITE SAMPLING LOCATION

N

DISPLAYED AS:
COORD SYS/ZONE: MSP
DATUM: NAD 83
UNITS: INT FEET
SOURCE: PIONEER

SCALE IN FEET
0 250 500

FIGURE 2

TYPE B DEVELOPMENT PLAN/STOCKPILE LOCATION

PIONEER TECHNICAL SERVICES, INC.
307 E. PARK AVE., SUITE 421
ANACONDA, MONTANA 59711
(406) 563-9371

DATE: 1/30/2024

1/30/2024 11:13:26 AM Z:\SHARED\ACTIVE PROJECTS\ARCO\BPSOU\RMAP\CADD\FIGURES\BORROW\TYPEB MATERIAL\RMAP-TYPEB-002-24.DWG

Tables

Table 1: BUTTE HILL COVER SOIL SPECIFICATION

8/15/2023

Source:
Sample #:

Description		Specification		Sample	Specification Met Yes	Specification Met No	Other Information Requested
Chemical (mg/kg)							**Organic Matter (%)**
	As	<	97				
	Cd	<	4				**Soil Nutrients**
	Cu	<	250				
	Hg	<	5				N (mg/kg)
	Pb	<	100				P (mg/kg)
	Zn	<	250				K (mg/kg)
pH (s.u.)							
		>	5.5				
		<	8.5				
SAR							
		<	12				
Saturation (%)							
		<	85				
		>	25				
EC (mmhos/cm)							
		<	4				
Textural Classification (USDA) <2.0 mm							**Particle Size**
				Loam			Sand (%)
				Sandy loam			Silt (%)
				Sandy clay loam			Clay (%)
				Sandy clay			
				Clay loam			
				Silty clay			
				Silty clay loam			
				Silt loam			
				Silt			
				*Per EPA Approval (Loamy sand)			
Rock Content (%) (by volume)		<	45				

Legend:

# Value	- Criteria met
# Value	- Does not meet Criteria

Atlantic Richfield Representative: _____ Date: _____

EPA Representative: _____ Date: _____

MT DEQ Representative: _____ Date: _____

TABLE 2 - TYPE B BORROW MATERIAL STOCKPILE DATA SUMMARY

(Represents approximatley 5,500 LCY of material)

	Sample ID	Sampling Date	Clay (%)	Sand (%)	Silt (%)	Texture Can't be Sand, Clay, or Loamy Sand	Rock Fragments < 45%	Saturation Percentage > 25% & < 85%	Saturated Paste Ph > 5.5 & < 8.5	Electrical Conductivity < 4 mmhos/cm	Sodium Adsorbtion Ratio < 12 for root zone materials	Organic Matter (Walkley Black)	As < 97 mg/kg	As FLAG	Cd < 4 mg/kg	Cd FLAG	Cu < 250 mg/kg	Cu FLAG	Hg < 5 mg/kg	Hg FLAG	Pb < 100 mg/kg	Pb FLAG	Zn < 250 mg/kg	Zn FLAG
1	24-RMAP-TypeB-6	01/22/24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.1		0.47		22.0		0.015	J	10.0		178.0	
2	24-RMAP-TypeB-7	01/22/24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12.9		0.31		21.9		0.013	J	9.9		173.0	
		MAX:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.1		0.47		22.0		0.015		10.0		178.0	
		MIN:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12.9		0.31		21.9		0.013		9.9		173.0	
		AVE:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.0		0.39		22.0		0.014		10.0		175.5	

Doesn't meet Butte Hill Cover Soil Specification

TABLE 3: TYPE B BORROW MATERIAL SOURCE PROPERTY INFORMATION

Count	Geocode	Owner
1	30-1286-04-1-01-01-0000	ARCO Environmental Remediation LLC

ATTACHMENT A

FINAL BUTTE RECLAIMED AREAS MAINTENANCE AND MONITORING (M&M) PLAN IN ACCORDANCE WITH BUTTE RECLAMATION EVALUATION SYSTEM (BRES)

Atlantic Richfield Company

317 Anaconda Road
Butte MT 59701

Mike Mc Anulty
Liability Manager

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August 1, 2022

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

RE: Butte Priority Soils Operable Unit (BPSOU) Final Reclaimed Areas Maintenance and Monitoring Plan

Agency Representatives:

On behalf of Atlantic Richfield Company and Butte-Silver Bow, the Butte Priority Soils Operable Unit (BPSOU) Final Reclaimed Areas Maintenance and Monitoring Plan is being distributed as described in the Agency approval letter dated June 23, 2022. The plan and appendices may be downloaded at the following link:

https://pioneertechnicalservices.sharepoint.com/:f:/s/submitted/EtIstRi99B9Kh94vArqyOQMBg6mJxJyHqJcKF-3znrb43g.

If you have any questions or comments, please call me at (907) 355-3914 or Eric Hassler at (406) 497-5042.

Sincerely,

Mike Mc Anulty
Liability Manager
Remediation Management Services Company
An affiliate of **Atlantic Richfield Company**

Eric Hassler, Director
Department of Reclamation
and Environmental Services
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Pat Cunneen / NRDP - email
Harley Harris / NRDP - email
Katherine Hausrath / NRDP - email
Meranda Flugge / NRDP - email
Ted Duaime / MBMG - email
Gary Icopini / MBMG - email
Becky Summerville / MR - email
Kristen Stevens / UP - email
Robert Bylsma / UP - email
John Gilmour / Kelley Drye - email
Leo Berry / BNSF - email
Robert Lowry / BNSF - email
Brooke Kuhl / BNSF – email
Lauren Knickrehm / BNSF - email
Jeremie Maehr / Kennedy Jenks - email
Annika Silverman / Kennedy Jenks - email
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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

Final

Butte Reclaimed Areas Maintenance and Monitoring (M&M) Plan
in Accordance with Butte Reclamation Evaluation System (BRES)

Atlantic Richfield Company

2022

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8, MONTANA OFFICE
FEDERAL BUILDING, 10 West 15TH Street, Suite 3200
Helena, MT 59626-0096
Phone 866-457-2690
www.epa.gov/region8

Ref: 8MO

June 23, 2022

Mr. Eric Hassler
Director
Butte-Silver Bow County
Dept. of Reclamation & Environmental Services
155 W. Granite St.
Butte, MT 59701
On behalf of Respondents

Mr. Mike McAnulty
Liability Manager
Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

Re: Approval letter for the Butte Priority Soils Operable Unit (BPSOU) Revised Draft Final Reclaimed Areas Maintenance and Monitoring Plan (dated June 15, 2022)

Dear Eric and Mike:

The U. S. Environmental Protection Agency (EPA), in consultation with the Montana Department of Environmental Quality (DEQ), is approving the *Revised Draft Final Reclaimed Areas Maintenance and Monitoring Plan (dated June 15, 2022).* Please distribute this plan as final.

If you have any questions or concerns, please call me at (406) 457-5019.

Sincerely,
NIKIA GREENE
Digitally signed by NIKIA GREENE
Date: 2022.06.23 08:45:09 -06'00'
Nikia Greene
Remedial Project Manager

cc: (email only)
Butte File
Matt Dorrington, DEQ
Daryl Reed; DEQ
Will George; DEQ

Jon Morgan; DEQ counsel
Carolina Balliew; DEQ
Harley Harris; NRDP
Katherine Hausrath; NRDP
Jim Ford; NRDP
Pat Cunneen; NRDP
John Gallagher; BSBC
Sean Peterson; BSBC
Eileen Joyce; BSBC
Eric Hassler; BSBC
Brandon Warner; BSBC
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SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT

Final

Butte Reclaimed Areas Maintenance and Monitoring (M&M) Plan
in Accordance with Butte Reclamation Evaluation System (BRES)

Prepared for:

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2022

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Acronym	Definitions
ARAR	Applicable or Relevant and Appropriate Requirements
BHRS	Butte Hill Revegetation Specifications
BPSOU	Butte Priority Soils Operable Unit
BRES	Butte Reclamation Evaluation System
BSB	Butte-Silver Bow
CAP	Corrective Action Plan
CD	Consent Decree
CERCLA	Comprehensive Environmental Response Compensation Liability Act
COC	Contaminant of Concern
DEQ	Department of Environmental Quality
DMP	Data Management Plan
EPA	U.S. Environmental Protection Agency
ERA	Expedited Response Actions
FSP	Field Sampling Plan
GIS	Geographic Information System
lbs	Pounds
ICIAP	Institutional Controls Implementation and Assurance Plan
M&M	Maintenance and Monitoring
NPL	National Priority Listed
NRDP	Natural Resources Damage Program
O&M	Operation and Maintenance
QAPP	Quality Assurance Project Plan
RAWP	Remedial Action Work Plan
RI	Reclamation Improvement
RMAP	Residential Metals Abatement Program
ROD	Record of Decision
RODA	Record of Decision Amendment
SD	Settling Defendants
SMP	Standard Maintenance Procedures
SSWS	Superfund Storm Water System
TCRA	Time Critical Removal Actions
UWS	Undesired Weedy Species
VI	Vegetative Improvement
XRF	X-Ray Fluorescence

1.0 INTRODUCTION

Remedial action performed under the Comprehensive Environmental Response Compensation Liability Act (CERCLA) response actions within the Butte Priority Soils Operable Unit (BPSOU) included storm water controls, waste removal, and engineered caps over mine waste left in place or contaminated areas. Settling Defendants (SDs) are required to provide a written operation and maintenance (O&M) plan to document compliance of O&M obligations for established programs related to solid media remedy as described in the 2020 Record of Decision Amendment (RODA) (EPA, 2020a), and 2020 BPSOU Consent Decree (CD) and Further Remedial Elements Statement of Work (EPA, 2020b). Reclaimed areas (Figure 1), sometimes called sites, must be monitored, evaluated, and maintained to achieve performance standards established in the U.S. Environmental Agency (EPA) Butte Reclamation Evaluation System (BRES) document (Appendix B to the EPA Record of Decision [ROD], BPSOU Silver Bow Creek/Butte Area National Priority List [NPL] Site [EPA, 2006]). Completion of the routine inspection and maintenance activities described in this plan is required to ensure waste is not exposed and performance standards achieved through the remedial action are upheld.

1.1 Scope

The performance standard that all reclaimed areas in the BPSOU must achieve was originally described under the 2006 ROD (EPA, 2006) and revised as described in the 2020 RODA (EPA, 2020a). The BRES specifies the evaluation methodology and guidelines for corrective action. As a result, it is the governing guidance document related to performance standards that reclaimed areas must achieve, evaluation methods, and corrective actions. The BRES is not a maintenance plan. As the ROD stipulates a requirement for a maintenance and monitoring (M&M) plan for reclaimed areas, this Butte Reclaimed Areas M&M Plan (Plan) provides the means and methods necessary to consistently maintain reclaimed areas to ensure the stability and integrity of those areas. Standard maintenance procedures (SMPs) provided in this Plan will be followed to provide assurance that maintenance performed on reclaimed areas is completed to a level that will continue to protect human health and the environment over the long term. Concurrently, the *BRES Field Manual* (Atlantic Richfield Company, 2018a) provides guidance to evaluate the stability, integrity, and degree of human and environmental protectiveness afforded by the response actions at the sites.

LEGEND

- UNRECLAIMED SITES
- INSUFFICIENTLY RECLAIMED SITES
- RECLAIMED SITES
- BPSOU BOUNDARY

N

DISPLAYED AS:
PROJECTION/ZONE: MSP
DATUM: NAD 83
UNITS: INTN'L FEET
SOURCE: PIONEER/BSB/QSI 2020

0 400 800 1,600 2,400 3,200
Feet

FIGURE 1

PIONEER TECHNICAL SERVICES, INC.

DATE: 4/8/2022

BRES EVALUATION RECLAIMED, UNRECLAIMED, AND INSUFFICIENTLY RECLAIMED AREAS

Path: Z:\Shared\Active Projects\ARCO\BPSOU\LandSupport\SolidMedia\BRES_updates\ReclaimedAreas_from 2018 folder\Project\Reclaimed_Unreclaimed_Insufficient_10_2018.mxd

1.2 Supplemental Material

This Plan incorporates or references various supplemental documents related to the work. This information is included as the appendices below:

Appendix A Site Boundaries List and Storm Water Structures
- Appendix A.1 BRES Sites Listed by Quadrant
- Appendix A.2 Unreclaimed Sites List
- Appendix A.3 Reclaimed Areas with Storm Water Structures

Appendix B Procedures, Field Forms, and Specifications
- Appendix B.1 Standard Maintenance Procedures
- Appendix B.2 Engineered Covers Field Form
- Appendix B.3 Butte Hill Revegetation Specifications

Appendix C Reports
- Appendix C.1 Summary and Technical Recommendations Report
- Appendix C.2 Corrective Action Plan
- Appendix C.3 Annual Maintenance and Monitoring Report

1.3 Roles and Responsibilities

This section describes evaluation, maintenance, monitoring, and oversight responsibilities.

1.3.1 Butte-Silver Bow

The Butte-Silver Bow (BSB) Department of Reclamation and Environmental Services is responsible for all monitoring, maintenance, and reporting described in this Plan; coordinating the associated annual field evaluation training prior to completing field evaluations; and performing all associated maintenance and monitoring required to ensure reclaimed areas in the BPSOU remain protective of human health and the environment. Key individuals comprising the BSB Department of Reclamation and Environmental Services are shown on Figure 2 and responsibilities are described below.

Program Director
The Program Director, Eric Hassler, oversees all activities and implementation of remedial actions throughout the department related to Superfund.

Assistant Program Director
The Assistant Program Director, Julia Crain, assumes the role of BRES Administrator. This individual is responsible for coordinating annual field evaluator training, overseeing system database and Geographic Information System (GIS) components, assuring the quality of all field data, compiling all associated reporting requirements described in this Plan, maintaining quality records, managing program data, and reporting final remediated property requirements to the Agencies.

Environment and O&M Division Manager
The Environment and O&M Division Manager (O&M Manager), Brandon Warner, assumes the role of Project Manager for reclaimed areas monitoring, maintenance, and end-use compliance. The O&M Manager/Project Manager is responsible for maintaining the official approved Quality Assurance Project Plan (QAPP), scheduling all work to be completed, and ensuring that the work is performed in accordance with the requirements contained herein. The O&M Manager/Project Manager is also responsible for consulting with the Program Director and/or Assistant Program Director regarding any project deficiencies and resolutions.

Data Management Division Manager
The Data Management Division Manager, Abby Peltomaa, ensures data quality is completed per the project QAPP, leads preparation and review of project final reports, evaluates information from instances of nonconformance, and evaluates inspection reports and surveillance reports.

GIS Data Specialist
The GIS Data Specialist, Jeremy Grotbo, ensures up-to-date GIS data are verified and maintained in the project database, maintains GIS data such as site boundaries, updates proposed changes to site boundaries as described within standard procedures, and notifies team members of updates.

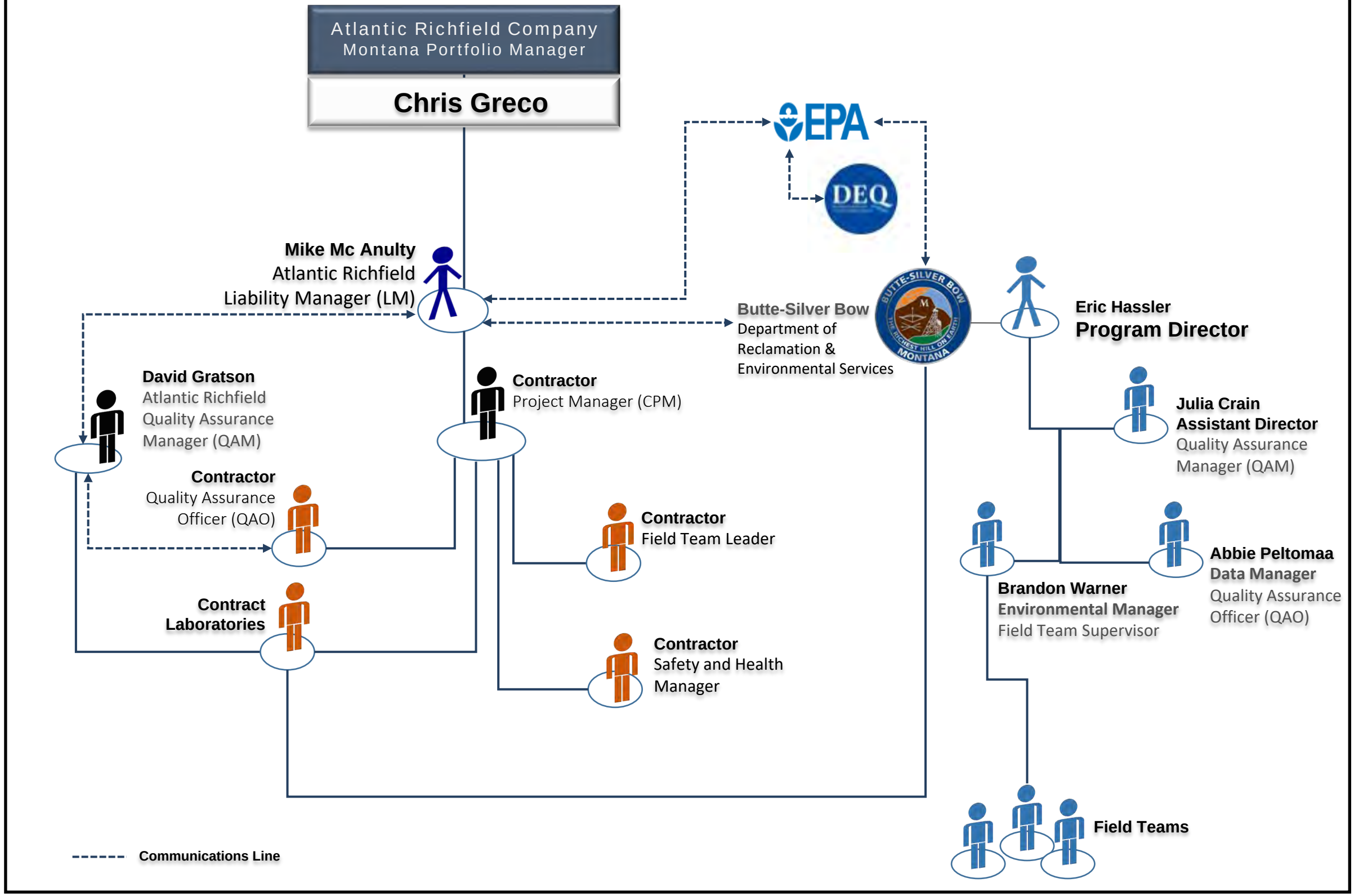

Figure 2. BPSOU Reclaimed Areas Communication Structure

1.3.2 Annual Field Evaluation Contractor

An external, independent contractor will perform routine annual field evaluations as described in the BRES Field Manual (Atlantic Richfield Company, 2018a) and provide the results to BSB for review and selection of appropriate corrective actions. The evaluation contractor must undergo annual training to accurately perform the evaluations as described in the BRES Field Manual.

1.3.3 EPA and DEQ – Agency Oversight

Regulatory agency oversight is provided by EPA, Region 8 and Montana Department of Environmental Quality (DEQ). EPA is the lead regulatory agency and acts in consultation with the DEQ. EPA Remedial Project Manager, Nikia Greene, and Montana DEQ Project Officer, Daryl Reed, referred to collectively as the Agencies, are responsible for ensuring M&M activities are performed as described in this Plan, reviewing Corrective Action Plans (CAPs) and related summary reports, ensuring reports are submitted as prescribed, and participating in performance monitoring inspections.

1.3.4 Atlantic Richfield Liability Manager

Atlantic Richfield Company (Atlantic Richfield) Liability Manager, Mike Mc Anulty, will ensure the program is implemented as prescribed; monitor the performance of the reclaimed areas, maintenance, and reporting activities; review all field recommendations with BSB prior to the recommendations being submitted for Agency approval; may make recommendations for adjustments to existing reclaimed areas boundaries; and will review all field recommendations with BSB prior to the recommendations being submitted for Agency approval.

The following require review and approval by Atlantic Richfield prior to implementation:

- Proposed evaluation of new sites/areas for reclamation.
- Addition of storm water features.
- Additional remedial investigation of sites.
- Recommendation for engineering evaluation.
- Deviations from the approved schedule.

1.4 Staffing and Training

In addition to routine work practice training provided by BSB, field crew personnel will undergo training related to Superfund practices, policies, procedures, and past remedial actions to ensure corrective action field work does not impact the performance of remedies in place.

The SMPs listed in this Plan (and included in Appendix B.1) are structured to ensure corrective measures are applied consistently for specific trigger items. Staff will be trained on the proper application of SMPs and how to properly document completed field work.

1.5 Evaluation Tool

The BRES Field Manual (Atlantic Richfield Company, 2018a) describes the BRES evaluation tool and instructions specifically designed for use in the upland environment in Butte, Montana and to address the diverse land types and uses of reclaimed areas. This document provides methods and performance standards to accurately evaluate the integrity, stability, and protectiveness of remedial work performed in reclaimed areas and will continue to be used to evaluate and prescribe corrective actions on reclaimed areas within the BPSOU in perpetuity.

1.5.1 Site Evaluations

An external, objective, and unbiased contractor performs site evaluations annually, typically in the late spring period on a rotating schedule that occurs every four years. Results of the annual site evaluations are reported to the O&M Manager. Trigger items listed in the evaluations are used to identify maintenance tasks, and these trigger items will be referenced as applicable in any associated CAP.

1.6 Site Access

Access to reclaimed areas is required to complete evaluations and related M&M tasks. Reclaimed areas are on SD-owned property and privately owned lands. Permission to access lands must be obtained prior to site arrival. To the greatest extent possible, land access agreements or easements have been established already. Notification should be given to property owners 48 hours prior to site arrival.

1.6.1 Sites on Privately Owned Property

A list of sites located on private, third-party owned property is provided in the *Institutional Controls Implementation and Assurance Plan* (ICIAP) (BSB and Atlantic Richfield Company, 2019).

1.6.2 Access Agreements

Prior to conducting remediation or evaluation activities on private, non-residential property, access must be obtained from the property owner. Refer to the ICIAP (BSB and Atlantic Richfield Company, 2019).

1.7 Maintenance Schedule and Coordination

Butte-Silver Bow is responsible for maintenance and completion of corrective actions driven by annual site evaluations. Corrective action will be completed within one calendar year of the inspection as specified in the ROD (EPA, 2006). Conventional maintenance tasks described in Section 8.6 will be completed according to priority and availability of resources as determined by the O&M Manager.

1.8 Health, Safety, and Environment

All work will be performed in accordance with the current BSB health and safety requirements. All personnel are responsible for reviewing, understanding, and implementing the safe work practices required by BSB.

2.0 BACKGROUND

Previous response actions implemented within BPSOU were conducted as time critical removal actions (TCRAs) and expedited response actions (ERAs) to address immediate human health and environmental risks. EPA developed the BRES (EPA, 2006) as an evaluation tool to assess reclamation work completed on lands impacted by mining within the operable unit. The evaluation tool is used to assess the stability, integrity, and degree of human and environmental protectiveness provided by reclamation actions and sets the criteria for long-term performance of reclaimed areas. Along with the BRES, the BRES Field Manual (Atlantic Richfield Company, 2018a) will be used to guide field evaluations.

2.1 Past Remedial Actions Summary

Initial response actions focused on addressing mine waste left *in place*. The TCRAs and ERAs used a land reclamation technique involving cover soil caps and revegetation. Superfund law requires "*actions to be consistent with, and contribute to, the efficient performance of a final long-term remedial action"* (EPA, 2006) to the extent practicable. As a result, EPA required early response actions to be designed and constructed consistent with any final remedy.

2.2 Site Descriptions Summary

Sites with impacted soil were grouped into different categories for remedial action during the remedial field investigation phase. The categories are defined in sections 2.2.1 through 2.2.4. A logic diagram, described in Section 2.2.2, helps identify the additional evaluation and remedial action requirements of solid media sites.

2.2.1 Conditional, Limited No Further Action

Areas that were reclaimed during previous cleanups and that were determined to have met standards and cleanup objectives in the corresponding Response Action Summary Document require periodic assessments of reclamation conditions. Corrective actions will be implemented as necessary as a result of annual evaluations or other related maintenance programs, such as the Surface Water Management Program or activities conducted under the *Interim O&M Plan for the BSB Superfund Storm Water System (SSWS) within the BPSOU* (BSB O&M SSWS Plan) (BSB, 2018) or other applicable storm water O&M plans.

2.2.2 Unreclaimed Source Areas Exceeding Action Level(s)

The ROD (EPA, 2006) also categorized sites as Unreclaimed. Unreclaimed areas will be evaluated individually as described in the *Unreclaimed Sites Quality Assurance Project Plan*

(QAPP) (Atlantic Richfield Company, 2018b) and Attachment C Further Remedial Elements Scope of Work to the BPSOU CD (EPA, 2020b) to assess past sampling events and results, identify site-specific issues, and develop specific Field Sampling Plans (FSPs). If the evaluation determines that contaminants of concern (COCs) exceeding human health criteria or substantially contributing to the degradation of surface water runoff are present at the site, a Remedial Action Work Plan (RAWP) will be generated for agency approval. The RAWP will define the appropriate actions required to remediate the site. Sites identified under the Field Survey of Previously Reclaimed Areas (PRP Group, 1997) will be reviewed to determine if additional action is required. Reviews may include previous BRES field evaluations, site evaluations, or construction completion reports to determine if remediation met ROD objectives.

Additional sampling may be necessary for sites listed in the Field Survey of Unreclaimed Areas (CDM, 1997) or sites considered for remedial action under a specific Administrative ROD or known Source Area. Sites listed in these categories likely have not received remediation and may not be completely characterized. A soil logic sampling diagram may be used to determine if site sampling is necessary. If sampling is necessary, samples will be collected as described in the Unreclaimed Sites QAPP (Atlantic Richfield Company, 2018b) and site-specific, Agency-approved FSP.

Site evaluations and sampling performed under the guidance of an approved QAPP and FSP will be used to determine if COCs are present, if concentrations exceed specific action levels, or if the site condition is related to mining and contributes to the exceedance of surface water Applicable or Relevant and Appropriate Requirements (ARARs). The results of site-specific evaluations and sampling will ultimately be used to determine appropriate site reclamation requirements. Upon completion of any required reclamation, sites will be maintained per this Plan.

2.2.3 Unreclaimed Source Areas Impacting Surface Water Quality

Unreclaimed source areas not exceeding lead or arsenic action levels may require reclamation to address contributions to storm water contamination of surface water. Upon completion of remediation activities, associated long-term M&M tasks will be carried out according to the BSB O&M SSWS Plan (BSB, 2018).

2.2.4 Previously Reclaimed Sites Not Addressed

Sites where reclamation took place outside of removal actions mandated or performed by EPA require continued M&M activity and possible further reclamation to meet performance standards described in the BRES (EPA, 2006). Refer to the solid media site evaluation logic diagram in the Unreclaimed Sites QAPP (Atlantic Richfield Company, 2018b) for additional guidance.

3.0 BOUNDARY REVISIONS

As described in the BRES (EPA, 2006), sites were divided into smaller land units referred to as polygons to improve the accuracy and precision of evaluations performed (polygons are smaller, specific areas within an established site boundary created to identify field evaluation findings, maintenance actions, or differences in vegetation). The initial assessment of these polygon boundaries resulted in numerous polygon areas. The original polygon delineation was re-evaluated and altered in 2018 to adjust boundaries to physical features, better reflect reclaimed conditions on the ground, and consolidate adjacent areas with similar cap types. Boundary adjustments and site reclamation details are provided in a BPSOU Reclaimed Areas Boundary Adjustments Report that has been submitted and is currently under review by agencies. Appendix A.1 provides a list of reclaimed areas with respect to the boundary adjustments. The list includes the reclaimed sites' historical site name, historical BRES number, new BRES number, new site name and the site status under the Boundary Adjustments Report. Unreclaimed areas are evaluated per the Unreclaimed Sites QAPP (Atlantic Richfield Company, 2018b); if an area is determined to require reclamation, it will be reclaimed according to Butte Hill Revegetation Specifications (BHRS) (Appendix B.3), as appropriate, and will be added to the site list in Appendix A.1 and evaluated under this Plan. The current unreclaimed sites list is shown in Appendix A.2 and includes the sites' historical BRES number (if applicable), historical site name (if applicable), new UR number and new site name.

This section includes additional information regarding boundary adjustments and methods to perform them. Adjustments should be considered periodically, as allowed by the ROD (EPA, 2006), to ensure evaluations are accurately performed and to improve the precision of evaluations completed.

3.1 Adjustments to Physical Features

Site boundaries may undergo re-evaluation every nine years or following two complete BRES evaluation cycles. Initial polygon delineation resulted in unclear boundaries at several locations making it difficult for field personnel to distinguish the site in the field. To all extents possible, polygons were extended to include available physical features such as roadways, curbs, fencing, etc. Boundary extensions were also made to include segments of adjacent property where historical waste may have been in contact with the polygon. As anticipated in the ROD (EPA, 2006), some boundaries were irrelevant and were therefore removed as areas and associated polygons were brought up to BRES standards.

3.2 Boundary Types

The sections below summarize delineation characteristics.

3.2.1 Vegetative Cover

Significantly different vegetative cover may be considered to distinguish boundary locations. Variations may be the result of different reclamation techniques, soil quality, terrain, slope, or vegetative species. Separate polygons are recommended where there is a sharp, visible line of

segregation between one or more areas. In contrast, if previously reclaimed areas have become difficult to distinguish, consideration will be given to adjust those boundaries and consolidate the area into one site.

3.2.2 Engineered Cover

An engineered cover uses distinct evaluation parameters different from a vegetative cover, and a boundary should segregate the area from the surrounding vegetative cover. Engineered cover areas include grass-sodded areas, non-vegetative caps (asphalt paving, “desert” gravel paving, concrete, cellular confinement, etc.).

3.2.3 Erosion

A boundary should distinguish areas of different slopes or aspects to appropriately characterize characteristics and conditions such as erosion effects across a site. Differences in erosion conditions can be caused by differences in slope or vegetation cover within a site.

3.2.4 Terrain and Site Features

Terrain and geologic site features may be used to delineate site boundaries. These types of features may make it easier for field crews to accurately distinguish site boundaries and site edges. Terrain features may include concrete shaft caps or rock outcroppings. Additional features that may be used as boundaries include roadways, trails, or fences.

3.2.5 Residential Yards

Residential yards will be removed from the reclaimed areas evaluation program. Upon removal from the evaluation cycle, any associated sampling or reclamation of the residential yard will fall under the Residential Metals Abatement Program (RMAP).

3.3 Additional Reclaimed Sites

Any additional sites reclaimed to meet BRES performance standards (EPA, 2006) will also be subject to maintenance tasks described in this Plan after remediation is complete and a construction completion report is issued. Refer to Section 4.1 for information on adding future sites to the reclaimed sites list.

4.0 REVISED SITE BOUNDARIES

Site boundaries can be re-evaluated and altered as necessary to remain consistent with M&M requirements. Specifically, SMP-10 (Appendix B.1) provides detailed information related to boundary revisions.

4.1 Future Adjustments

Boundary determinations will be made to areas reclaimed in the future as they are incorporated into the BRES program. Boundary adjustments may involve consolidation of newly reclaimed land with an existing, previously reclaimed area. Adjustments will be made using boundary adjustment protocol described in SMP-10 (Appendix B.1).

To add sites to the list for future field evaluations, the following approach will be applied:

- Reclamation must be complete according to the prescribed remediation plan.
- Boundary delineation is complete as described in SMP-10 (Appendix B.1).
- Field verification is completed by the O&M Manager or designated field crew leader.
- The reclaimed area is assigned a site identification number (Site ID) and appropriate quadrant.
- The Site ID, quadrant, remedial status, and attribute information are saved to the reclaimed areas GIS database to be included on the evaluation list.

5.0 EXCLUSIONS

The BRES (EPA, 2006) provides performance standards, evaluation criteria, and corrective actions for reclaimed uplands in recreational, residential, industrial, and commercial areas. Specific areas and land types are excluded from evaluation, and this section describes the requirements to maintain these excluded areas.

5.1 Superfund Storm Water Structures

Reclaimed areas may include Superfund storm water features or structures (see Appendix A.3) but maintaining or monitoring those features/structures is not included in this Plan. While Superfund features/structures may be located directly downgradient of a reclaimed site or are used as reclaimed site boundaries, Superfund storm water features/structures and their operation, inspection, and maintenance requirements fall under the BSB O&M SSWS Plan (BSB, 2018). However, Superfund features/structures located on or adjacent to a reclaimed area may be evaluated during the individual reclaimed scheduled evaluation of the site under this plan to observe if the structure impacts or may potentially impact reclamation integrity.

5.2 Residential Metals Abatement Program Properties

Potential mine waste encountered within BPSOU residential properties is handled according to the RMAP. Maintenance of residential properties is the responsibility of the residential property owner as defined in the deed restrictions associated with the RMAP's work. In the event mine waste is suspected, the property owner should contact the BSB RMAP to request sampling or abatement services. Excavation activities performed by the resident or property owner must follow the provisions of the BSB Excavation Ordnance.

In addition to residential yards and living spaces, RMAP addresses contaminants and pathways at schools, playgrounds and play areas, and residential properties within a commercial/industrial area.

5.3 Engineered Covers

Engineered covers are a widely used reclamation technique within BPSOU. Specific covers are implemented to meet end-use criteria. These covers include grass-sodded areas, asphalt parking lots, concrete caps, and trails, etc. These areas must be monitored and maintained to ensure the remedy implemented remains protective and functional and there is no impending threat to human health or the environment. These areas are excluded from vegetation field evaluations because they clearly do not meet the BHRS (Appendix B.3) vegetated diversity criteria; however, an evaluation checklist for engineered covers is provided in Appendix B.2. Performance, monitoring, and maintenance criteria are described below.

5.3.1 Grass-Sodded Areas

Grass-sodded, mono-cultural areas do not meet the vegetative diversity criteria described in the BRES (EPA, 2006). Manicured, sodded areas are installed at various areas as part of the remedy and specific use restrictions are placed on these areas.

Site-specific plans describe maintenance activities and intervals outside the scope of this document. Monitoring of these areas is required and will be performed to ensure long-term protectiveness of grass-sod caps in areas where waste remains left in place. Disturbance of these areas is not allowed without prior approval through the BSB Excavation and Dirt Moving permit process (current process available on the Butte-Silver Bow County website). Refer to provisions of the BSB Excavation Ordinance (current ordinance available on the Butte-Silver Bow County website).

5.3.2 Asphalt Parking Lots

Asphalt parking lots must be maintained to ensure cap integrity and ensure the parking lot is viable for sustained use. Appropriate maintenance is needed to ensure the pavement can remain in service with minimal expense. Preventative maintenance includes seal coating to prevent water penetration and intrusion into the sub-grade. Crack sealing should also be performed for surface cracks larger than $^1/_8$ inch wide. An economical and acceptable approach to crack sealing is the use of an injection nozzle to apply sealant. Prominent asphalt parking lots installed over historical areas of impacted materials in the BPSOU are listed below.

- Maroon Activities Center.
- Belmont Center.
- Copper Mountain Park.
- Mountain Con Foreman’s Park.
- Blue Wing Dump.

Maintenance of these lots is the responsibility of the property owner. Disturbance of these areas is not allowed without prior approval through the BSB Excavation and Dirt Moving permit process (current process available on the Butte-Silver Bow County website).

5.3.3 Concrete Caps

Concrete caps are installed in areas that may require higher structural integrity and lower maintenance to ensure the remedy remains protective. Areas where concrete caps are installed include mine shaft closures, areas of increased industrial traffic loads, and areas where subsidence may be a concern. The engineered cap field evaluation form criteria will be referenced during routine evaluations to ensure excessive cracks are not present, which can allow further deterioration due to freeze thaw cycles.

5.3.4 Trails

Trails must be maintained to ensure long-term protectiveness of the remedy. Maintenance evaluations are performed to ensure erosion does not occur along trail edges, trail usage does not create unauthorized spur trails, and weed and plant growth do not compromise the integrity of the trail material.

Disturbance of these areas is not allowed without prior approval through the appropriate BSB departments and Operations Managers and reference to the Excavation and Dirt Moving permit process.

5.3.5 Riparian Areas

Riparian areas within the BPSOU (Lower Area One, along Silver Bow Creek, and along Blacktail Creek) are not included in evaluations. Should riparian areas require evaluations in the future, revisions or addendums to this document will be required to include methods for evaluating riparian areas.

5.3.6 Rock Outcrops

Rock outcrops are excluded from evaluations. Rock outcrops may be used as boundary delineations or characterized as rock outcrop micro-sites within a site boundary.

5.3.7 Rock Armor and Riprap Areas

Rock armor and riprap areas are rock or other material typically used to protect against erosion, scour and water, or ice erosion. These materials may be placed along embankments, at ditch inlet/outlet areas, or where erosion is predicted. These areas are excluded from vegetative evaluations and may be used as boundary delineations.

6.0 RECLAIMED AREAS

Figure 1 on page 2 illustrates the reclaimed, unreclaimed, and insufficiently reclaimed areas within the BPSOU. All reclaimed areas shown on the figure will be routinely monitored and maintained to ensure the remedy in place remains effective. Sites listed below are monitored for evidence of erosion, vandalism, or failure as described in the sections below.

6.1 Reclaimed Area Quadrants

Reclaimed areas are separated into quadrants (Figure 1 with respect to Appendix A.1). Each quadrant is evaluated according to field evaluation protocol every four years, on a rotating schedule. All sites within the specified quadrant are evaluated during the same evaluation year, and corrective action is completed by the end of the following calendar year.

6.2 Future Reclaimed Areas

Future reclaimed areas are added to the main list once site reclamation for the specific area is complete. These sites will be included in the appropriate quadrant and evaluated per the rotating quadrant schedule.

6.3 Third-Party Owned Source Areas

Over time, some Source Area Properties have been conveyed to third parties. In many conveyances, Atlantic Richfield and BSB reserved access rights included in the conveyance deeds to third parties.

Mine waste encountered within BPSOU on third-party owned properties not within residential areas will be reclaimed to open space criteria unless and until the properties are developed. In cases where third-party owned properties with existing access agreements must be reclaimed, owners will be notified by BSB to coordinate site access to complete evaluation and potential reclamation.

Upon completion of any reclamation, owners will be informed of maintenance responsibilities and ongoing monitoring performed under the BRES (EPA, 2006). If reclamation is not required, property owners will be informed that no further action will take place.

For Source Area Properties where reserved access rights were not included in the conveyance deeds, BSB will contact the third-party property owner to obtain permission to access the property to perform necessary evaluations and reclamation (as warranted). Attempts to seek access will be performed and recorded as described the ICIAP (BSB and Atlantic Richfield Company, 2019).

6.4 Storm Water Features

Many storm water features are installed within or near reclaimed areas. Storm water features provide run-on/runoff control to reclaimed areas and should be routinely monitored and maintained to ensure the feature meets its intended purpose. Observations of storm water features requiring maintenance are captured using inspection forms, and an associated work order is created to communicate maintenance needs to the appropriate parties responsible for maintenance of these features. Features are monitored according to the BSB O&M SSWS Plan (BSB, 2018).

7.0 CORRECTIVE ACTIONS

The BRES manual sets forth the performance standards the reclaimed areas must achieve to maintain long-term protection of human health and the environment. The periodic evaluation of reclaimed sites against the BRES performance standards will direct the appropriate level of corrective action work that may be needed at each site. Corrective actions can be placed in three main categories:

- Vegetation Improvement (VI) – VI is the least intensive of the corrective actions and involves generally surficial steps to improve vegetation conditions at a site. Most VIs are relatively simple steps (e.g., supplemental seeding, fertilizing, raking) taken to improve vegetation cover in certain subareas of a site or to address portions of a site with barren areas.
- Reclamation Improvement (RI) – RI is the moderate to high level of corrective actions and is intended to restore a site to meet the BHRS. If a site undergoes VI, and then falls into the less than 21 percent live cover category again during the next BRES evaluation, the site or that portion of a site is then required to undergo RI in order to meet the BHRS. Sites with large barren areas or with failed VIs for barren areas must also be addressed by an RI plan to meet the BHRS. RI actions require the use of a reclamation specialist to design and implement a corrective action.
- Engineering Assessment (EA) – EA is the most intensive level of corrective action intended usually to address significant erosion, drainage, exposed waste, bulk soil failure, run-on/runoff, or other issue that may require the intervention of a professional engineer, in consultation with a reclamation specialist when necessary, to address.

Corrective actions may simply be some type of minor activity, such as repairing small actively eroding gullies or supplemental seeding as part a VI, or they may involve full and complete reclamation of a failed reclaimed site. Conventional O&M (e.g., fence maintenance, weed spraying, litter control, access control) differs from corrective actions in that corrective actions are directed specifically at maintaining cap integrity.

Results from the BRES evaluations will be used to trigger corrective actions that ensure the response action caps are appropriately maintained. After environmental and other site information have been collected and compiled, as necessary, the SDs will develop site-specific CAPs to address the deficiencies identified at specific sites during the BRES evaluation. The CAPs will summarize the results of the field sampling (Section 8.4) and describe the VI, RI, or

EA work that is proposed to complete the corrective action. These work plans must be reviewed and approved by EPA. EPA must approve CAPs prior to implementation. Most corrective action work must be completed within the calendar year of the date of the original BRES field evaluation.

8.0 MAINTENANCE TASKS

Maintenance tasks described in this Plan are those typically required to alleviate trigger items identified during the site's field evaluation. Conventional maintenance tasks described in Section 8.6 are required regardless of site delineation. All materials used for corrective action must meet BHRS criteria (Appendix B.3).

8.1 Standard Maintenance Procedures

The SMPs exist to provide consistent, repeatable methods to perform maintenance and corrective measures activities. The procedures, listed below and provided in Appendix B.1, should be reviewed periodically to ensure information is consistent with field requirements, and field personnel are properly trained in application of the procedures. Butte-Silver Bow will update these procedures as needed to reflect current conditions, standards, and science. Additional procedures may also be created as needed. New and updated procedures must be reviewed and approved by the Agencies prior to implementation.

Table 1. Reclaimed Areas Standard Maintenance Procedures.

SMP Number	Title
SMP-1	Soil pH Field Testing
SMP-2	Cover Soil Placement
SMP-3	Limestone Placement and Stabilization
SMP-4	Organic Amendment
SMP-5	Barren Areas
SMP-6	Seeding and Fertilizing
SMP-7	Site Capping
SMP-8	Erosion
SMP-9	Exposed Waste Rock
SMP-10	Boundary Revision/Creation
SMP-11	Vegetative or Reclamation Improvements and Engineering Assessments
SMP-12	Weed Control
SMP-13	XL3 Field X-Ray Fluorescence (XRF) Analyzer
SMP-14	Maintenance Polygon Creation

8.2 Directed Maintenance

Completion of required maintenance is of high priority because associated corrective action is the approved method for ensuring cap integrity and eliminating exposure to waste to protect human health and the environment.

During site evaluations, site-specific issues are identified. Items include vegetation conditions, evidence of erosion, presence of site edges substantially different than the interior of the site, gullies, barren areas, and exposed waste.

Identified issues require CAPs, which are prepared to address VI or RI to provide an appropriate remedy for deficiencies identified during field evaluations. All CAPs must be reviewed and approved, as described in Section 11.2, by the Agencies prior to implementation.

Site-specific trigger items require correction, but these corrections are achieved through implementing SMPs. Corrective actions using SMPs, as noted on the Summary and Technical Recommendations Report (refer to Section 11.0 and Appendix C.1), can be implemented without additional review as all SMPs have previously received Agency approval. Maintenance performed as a result of annual field evaluations must be completed within one calendar year of the evaluation.

8.2.1 Site Corrective Actions

Erosion and vegetation deficiencies are site-based, meaning corrective action must address the entire site/reclaimed area. All corrective actions will be completed according to approved standard procedures to ensure corrective actions are applied consistently and uniformly. The spatial data pertaining to the identification of conditions in the field along with maintenance activities and suggested boundary adjustments will be collected using ArcGIS software and applications. In addition, BRES field evaluation Summary and Technical Recommendations Reports, CAPs, and annual O&M reports will be prepared annually.

Site edges, exposed waste material, bulk soil failure or instability, barren areas, or the presence of rills and gullies require corrective action, and the corrective action can be applied locally and directly but may not need to be applied uniformly across the entire site. Standard procedures described below and listed in Appendix B.1 will be applied accordingly to the localized area.

8.2.1.1 Vegetation

Corrective actions required to address vegetative deficiencies are driven by a threshold score. The BRES (EPA, 2006) uses 3 live vegetation cover categories: lowest (less than 21% of the area has live vegetative cover), middle (21 to 40% of the cover is undesirable), and upper (41 to 100% of the area has vegetative cover).

Under the lowest live vegetation cover category (less than 21% live cover), the site must undergo either a VI or RI. The VI or RI should be completed within a calendar year of the evaluation in which the deficiency was observed, and the site should undergo another evaluation 3 years

following corrective action work (i.e., back on the 4-year evaluation cycle). If a site undergoes VI, and then falls into the lowest (less than 21% live cover) category again during any future evaluations, a RI must be completed and implemented according to the BHRS (Appendix B.3).

In the middle live vegetation cover category (21 to 40% of the cover is undesirable and contains undesired weedy species [UWS]), if greater than 10% of the vegetative-specific polygon is covered by UWS, the polygon must undergo a VI. If less than 10% of the area of the polygon is covered by UWS, the polygon must be evaluated according to the regular 4-year evaluation cycle.

For sites that fall into the upper vegetation cover category (41 to 100% of the site contains live vegetative cover), no action is required, and the site should be re-evaluated under the regular 4-year evaluation cycle.

8.2.1.2 Erosion

An erosion evaluation score of 55 or less requires no immediate action. The site will continue to be on the regular 4-year evaluation cycle.

An erosion score of greater than 55 during an evaluation triggers a recommendation for corrective action. An EA on the erosion and flow patterns must be performed to determine the appropriate type of corrective action needed to reduce erosion. A CAP must be developed, approved, and implemented within the calendar year. The area repaired should be monitored and, if the erosion control actions are failing, the site should be repaired immediately. The site and reclamation activities will undergo a full evaluation 3 years following the corrective action work.

8.2.2 Engineered Caps

Engineered caps are used in public access areas and function as a barrier between waste materials and the environment or public. It is critical these caps remain functional and protective to the environment and health. Engineered caps are evaluated by completing the Field Form for Engineered Caps (Appendix B.2).

Maintenance is required to ensure long-term protection. Engineered caps located within the reclaimed area quadrants are evaluated on the same periodic schedule as vegetative caps. Caps placed over liners may require more frequent inspections, at the discretion of the O&M Manager, to ensure the liner is not exposed by animal intrusion, public access, or motorized vehicle use. Site edges are particularly susceptible to degradation and should be inspected for signs of erosion, undercutting of the cap, animal intrusion, vegetation growth, etc., which could lead to premature degradation of the cap.

8.2.3 Vegetative Caps

Vegetative caps placed over mine waste areas must be completed according to BHRS (Appendix B.3). In general, limestone is placed over mine waste, then covered with a minimum 18-inch depth of cover soil meeting the minimum Butte Hill Cover Soil requirements described in the

BHRS. A cover soil approval form is provided in Appendix B.2. Soil amendment, fertilizer, compost, etc., activities must be completed to ensure the minimum vegetative growth criteria are met. Agency-approved seed mix will be applied and tilled.

8.2.4 Annual Vegetative Maintenance Activities

Annual vegetative maintenance is critical to the success of reclaimed areas. Vegetation is a key component to the remedy and ensures buried waste is not exposed due to erosion over time. Vegetative maintenance includes control over unwanted species and periodic, local amendment or fertilization of sites. Guidance for vegetation maintenance is provided in sections below.

Additional maintenance activities may range from additional field sampling and evaluation, vegetation amendments, or soil placement. Vegetative maintenance activities must be documented in the annual report as described in Section 11.0.

8.2.5 Noxious Weed Control

Noxious weed control must be implemented to sites as necessary to subdue spotted knapweed, leafy spurge, matrimony vine, and other noxious weeds (Appendix B.3). All weed spraying activities must employ a spot spraying method (i.e., no boom-spraying) as described in SMP-12 (Appendix B.1). All reclaimed areas must be sprayed consecutively over the spring, summer, and fall spraying seasons for at least two full growing seasons or until control is achieved. Weed control will not be performed where seeding has recently occurred, or early germination is present.

Sterilization activities must be implemented on appropriate reclaimed areas and will include weedy areas as well as site pathways, walking trails, and engineered soil caps.

In addition to noxious weed control using spot spraying, species such as cheat grass, mustards, and other species, will be mowed prior to seed propagation to mitigate the spread of these species, which drive down live cover scores and threaten the sufficiency of desirable species.

8.2.6 Granular Fertilizer Amendment

Newly reclaimed areas will be fertilized at a rate of 60 pounds (lbs) of nitrogen (N) per acre, 80.0 lbs of phosphorus (P) per acre, and 150.0 lbs of potassium (K) per acre (NPK = 60-80-150), as recommended in the BHRS (Appendix B.3). Fertilizer may also be applied prior to hydroseeding and/or hydromulching. Soil analysis may be conducted to determine site-specific fertilizer requirements on a case-by-case basis.

Granular fertilizer amendment may be applied at a rate of 25 lbs of nitrogen (N) per acre, 0.0 lbs of phosphorus (P) per acre, and 0.0 lbs of potassium (K) per acre (NPK = 25-0-0) to a site to improve the cover of existing vegetation. Fertilization must take place in the spring. Fall fertilization is discouraged to minimize plant growth prior to the winter season.

Manual and/or mechanical and/or hydraulic methods of application are allowed as long as the method provides a uniform application at the specified rate. The fertilizer must not be incorporated into the soil by disking, raking, or any other soil-intrusive method to maintain existing desirable vegetation. Refertilization following seedling establishment will not require incorporation into the soil to protect existing vegetation and newly germinated sprouts.

8.2.7 Seeding Approaches

Before June 15 or after October 15, interstitial seeding may be applied to increase the percentage of ground cover of desirable species. Two primary seeding approaches are available (interstitial or hydromulch) and will be applied as described in SMP-6 (Appendix B.1). After October 15, an EPA-approved seed mix must be incorporated into a hydroseed mix, which will also include an EPA-approved mulch and tackifier. Hydroseed and tackifier are used to bind together seeds, soils, and mulch particles, which is especially beneficial for effective seeding on steep slopes.

Mulch must not be applied until after October 15 and must be applied in a uniform manner using a mulch spreader at rates varying from 2,000 to 4,000 lbs per acre. The actual application rate will depend on site conditions (i.e., slope, erosion potential, etc.). The vegetative material must be fed in the mechanical spreader at an even, uniform rate.

Vegetation, including native species, may be considered as applicable to maintaining remediation objectives. Implementation of native species will be evaluated by a team of vegetation and area reclamation subject matter experts on a site-specific basis. The team of subject matter experts may include representatives from the SDs, Natural Resources Damage Program (NRDP), or others as appointed by SDs.

Complete seed mixtures including seeding rates and alternate mixes are provided in the BHRS (Appendix B.3).

8.3 Field Sampling

Field sampling may be required for VI or RI corrective actions to determine site characteristics. Sample analysis must include soil pH measurements, nutrient content, and other analytical parameters to indicate the status of corrective action performed. Composite soil samples must be analyzed for metals (arsenic, cadmium, copper, lead, and zinc), organic content (Walkley-Black), nitrate (NO_3) nitrogen, available phosphorus (P), and available potassium (K). Collection and analysis of composite soil samples must follow the corresponding SMPs (Appendix B.1) and Section 8.3.2, as described in the Agency-approved Reclaimed Areas Maintenance and Monitoring QAPP (Atlantic Richfield Company, 2018c).

8.3.1 Soil pH Samples

Soil pH is determined using a direct read probe. Activities will follow the instructions described in SMP-1 (Appendix B.1). A minimum of one complete pH sample is recommended per quarter acre.

8.3.2 Composite Soil Sample Depths

Composite soil samples must be obtained from various depth intervals. One composite sample will be collected from 0 to 6 inches from the top of the surface to be analyzed for metals (listed in Section 8.3 above), organic compounds (Walkley-Black), nitrogen, phosphorus, and potassium. One composite sample will be collected from 6 to 18 inches from the top of the surface to be analyzed for metals (listed in Section 8.3 above).

Composite samples must be collected at a frequency of not less than 1 sample per 5 acres, and no more than 1 sample per 100 square feet. Prior to sampling activities, a site-specific FSP will be submitted for Agency review and approval. The sampling requirements for a site or location will be specified in the site-specific FSP.

8.4 Field Sampling Plans

Prior to any field sampling, a FSP will be prepared to include the information listed below at a minimum and reference an Agency-approved QAPP.

- Title page and approval authority.
- Introduction and appropriate Agency-approved QAPP reference.
- Goals, objectives, and proposed schedule for field work.
- Site figure including sampling locations, number and depth of samples to be collected, and sample field identification.
- Field activity methods and procedures, standard operating procedures, and/or SMPs.
- Sample labeling and shipping.
- Sample analysis, specifying X-ray fluorescence (XRF) vs. laboratory analysis and laboratory name.
- Figure showing the site and/or area represented by a sample, sample ID, and aliquot locations for composite samples.

8.5 Storm Water Features

Additional storm water features may be required to address run-on/runoff controls and/or associated trigger items identified in field evaluations. Features must be evaluated on a case-by-case basis and designed and implemented as needed to address the site appropriately. Curb and gutter systems may be considered where reclamation contributes to achievement of surface water ARARs or reduces long-term O&M obligations.

Curb and gutter systems may be installed and designated as an engineered edge. No formal curb and gutter program is associated with this Plan. Site storm water features will be maintained through routine and opportunistic monitoring activities. Maintenance of newly constructed storm water engineered structures is to be addressed in the BSB O&M SSWS Plan (BSB, 2018); Appendix B of the BSB O&M SSWS Plan contains a list of sites with storm water features. Maintenance activities should be coordinated to maximize program resources.

8.6 Conventional Maintenance Tasks

Conventional maintenance tasks are listed in this section primarily for task accounting purposes. Site-specific conventional maintenance tasks are described within separate but related O&M plans.

8.6.1 Site Access

Access to sites must be maintained to ensure M&M activities can be completed as needed. Site access includes maintenance of secure access gates and locks as appropriate.

Access to third-party owned sites will be obtained as described in the BPSOU ICIAP (BSB and Atlantic Richfield Company, 2019).

8.6.2 Fence Repair

The need for periodic fence repairs is anticipated at sites throughout the BPSOU. Due to the various types of existing fences, refer to the BSB maintenance protocol for specific guidelines for fence repair. This work will be documented in the daily report for recordation and reproduction in a Summary and Technical Recommendations Report (refer to Section 11.0).

8.6.3 Signage

Signage may be required for areas where waste remains in place or where property boundary designations require trespass warnings. Signage may be used to provide notification to the public to ensure wastes are not disturbed. Signage must be replaced as necessary to provide information. This work must be documented in the daily report for recordation and reproduction in a Summary and Technical Recommendations Report (refer to Section 11.0).

8.6.4 Trash/Debris

Trash and debris must be removed frequently to prevent migration to Silver Bow Creek. Collection of trash and debris is an ongoing task. Periodic collection activities may be completed at the discretion of the O&M Manager or implemented in accordance with field evaluation outcomes. This work must be documented in the daily report for recordation and reproduction in a Summary and Technical Recommendations Report (refer to Section 11.0).

8.6.5 Mowing

Site mowing activities are performed on a periodic, as-needed basis, as determined by a site investigation or as requested by outside entities (i.e., BSB Fire Department). This work must be documented in the daily report for recordation and reproduction in a Summary and Technical Recommendations Report (refer to Section 11.0).

8.6.6 Raking

Site raking activities are performed on a periodic, as-needed basis, as determined by a site investigation, or as requested by outside entities. This work must be documented in the daily report for recordation and reproduction in a Summary and Technical Recommendations Report (refer to Section 11.0).

8.7 Annual Maintenance Inspections

Annual maintenance inspections are performed by BSB independent of field evaluations. Annual maintenance inspections may be coordinated with field evaluations but are ultimately at the schedule and discretion of the O&M Manager. The maintenance inspections are conducted to ensure sites are well maintained, while the field evaluations specifically evaluate stability, integrity, and protectiveness of reclamation actions according to a set schedule. Annual maintenance inspections address site items not evaluated through during a field evaluation such as the following:

- Security and signage.
- Fire potential.
- Drainage.
- Other parameters included in conventional maintenance tasks.

8.8 Opportunistic Maintenance Observations

The BSB Department of Reclamation and Environmental Services personnel (O&M Manager, field inspector, and field crews) and BRES field evaluation personnel have access to field devices to conduct opportunistic observations in the field to accommodate O&M objectives that require maintenance in the interim period between scheduled field evaluations. Currently, BSB personnel perform opportunistic maintenance observations on BPSOU response action sites to check institutional controls (fences, signage, and security) and the presence of weeds, debris, or other factors emerging more frequently than once every four years. This process allows personnel to observe the sites while in the vicinity and address issues in order of priority in a timely fashion. This process ensures the sites are well-maintained and function is not impacted by any of the conditions below:

- Weeds.
- Security.
- Debris.
- Fire potential.
- Adjacent areas.
- Signs and fences.

- Drainage ditches.
- Run-on or runoff conditions.
- Other detrimental conditions.

8.9 Field Maintenance Performance Periods

Certain aspects of maintenance field work are constrained to specific performance periods. Table 2 below provides guidance regarding when field work can be implemented or when no work should be performed.

Table 2. Field Work Performance Periods.

Task	*Application/Field Work	No Work Performed
Field Evaluations	May 1 – June 30	June 30 – April 30
Field Verification	June 1 – October 30	November 1 – May 31
Monitoring	March 2 – November 30	December 1 – March 1
Capping	March 2 – November 30	December 1 – March 1
Seeding	October 16 – 30; March 1 – June 14	June 15 – October 15
Fertilizing	October 16 – 30; March 1 – June 14	June 15 – October 15
Weed Spraying	March 2 – November 30	December 1 – March 1

***Subject to site and weather conditions, schedule may vary slightly.**

9.0 FIELD EVALUATION AND CORRECTIVE ACTION SCHEDULE

This section summarizes the field evaluation and corresponding corrective action requirements to meet the reporting requirements (Section 11.0). Refer to information regarding the standard rotating schedule to complete annual field evaluations of sites based on reclaimed area quadrants.

9.1 Field Evaluation Schedule

Field evaluators, as designated in Section 1.3.1, conduct the BRES evaluations. Evaluations must be initiated in mid-June and are normally completed within 10-15 days of initiation. Evaluators enter data into a cloud-based database, hosted by ArcGIS Online, using field evaluation forms on a field-capable tablet device (Apple iPad or similar). Once an evaluation is complete, the site evaluation form data populates the database (see Section 10.0).

The uploaded information is accessible on computers at the BSB GIS Office through a Microsoft Access user interface, which allows for quality assurance/quality control and data management. Subject to quality assurance review, the data undergo a quality check and are cross-referenced with spatial data collected in the field to ensure field evaluations capture both quantitative findings and specify the particular location where the trigger items occur on the site (Data Management Division Manager conducts the quality check as described in Section 2.3 of the Reclaimed Areas Maintenance and Monitoring QAPP [Atlantic Richfield Company, 2018c]).

The Data Management Division Manager coordinates generating a draft Summary and Technical Recommendations Report of the evaluations to quantify the trigger items identified and uses the

report to schedule field verification events and develop proposed corrective actions. The field verification process must be completed by October 30. Proposed corrective actions derived from field verification must be incorporated into the annual Summary and Technical Recommendations Report submitted for Agency review by November 30. Refer to Section 11.0 for details on the report.

9.2 Corrective Action

For sites requiring corrective action, the O&M Manager coordinates developing a site-specific CAP describing the specific actions required to contend with the vegetation or erosion issues and trigger items identified during the evaluations in consultation with the Assistant Program Director. The CAP must be submitted for Agency review by January 30 with final Agency approval by March 1 (refer to Section 11.0 for details). A FSP, referencing an Agency-approved QAPP, will then be prepared, as needed, for collection of data for sites with scores requiring corrective action.

Upon approval of corrective actions, BSB generates work orders (describing the nature of the work on each site) to perform the field work. Work orders include a description of the nature of the work on each site. Work is initiated as soon as the ground is frost-free, approximately April 15, and is suspended in the fall, approximately October 30. The BSB Maintenance crews capture work items completed using ArcGIS Online and ESRI Survey 123 and upload/record spatial data, photographs of the site, team members involved, duration of the project, equipment used, and other pertinent project data. The O&M Manager performs field verification of work completed by October 30.

10.0 DATA MANAGEMENT

The database used to track the site evaluations and maintenance work performed on reclaimed areas was developed using SQL programming language and is housed on a cloud-based server. Data is captured, populated to the hosted database, and pulled to a computer for real-time quality assurance assessment by data management staff using Microsoft Access.

10.1 Database Management

The BPSOU reclamation database is the storage location for all reclamation data related to source areas reclaimed and evaluated under the BRES tool. The BRES data collection and management system is maintained by BSB as described in the BPSOU Data Management Plan (DMP) (Atlantic Richfield Company, 2017). Various individuals, from field personnel to operations personnel to data administrators, enter and manage the data according to the BPSOU DMP. Information stored in the reclamation database may include, but is not limited to, the following:

- Remediation response action history.
- Cover soil source and depth applied.
- As-built information.
- Soil sampling results.

- Annual field evaluations.
- Vegetation information: species observed, weeds, and percent vegetation cover (method, observer, year).
- Erosion issues.
- Site trigger items including site edges, land slumps or bulk soil failure, barren areas, and gullies and rills.
- Maintenance activities.

The database was designed to allow field personnel to upload site-related data via a mobile field device. Operators use a field-capable tablet to upload/record specific information such as spatial boundaries and locations where work is performed, photographs of the work, team members at the site, duration of the project, equipment used, and material quantities brought in, hauled out, and applied to the site. All field data are saved to ArcGIS Online as well as the BPSOU database to accurately track and manage completion of maintenance work, materials used, equipment, and daily logs. Refer to the BSB Product Documentation and User Guide – BRES, included as an appendix to the BRES Field Manual (Atlantic Richfield Company, 2018a), for additional instructions regarding use, data management, and transfer.

10.2 Geographic Information System

Within the data management system, ESRI ArcGIS software and applications allow field personnel to perform mapping in the field including verifying boundaries, identifying locations of trigger items or other areas of concern, and tracking completion maintenance work. Field crews use the field-capable tablets to upload detailed information about work completed, work locations, time-stamped site arrival, and completion information. The field crews can also generate spatial features files that generate shape files for archival within the BSB GIS Database to serve as a record verifying work performed.

10.3 Field Data Transfer Quality Control

At various stages in the process, BSB performs quality control on the data generated by field personnel. The quality control process ensures the integrity of data used to make decisions specifically related to vegetative cover and transfer of field data. Field personnel enter site data directly from the field into the database, which allows office staff access to the same data in real-time. The data administrator can review the data and make corrections on the spot and make minor adjustments to boundary mapping information to match existing topography or boundary delineations and material quantities reported.

11.0 REPORTING

Related to reporting, BSB is responsible for providing all required reporting to the Agencies for review and approval. Figure 3 below shows a schematic of the evaluation, corrective action, and reporting cycle. The reports listed below must be prepared annually. This section describes each report.

Report Title	Submittal Date	Notes
Summary and Technical Recommendations Report	November 30	Summary of field evaluations completed in June and proposed corrective actions.
Corrective Action Plan*	January 30	Addresses field work to be completed in upcoming construction season.
Annual Maintenance Report	March 30	Summarizes work completed in the previous year.

*Submittal of subsequent documents determined by receipt of Agency comments.

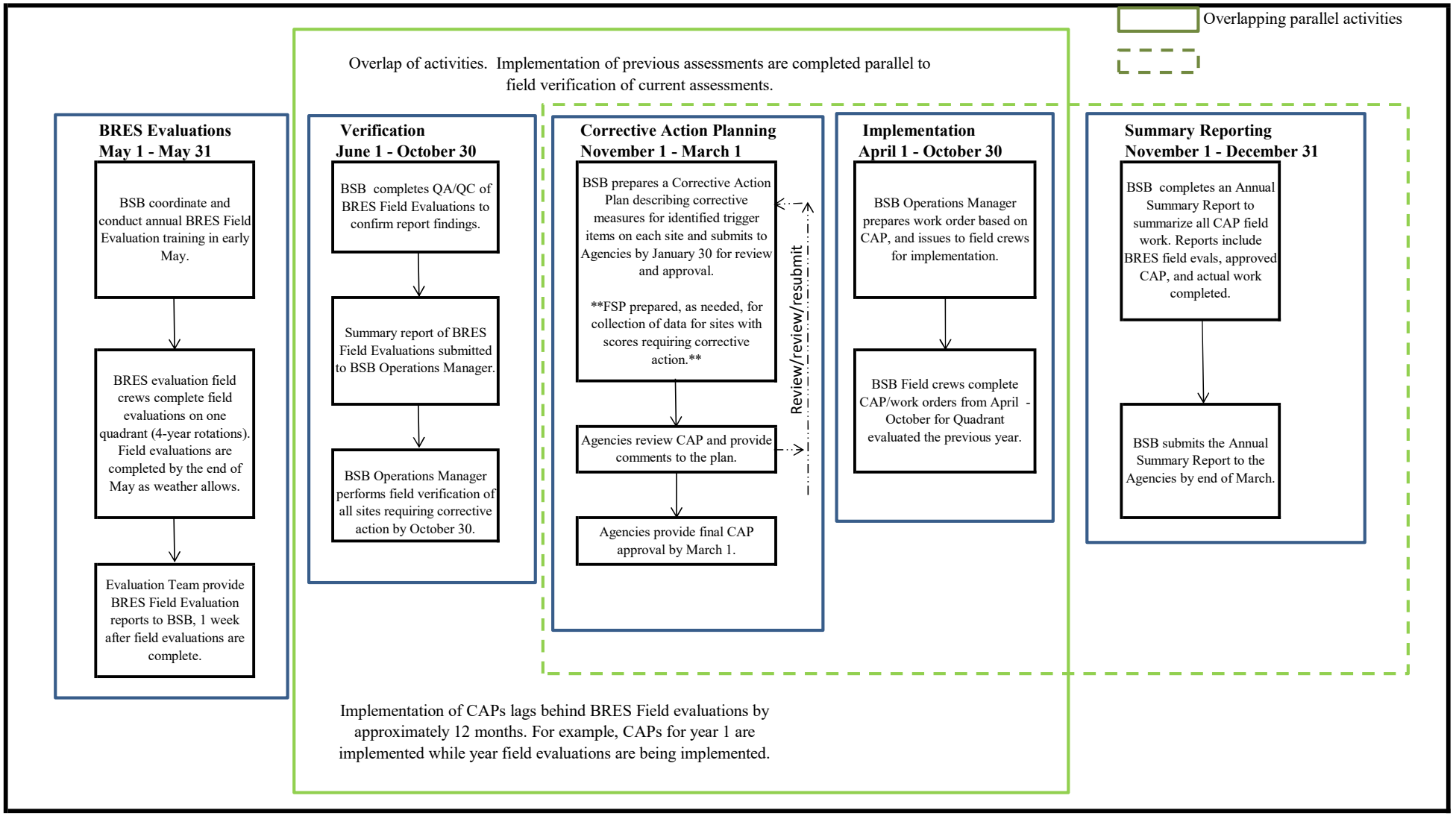

Figure 3. Reclaimed Areas Evaluation, Corrective Action and Reporting Cycle.

11.1 Summary and Technical Recommendations Report

The Summary and Technical Recommendations Report summarizes field evaluations completed in June, summarizes erosion and vegetation scores and trigger items identified during field evaluations, and proposes technical recommendations for corrective action for management group consideration. These reports include various data in different formats. This report also includes any BSB-proposed maintenance for evaluated sites. An outline of the report is provided in Appendix C.1 for reference.

The Assistance Program Director (along with the Data Management Division Manager) coordinates developing a draft Summary and Technical Recommendations Report of the evaluation findings for each specific site to quantify the trigger items identified and uses the report to schedule field verification events and develop proposed corrective actions. The field verification process must be completed by October 30. Proposed corrective actions derived from field verification must be incorporated into the annual Summary and Technical Recommendations Report submitted for Agency review by November 30. Upon submittal, the Management Group (consisting of BSB/Atlantic Richfield, Agencies, and appropriate technical members described in the BRES Field Manual [Atlantic Richfield Company, 2018a]) meet to consider the proposed corrective actions and develop strategies for developing formal CAPs.

11.2 Corrective Action Plan

All CAPs are prepared by BSB for initial Agency review by January 30. Final Agency approval for CAPs is complete by March 1.

These CAPs must be prepared to address VI and RI triggers identified in field evaluations and propose corrective actions for vegetation and erosion deficiencies and site-wide trigger items. To the extent possible, the corrective actions should propose the necessary quantity of materials and equipment and the SMP described in Section 8.1 to correct the deficiency.

The CAPs describing VIs or RIs will include a specific approach to provide an effective long-term solution to the specific deficiency. The CAPs should also provide additional monitoring requirements to verify the recommended corrective measures are effective and maintained prior to the next available field evaluation. A CAP outline is provided in Appendix C.2.

For the process, BSB prepares and submits the CAPs to EPA and Montana DEQ for review and approval. EPA and DEQ should provide comments approval by January 30. If a CAP is revised due to Agency comments, BSB can revise the CAP and resubmit it within 30 days. EPA will provide approval of all CAPs by March 1 or within 30 days of resubmittal of a revised CAP plan.

Once CAPs are approved, BSB generates work orders to complete the work (refer to Section 9.2).

11.3 Annual Maintenance Report

An Annual Maintenance Report is prepared by BSB and submitted to the Agencies for review by March 30 of the year following maintenance actions. The annual report provides a summary of all corrective actions completed to address deficiencies and trigger items identified during field evaluations and describes conventional maintenance tasks implemented on a site. Work completion summaries will typically include documentation of the materials used, their source, quantity, and final site condition.

12.0 REVISIONS AND UPDATES

This M&M Plan will be reviewed annually, and revisions and updates to address the following will be made to this document as necessary:

- Addition of newly reclaimed areas.
- Removal of sites from reclaimed areas program.
- Change in reclaimed area boundary or quadrants.
- Change in land use.
- Reporting requirements and distribution.
- Responsibilities.

13.0 REFERENCES

Atlantic Richfield Company, 2018a. Butte Reclamation Evaluation System (BRES) Field Manual. Draft Final. Prepared by Pioneer Technical Services, Inc., October 2018.

Atlantic Richfield Company, 2018b. Final Unreclaimed Sites Quality Assurance Project Plan QAPP. Prepared by Pioneer Technical Services, Inc., September 6, 2018.

Atlantic Richfield Company, 2018c. Final Reclaimed Areas Maintenance and Monitoring Quality Assurance Project Plan QAPP. Prepared by Pioneer Technical Services, Inc., October 5, 2018.

Atlantic Richfield Company, 2017. Butte Priority Soils Operable Unit (BPSOU) Data Management Plan (DMP). Prepared by TREC Inc., December 22, 2017.

BSB, 2018. Interim Operation and Maintenance Plan for the Butte-Silver Bow Superfund Storm Water System Within the Butte Priority Soils Operable Unit. Butte-Silver Bow, June 2018.

BSB and Atlantic Richfield, 2019. Institutional Controls Implementation and Assurance Plan. Prepared for Butte Silver Bow and Atlantic Richfield Company by Pioneer Technical Services, Inc. October 2019.

CDM 1997. Final Field Survey of Unreclaimed Areas Summary Report, Priority Soils Operable Unit, Silver Bow Creek/Butte Area National Priorities List Site. Prepared by CDM for EPA. November 13.

EPA, 2020a. Record of Decision Amendment for the Butte Priority Soils Operable Unit of the Silver Bow Creek/Butte Area Site. Butte and Walkerville, Montana. U.S. Environmental Protection Agency. Montana Department of Environmental Quality. February 4, 2020. https://semspub.epa.gov/work/08/100007291.pdf.

EPA, 2020b. 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 .

EPA, 2006. Record of Decision, Butte Priority Soils Operable Unit, Silver Bow Creek/Butte Area NPL Site. U.S. Environmental Protection Agency, September 2006. Appendix B, Butte Reclamation Evaluation System (BRES).

PRP Group 1997. Technical Memorandum: Field Survey of Previously Reclaimed Areas.

Appendix A
Site Boundaries List and Storm Water Structures

Appendix A.1
BRES Sites Listed by Quadrant

QUADRANT 1 BRES SITES
Updated Site Names and Numbers

Historic BRES No.	Historic Site Name	New BRES No.	New Site Name	Site Status
5	Alice Dump	360	Alice North	Boundary Adjustment
		361	Alice South	
8	Belle of Butte	8	Belle of Butte	No Change to Boundary
		337	Belle of Butte (Engineered Cover)	New Site
9	Clark Street Dump	9	Clark Street Dump	Insufficiently Reclaimed Site List
11	Magna Charta Lessee Dumps	11	Magna Charta Lessee Dumps	No Change to Boundary
		343	Magna Charta Lessee Dumps (Engineered Cover)	New Site
12	Moose Dump	12	Moose Dump	No Change to Boundary
17	Paymaster	17	Paymaster	Boundary Adjustment
18	Walkerville Ballfield	18	Walkerville Ballfield	No Change to Boundary
19	Blue Wing Dump	19	Blue Wing Dump	Recharacterized
20	Walkerville Playground	20	Walkerville Playground (Engineered Cover)	Boundary Adjustment
21	Capitol Hill Dump	21	Capitol Hill Dump	No Change to Boundary
29	Lexington Dump	29	Lexington Dump	Boundary Adjustment
		341	Lexington Dump (Engineered Cover)	
29N	Lexington Dump North	29N	Lexington Dump North	
30	Atlantic-1	30	Atlantic-1	Insufficiently Reclaimed Site List
		310	Atlantic-1 (Engineered Cover 1)	New Site
31	Waste Dump #5	31	Waste Dump #5	Boundary Adjustment
32	Corra 2 Dump	32	Corra 2 Dump	Insufficiently Reclaimed Site List
32S	South Corra 2 Dump	301	South Corra 2 & Rock Island Dumps	Boundary Adjustment
39	Rock Island Dump			
37	Josephine Shaft	37	Josephine Shaft	
38	Sister Dump	38	Sister Dump	
40	Silver Queen (North of Trail)	303	West Gray Rock (North of Trail)	
41	West Gray Rock			
42	Penrose			
43	East Gray Rock			
40	Silver Queen (South of Trail)	307	East Gray Rock (South of trail)	
41	West Gray Rock			
42	Penrose			
43	East Gray Rock			
158	Waste Rock Dump	158	Waste Rock Dump	Insufficiently Reclaimed Site List
177	North Alice Culvert	300	North Alice Culvert	
177E	North Alice Culvert East			
177N	North Alice Culvert North	177N	North Alice Culvert North	Recharacterized
N/A	GMMIA Trail from Center Street to Granite Mountain Memorial	368	GMMIA Trail from Center Street to Granite Mountain Memorial	New Site
N/A	GMMIA North	309	GMMIA North	
N/A	GMMIA South	308	GMMIA South	
N/A	Scrap H	323	Scrap H	
GMMIA Mine Waste Repository				

QUADRANT 2 BRES SITES
Updated Site Names and Numbers

Historic BRES No.	Historic Site Name	New BRES No.	New Site Name	Site Status
4	Amy Dump	4	Amy Dump	No Change to Boundary
15	Rising Star Dumps West	15	Rising Star Dumps West	
15E	Rising Star Dumps East	15E	Rising Star Dumps East	
16	Curry	16	Curry	Boundary Adjustment
24	Twilight East	24	Twilight East	
25	Venus Dump	25	Venus Dump	
26	Cripple Dump	26	Cripple Dump	No Change to Boundary
33	Jennie Dell	33	Jennie Dell	
34	Eveline Dump	34	Eveline Dump	
34E	Eveline East	34E	Eveline East	Boundary Adjustment
35	Del Monte	312	Del Monte & Garfield West	
45	Garfield			
35	Del Monte	313	Del Monte & Garfield East	
45	Garfield			
36	LaPlatta Gulch	36	LaPlatta Gulch	No Change to Boundary
46	Missoula Mine	363	Lower Missoula Gulch West	Boundary Adjustment
		364	Lower Missoula Gulch East	
46E	Missoula Mine East	46E	Missoula Mine East	
47	Ravin Dump	47	Ravin Dump	
48	Old Glory West	48	Old Glory West	
49	Old Glory	49	Old Glory	
		359	Old Glory (Engineered Cover)	
50	Zelia	50	Zelia	No Change to Boundary
52	Moscow Dump	52	Moscow Dump	Boundary Adjustment
		345	Moscow Dump (Engineered Cover)	
53	Poulin Dump	314	Buffalo North	
54	Spence Dump			
55	Kennedy Dump			
56	Buffalo Dump			
57	Little Mina-1	57	Little Mina-1	
59	Little Mina	59	Little Mina	
		342	Little Mina (Engineered Cover)	
58	Mountain Con-2 Dump	348	Mountain Con Mine Dump South	
181	Mountain Con-3			
60	Mountain Con Mine Yard	346	Mountain Con Mine (Engineered Cover)	
		366	Mountain Con Mine	
60A	Mountain Con Mine Yard Poly A	351	Mountain Con Mine Slope	
60B	Mountain Con Mine Yard Poly B			
60C	Mountain Con Mine Yard Poly C			
60F	Mountain Con Mine Yard Poly F			
		374	Mountain Con Mine Slope (Engineered Cover)	
60D	Mountain Con Mine Yard Poly D	350	Mountain Con Mine Hoist	
60E	Mountain Con Mine Yard Poly E			
		375	Mountain Con Mine Hoist (Engineered Cover)	
58	Mountain Con-2 Dump	347	Mountain Con Mine Dump North	
60	Mountain Con Mine Yard			
61E	Mountain Con-1 Dump East			
61N	Mountain Con-1 Dump North			
61S	Mountain Con-1 Dump South			
61W	Mountain Con-1 Dump West			
N/A	Foreman's Park	349	Foreman's Park	New Site
		373	Foreman's Park (Engineered Cover)	
66	West Ruby Dump	66	West Ruby Dump	Boundary Adjustment
68	Little Mina-2	68	Little Mina-2	
68	Little Mina-2	316	Little Mina-2 (Engineered Cover)	
161	Goldsmith Dumps	161E	Goldsmith Dumps East	
		161W	Goldsmith Dumps West	
171	Blaine Center	171	Blaine Center	
174	Buffalo South (south of dithc)	174	Buffalo Ditch	
174	Buffalo South (north of ditch)	315	Buffalo South	
67	Silver Hill Dump			
N/A	SW Corner of Buffalo and North Main Street			New Site
175	Upper Missoula Gulch	330	Upper Missoula North	Boundary Adjustment
		365	Upper Missoula South	
27	Wappello Dump			
179	Ralph Sr	179	Ralph Sr	No Change to Boundary
1511	La Platta St.	1511	La Platta St.	
178	Leathers Property	178	Leathers Property	Transfer from Program
178W	Leathers Property West	178W	Leathers Property West	
N/A	GMMIA Trail from Wyoming to Granite Mountain Memorial	367	GMMIA Trail from Wyoming to Center Street	New Site
N/A	NW Corner of Center St. and Idaho St.	358	33 Missoula Avenue	

QUADRANT 3 BRES SITES
Updated Site Names and Numbers

Historic BRES No.	Historic Site Name	New BRES No.	New Site Name	Site Status
51	Syndicate Pit	51	Syndicate Pit	Boundary Adjustment
70	Anselmo Dump	70	Anselmo Dump	
71	Anselmo Mine Yard	71	Anselmo Mine Yard	
71N	Anselmo-Timber Yard Slope	71N	Anselmo-Timber Yard Slope	
		317	Anselmo Timber Yard Slope (Engineered Cover)	New Site
72	New Era 1 & 2 - Downey Shafts	72	New Era 1 & 2 - Downey Shafts	Boundary Adjustment
72S	Donkey Hill	72S	Donkey Hill	
73	Jasper Dump	73	Jasper Dump	
74	West Gagnon Dump	74	West Gagnon Dump	
		318	West Gagnon Dump (Engineered Cover)	
75	National Dump	75	National Dump	
76	Waste Dump #20	76	Waste Dump #20	
77	PA020 Dump	77	PA020 Dump	
78	Original Mine Yard	78	Original Mine Yard South Slope	Boundary Revision
		319	Original Mine Yard	
		320	Original Mine Yard (Engineered Cover)	
79	Late Acquisition	79	Late Acquisition	Boundary Adjustment
80	West Steward Parking Lot	80	West Steward Parking Lot	
		333	West Steward Parking Lot (Engineered Cover)	
81	Clear Grit Dump	81	Clear Grit Dump	
82	Cellar Dirt Dump	82	Cellar Dirt Dump	
83	Steward Mine Yard	83	Steward Mine Yard	
83A	Steward Mine Yard Poly A			
83B	Steward Mine Yard Poly B			
83C	Steward Mine Yard Poly C			
83D	Steward Mine Yard Poly D			
83F	Steward Mine Yard Poly F	324	Steward Mine Yard (Engineered Cover)	
84	Mandan Park Play Area	84	Mandan Park Play Area	Boundary Adjustment
90	Waste Dump #37	90	Waste Dump #37	Transfer from Program
91	Robert Emmett Dumps	91	Robert Emmett Dumps	Boundary Adjustment
93	Soudan-Gold Hill	93	Soudan-Gold Hill	No Change to Boundary
94	Rialto Dump	94	Rialto Dump	Investigation Necessary
96	Washoe Dump	96	Washoe Dump	Boundary Adjustment
		332	Washoe Dump (Engineered Cover)	
97	Parrot Dump & Mine Yard	322	Parrot Mine	
97S	Parrot Shop South Slope			
97S2	Parrot Shop South Slope Poly 2			
97S3	Parrot Shop South Slope Poly 3			
100	Capri Motel - Arctic Dump	100	Capri Motel - Arctic Dump	No Change to Boundary
101	Blue Jay Mine	101	Blue Jay Mine	Boundary Adjustment
104	Colorado Dump (Shaft)	104	Colorado Dump (Shaft)	No Change to Boundary
		370	Colorado Dump [Shaft] (Engineered Cover)	
105	Lizzie Shaft	105	Lizzie Shaft	Boundary Adjustment
106	Hoy-Hickey Shafts	106	Hoy-Hickey Shafts	No Change to Boundary
110	PA009 Dump	321	PA009 Dump	Boundary Adjustment
110E	PA009 Dump East			
110N	PA009 Dump North			
110S	PA009 Dump South			
114	Emma Shaft	114	Emma Shaft	No Change to Boundary

QUADRANT 3 BRES SITES
Updated Site Names and Numbers

Historic BRES No.	Historic Site Name	New BRES No.	New Site Name	Site Status
115	Butte New England	115	Butte New England	Boundary Adjustment
		339	Butte New England (Engineered Cover)	
116	Belmont Mine Yard	116	Belmont Mine Yard	
116N	Belmont Hoist	116N	Belmont Hoist	
121	Travona Dump	121	Travona Dump	
125	Child Harold-2 Dump	125	Child Harold-2 Dump	No Change to Boundary
126	Green Copper Dump	126	Green Copper Dump	
127	Tension Dump	327	Tension Dump	Boundary Adjustment
128	Alliance Dump			
129	Heaney Dump			
159	NW Syndicate Pit	336	North Syndicate Pit	
160	NE Sydicate Dump-Oro Butte Shaft			
160S	Syndicate Pit Dumps	326	Sydnicate Pit & Tullamore Dumps	
180	Tullamore Dumps			
172	Caledonia Triangle	172	Caledonia Triangle	
173	Garden Street Area	173N	Garden Street Area North	
		173S	Garden Street Area South	
1501	Christmas	1501	Christmas	Transfer from Program
1503	Hornet Addition	1503	Hornet Addition	Boundary Adjustment
1539	Henriett	1539	Henriett	
1542	Hesperus (Mercury St.); New & Mahoney East	1542	Hesperus (Mercury St.)	
1625	Black Bird	376	Black Bird	
1625E	Black Bird East			
1625N	Black Bird North			
1625W	Black Bird West			
1625S	Black Bird South	1625S	Black Bird South	
2000	BA&P Trail - MT Tech to Rocker	2000	BA&P Trail - MT Tech to Rocker	
2010	BA&P Trail - Rocker	2010	BA&P Trail - Rocker	
2330	BA&P Trail Section A	2331	BA&P Trail Section A	
		2332	BA&P Section A Eng Cov	
		2333	BA&P Trail Section B	
		2334	BA&P Trail Section B Eng Cov	
		2335	BA&P Trail Section C	
		2336	BA&P Trail Section C Eng Cov	
2340	BA&P Trail Section B	2341	BA&P Trail Section D	
		2342	BA&P Section D Eng Cov	
2350	BA&P Trail Section C	2351	BA&P Trail Section E	
		2352	BA&P Section E Eng Cov	
2360	BA&P Trail Section D	2361	BA&P Trail Section F	
		2362	BA&P Section F Eng Cov	
2370	BA&P Trail Section E	2371	BA&P Trail Section G	
		2372	BA&P Section G Eng Cov	
2380	BA&P Trail Section F	2381	BA&P Trail Section H	
		2382	BA&P Section H Eng Cov	
2390	BA&P Trail Section G	2391	BA&P Trail Section I	
		2392	BA&P Section I Eng Cov	

QUADRANT 4 BRES SITES
Updated Site Names and Numbers

Historic BRES No.	Historic Site Name	New BRES No.	New Site Name	Site Status
120	Bonanza Dump	334	Bonanza Dump	Boundary Adjustment
120E	Bonanza Dump East			
120	Bonanza Dump	371		
132	Emma Dump	132	Emma Dump	
133	Dexter Mill	133	Dexter Mill	
134	Star West Dump	134	Star West Dump	
135	Washoe Sampling Works	135	Washoe Sampling Works	
136	Ophir Dump	136	Ophir Dump	
		372	Ophir Dump (Engineered Cover)	
142	Charlie Judd Park	142	Charlie Judd Park	
150	Colorado Smelter	150	Colorado Smelter	
150N	Colorado Smelter North	150N	Colorado Smelter North	
154	Clark Mill Tailings NE	154	Clark Mill Tailings NE	
155	Clark Mill Tailings	155	Clark Mill Tailings	
		335	Clark Mill Tailings (Engineered Cover)	
156	Timber Butte Mill	156	Timber Butte Mill	
1656	Maryland Ave & Iron St	1656	Maryland Ave & Iron St	No Change to Boundary
1796	Kaw at Casey	1796	Kaw at Casey	Boundary Adjustment
2310	Silver Bow Creek	2311	Texas to Harrison	
		2312	Harrison to Montana	
CB08	Catch Basin 08	CB08	Catch Basin 08	
CB09	Catch Basin 09	CB09	Catch Basin 09	
N/A	Continental Roadside Ditch	340	Continental Roadside Ditch	New Site

Appendix A.2
Unreclaimed Sites List

UNRECLAIMED SITES
Site Names and Numbers

Historic BRES No.	Historic Site Name	New UR No.	New Site Name
2	Minnie Irvine	UR-1	Minnie Irvine
N/A	N/A	UR-2	East of Scrap H Point Rd. near Moose Dump
14	Source Area No. 14	UR-3	Surprise Dump
N/A	N/A	UR-4	Northwest corner of Center St. and Idaho St.
N/A	N/A	UR-5	Northwest corner of N Montana St. and Ruby St.
N/A	N/A	UR-6	Northwest corner of E Granite St. and Arizona St.-Capri Motel Parking Lot
N/A	N/A	UR-7	Southwest corner of E Granit St. and Covert St.
117	Anderson Shaft	UR-8	Anderson Shaft
117E	Anderson Shaft East		
N/A	N/A	UR-9	West of S Excelsior Ave. North of I-15
123	Otisco Dump	UR-10	Otisco Dump
N/A	N/A	UR-11	Northwest corner of Atlantic St. and E 2nd St.
148	Unnamed Dump	UR-12	Unnamed Dump
N/A	N/A	UR-13	North of I-15 and West of Colorado Smelter North
N/A	N/A	UR-14	East of Copper Mountain Complex
N/A	N/A	UR-15	South of Ryan Rd. and West of 4th St.
	N/A	UR-16N	Garden Street North Area
N/A	N/A	UR-16S	Garden Street South Area
N/A	N/A	UR-17	Surrounding Areas of Upper Missoula Gulch
N/A	N/A	UR-18	Southwest corner of Hornet St. and Alabama St.
N/A	Rarus	UR-19	Rarus
N/A	NW corner of Covert & Park St.	UR-20	NW corner of Covert & Park St.
N/A	SE Corner of Park St. & Oklahoma St. (vegetative cover)	UR-20	SE Corner of Park St. & Oklahoma St. (vegetative cover)
N/A	East Galena St. (300 Block)	UR-21	Nora Dump
N/A	NE corner of N. Arizona & E. Granite St.	UR-22	NE corner of N. Arizona & E. Granite St.
N/A	NE corner lot of New & Mahoney St.	UR-23	New Mahoney
N/A	N/A	UR-24	Clark Mill and adjacent mill tailings
N/A	N/A	UR-25	Scrap H Point Rd.-South Ryan Rd. embankment
N/A	Grove Creek	UR-26	Grove Creek
N/A	W. Copper & N. Washington	UR-27	W. Copper & N. Washington
N/A	800 block of Waukesha	UR-28	800 block of Waukesha
N/A	Surrounding area of Green apts.	UR-29	Surrounding area of Green Apts.
N/A	SW Corner of N. Henry & W. Zarelda	UR-30	SW Corner of N. Henry & W. Zarelda
N/A	Surrounding area of Big Butte VFD.	UR-31	Surrounding area of Big Butte VFD.
N/A	SE corner of S. Colorado & W. Mercury St.	UR-32	SE corner of S. Colorado & W. Mercury St.
N/A	N/A	UR-33	I-15 and Excelsior St.
N/A	Desperation	UR-34	Desperation
N/A	N/A	UR-35	Steward Parking Lot
N/A	N/A	UR-36	South Parrot Slope
N/A	N/A	UR-37	Main St. and Mullen St. -NE Corner
N/A	Isele	UR-38	Isele
N/A	N/A	UR-39	Surrounding Areas of Belle of Butte
155E	Clark Mill Tailings East	UR-40	Clark Mill Tailings East
152	Montana St & I-90	UR-41	Montana St & I-90

Appendix A.3
Reclaimed Areas with Storm Water Structures

Reclaimed Areas with Storm Water Structures

QUADRANT 1		
Bres No.	**BRES Site Name**	**Engineered SW Feature Descriptions**
360	Alice North	Multiple RLDs, & Bull Run Gulch
361	Alice South	Multiple RLDs, & Bull Run Gulch
30	Atlantic-1	Multiple RLDs north, south, east and west, culverts and sediment catch basin along Bernie's Way
32	Corra2 Dump	Multiple RLDs and culverts
303	Penrose	Multiple RLDs and culverts under BA&P Walking Trail
37	Josephine Shaft	Multiple RLDs and culverts
29	Lexington Dump	Multiple RLDs north, south, east and west,culvert inlets at B Street and outlet under MainSt. (offsite)
11	Magna Charta Lessee Dumps	Multiple RLDs, culverts & Daly St. inlet
300	North Alice Culvert	Multiple RLDs,culvert inlets & outlets & culvert under haul road
301	South Corra 2 & Rock Island Dumps	Multiple RLDs and culverts along Bernie's Way & Summer St
18	Walkerville Ballfield	RLDs and Sub-Drain along North Street
20	Walkerville Playground	RLDs on slope drainage, culvert inlets and outlets
303	West Gray Rock (North of Trail)	Multiple RLDs and culverts along Summer St. and culverts under BA&P Walking Trail
307	East Gray Rock (South of Trail)	
QUADRANT 2		
Bres No.	**BRES Site Name**	**Engineered SW Feature Descriptions**
4	Amy Dump	RLDs, drop inlets & Bull Run Gulch
25	Venus Dump	RLD to catch basin and inlet along Walkerville Drive
315	Buffalo South	Multiple RLDs, culvert inlets & outlets
314	Buffalo North	RLDs, culverts on N. Montana St.& Buffalo St., (2) SW inlets on Main St.
313	Del Monte & Garfield East	RLD along 5th Street
312	Del Monte & Garfield West	RLD along 5th Street
36	LaPlatta Gulch	Multiple RLDs and culverts & asphalt lined ditch and inlets on LaPlatta Street
59	Little Mina	RLD and inlet along Buffalo St.
57	LittleMina-1	RLD and inlet on Buffalo St.
363	Lower Missoula Gulch East	Culvert inlet and outlet under eastern access road
364	Lower Missoula Gulch West	
52	Moscow Dump	RLD along N. Montana Street
348	Mountain Con Mine Dump South	Multiple RLD and culverts under trail (2), culvert inlets & outlets
366	Mountain Con Mine	RLD with culvert inlets and outlets
330	Upper Missoula Gulch	Multiple RLDs, culvertinlets & outlets, in addition to concrete lined main Missoula Gulch
QUADRANT 3		
BRES No.	**BRES Site Name**	**Engineered SW Feature Descriptions**
71N	Anselmo-Timber Yard Slope	Multiple RLDs, catch basins (2),culvert inlets and outlets
71	Anselmo Mine yard	Multiple RLDs, catch basins and SW inlets
115	Butte New England	Multiple RLDs
82	Cellar Dirt Dump	Multiple RLDs
81	Clear Grit Dump	Multiple RLDs
79	Late Acquisition	Multiple RLDs
84	Mandan Park Play Area	RLD on N. Wyoming St.
75	National Dump	RLD and inlet
336	North Syndicate Pit	SW inlets (2) along N. Clark St. and Ball field run off ditch
78	Original Mine Yard Slope	RLD along south fence-line and SW inlet
77	PA020 Dump	Asphalt SW Diversion Berm on Main St.
322	Parrot Mine	Multiple RLDs on north and south
		Multiple RLDs & inlets along Granite St.
		RLD & inlet along Anaconda Road
		RLD on south-east side
94	Rialto Dump	SW inlet on SE corner (across from Site)
326	Syndicate Pit & Tullamore Dumps	RLDN. By Walking Trail & S. along Empire St.
51	Syndicate Pit	Multiple RLDs
96	Washoe Dump (CapriN.)	RLDs (2) along west parking lot & south fence-line
116	Belmont Mine Yard	Multiple RLDs
116N	Belmont Hoist	RLD on Continental Drive & S E inlets (2)
QUADRANT 4		
BRES No.	**BRES Site Name**	**Engineered SW Feature Descriptions**
CB08	Catch Basin 08	Catch basin, inlet/outl structures, RLD, sediment trap
CB09	Catch Basin 09	Catch basin, inlet/outl structures, RLD
155	Clark Mill Tailings	MultipleRLDs, culvert inlets & outlets
154	Clark Mill Tailings NE	RLD from Timber Butte
150	Colorado Smelter	Multiple RLDs & Sed. Basins & SW inlet under I-15
156	Timber Butte Mill	Multiple RLDs

RLD = Rock lined Ditch

Appendix B
Procedures, Field Forms, and Specifications

Appendix B.1
Standard Maintenance Procedures

PURPOSE	To establish a uniform procedure to safely and effectively perform inspection and maintenance tasks at sites listed under the BPSOU BRES.
SCOPE	Work described in this procedure includes soil sampling using a hand-held soil pH meter. Associated steps workers are required to implement include: dig a shallow hole using hand tools, calibration, operate the meter, rinse, and record data. Work described in this procedure includes soil sampling using a hand-held soil pH meter, a *Hanna Instruments Model# 99121* or equivalent.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, operations personnel must bring the issue to the attention of the O&M Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1. Sample Size	a. A minimum of one complete pH sample is recommended per ¼ acre with at least one duplicate pH sample per site. At larger sites, take duplicate pH samples at a rate of 1 for every 20 samples analyzed.
2. Device operation	a. To turn the device on or off Press: On/Off button. b. To Freeze the device Press: Set/Hold.
3. Device Calibration	a. Connect the PH probe to the meter. b. Hold the On/Off button until Calibration is visible on the screen. c. Put the probe in 7.01 calibration solution. d. The meter will recognize the solution and calibrate. e. Once the calibration is recognized and stable, press: On/Off
4. Prepare to take a pH measurement	a. Connect the probe when the device is off. b. Remove the protective cap from the probe. c. Insert the probe into the sample. d. Wait until the "not stable" read out has turned off; and e. Record the measurement.
5. Dig hole and prepare for sampling	a. Determine location from engineering assessment. b. Using a hand trowel, dig a hole approximately 2 - 4 inches deep, discarding the top 2 inches of soil. c. Remove foreign, non-organic material, and break-up large material. d. Perforate the soil with the included soil drill to a depth of at least 8 inches. e. If the soil is dry, moisten with a small amount of distilled water. f. Rinse the probe with **tap water** (not distilled). g. Insert the probe slightly into the soil, making sure that it is in contact with the soil surfaces.
6. Record measurement; rinse and repeat.	a. Once the readings have stabilized record the measurement. b. Remove the probe from the hole, gently **clean off loose soil with your fingers**, then rinse the probe with **tap water;** **Caution: Avoid using a rag or cloth to prevent damage to the probe.** c. Repeat this procedure in several locations; then d. Average the results
7. Documentation	a. Prepare a map showing sampling location(s) and sample results.

	b. A field GPS device may be used to record sample locations.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT The following documents should be referenced to assist in completing the associated task.	
DRAWINGS	NA
RELATED SOP's / WORK PLANS	Manufacturer's Instructions
FORMS/CHECKLIST	

APPROVALS/CONCURRENCE By signing this document, all parties acknowledge the completeness and applicability of this SOP for its intended purpose. Also, by signing this document, it serves as acknowledgement that I have received training on the procedure and associated competency testing.	
MANAGER	**DATE**
LEAD OPERATOR	**DATE**
OPERATOR	**DATE**
OTHER	**DATE**
OTHER	**DATE**

Revisions:

APPROVALS/CONCURRENCE

By signing this document, all parties acknowledge the completeness and applicability of this SOP for its intended purpose. Also, by signing this document, it serves as acknowledgement that I have received training on the procedure and associated competency testing.

Rev.	Description	Date	Approval
1	Updated per Agency comments 4/5/2019	5/15/2019	

BPSOU RECLAIMED AREAS M&M SMP- 2
COVER SOIL PLACEMENT

PURPOSE	To establish a uniform procedure to safely and effectively perform inspection and maintenance tasks at sites listed under the BPSOU Reclaimed Areas M&M Plan.
SCOPE	Work described in this section includes visual inspection, placing, and spreading the limestone and fill on prepared areas in accordance with this Specification at the locations shown on the Drawings.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, operations personnel must bring the issue to the attention of the Project Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1. Material	Verify cover soil material is free of any trash, rocks, lumps of soil, stumps, and brush. Rock content (i.e., particles >2.0 mm) constitutes <45% (by volume) of the cover soil and the maximum allowable rock size is 6 inches in diameter. Cover soil source should be free of any noxious weeds, to the greatest extent possible. Verify cover soil is a friable material and the <2.0 mm fraction characterized as loam, sandy loam, sandy clay loam, sandy clay, clay loam, silty clay, silty clay loam, silt loam, or silt in accordance with the USDA Soil Conservation Service textural classification (attached). Loamy sand may be acceptable from 6 to 18 inches in certain circumstances, per approval of EPA. Verify soil pH shall between 5.5 and 8.5, and soil SAR shall be <12. Soil saturation percent will be less than 85% and greater than 25%. The soil shall have an EC less than 4 mmhos/cm. NO_3, P, and K will be used by EPA and Atlantic Richfield Company to verify fertilizer rates. Cover soil specifications are provided in the BHRS.
2. Approvals	Cover soil shall not be placed until the areas to be covered have been properly prepared, the limestone layer appropriately applied (if required), all construction work in the area has been completed and approved all subgrade preparations have been completed.
3. Placement	Under normal conditions, slopes must not exceed a maximum of 3:1 (3 horizontal to 1 vertical). Verify placement of cover soil thickness provides a minimum thickness specified in the appropriate corrective action related SMP. Ensure sufficient cover soil is applied to account for settling, sloughing, and erosion.
4. Reporting	Report quantities and application in the annual Reclaimed Areas Summary Report.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT

The following documents should be referenced to assist in completing the associated task.

DRAWINGS	BRES Quadrant Maps, Aerials

RELATED SMP's / WORK PLANS	
FORMS/CHECKLIST	BRES Field Evaluation Report Reclaimed Areas Recommendation Summary Report

APPROVALS/CONCURRENCE By signing this document, all parties acknowledge the completeness and applicability of this SMP for its intended purpose. Also, by signing this document, it serves as acknowledgement that I have received training on the procedure and associated competency testing.	
MANAGER	**DATE**
LEAD OPERATOR	**DATE**
OPERATOR	**DATE**

Revisions:

Rev.	Description	Date	Approval

BPSOU RECLAIMED AREAS M&M SMP - 3

LIMESTONE PLACEMENT AND STABILIZATION

PURPOSE	To establish a uniform procedure to safely, consistently, and effectively perform inspection and maintenance tasks at sites listed under the BPSOU Reclaimed Areas.
SCOPE	Work described in this section includes limestone stabilization, hauling, placing, and spreading the limestone and fill on prepared areas in accordance with this Specification at the locations shown on the Drawings.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, operations personnel must bring the issue to the attention of the O&M Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1. Sub-Grade Prep	The sub-grade surface to be covered shall be brought to grade, finished smooth and uniform immediately prior to limestone placement. Grades shall be maintained in a true and even condition. Where grades have not been established, the areas shall be graded and sloped to drain to prevent formation of standing water.
2. Limestone Application Rate	A minimum 350 tons/acre (approximately a 2 inch thick layer) of limestone shall be placed on the low pH soil.
3. Approvals	Limestone placement and application rate must be approved prior to placement. Address placement and application rate with the Superfund Manager for approval prior to placement. Limestone materials must have a calcium carbonate equivalent content of not less than 65%. All limestone must be <1 inch in diameter and 50% (weight basis) must pass a 60 mesh.
4. Limestone Application	Apply limestone and spread to provide a uniform layer (approximately 2 inches thickness) across the entire low pH area. Note: limestone must be applied prior to cover or topsoil placement.
5. Documentation	Documentation of this sampling effort, including a map showing sampling location(s) and sample results, shall be included in the final construction completion document(s) for the project.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT

The following documents should be referenced to assist in completing the associated task.

DRAWINGS	BRES Quadrant Maps, Aerials
RELATED SMP's / WORK PLANS	
FORMS/CHECKLIST	BRES Field Evaluation Report; Reclaimed Areas Recommendation Summary Report

APPROVALS/CONCURRENCE By signing this document, all parties acknowledge the completeness and applicability of this SMP for its intended purpose. Also, by signing this document, it serves as acknowledgement that I have received training on the procedure and associated competency testing.	
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OPERATOR	**DATE**
OTHER	**DATE**
OTHER	**DATE**

Revisions:

Rev.	Description	Date	Approval

BPSOU RECLAIMED AREAS M&M SMP- 4
ORGANIC AMENDMENT

PURPOSE	To establish a uniform procedure to safely, consistently, and effectively perform inspection and maintenance tasks at sites listed under the BPSOU Reclaimed Areas.
SCOPE	Work described in this procedure includes sampling, material placement, and incorporation required to complete corrective action recommendations of reclaimed sites.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, operations personnel must bring the issue to the attention of the O&M Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1.Materials	Organic amendments materials include manure, compost, etc. typically utilized to increase the organic matter content of soil. 1. Organic amendments shall be analyzed for percent dry weight, percent rock >2.0 mm (% dry weight), organic matter content of the < 2.0mm fraction (% dry weight using Walkley Black procedure. 2. Manure – Cattle manure is the preferred manure type, containing < 20% straw material by dry weight.
2.Application	1. Application rate shall be calculated using 3% (dry weight) organic amendment applied to the upper 6 inches of the cover soil. 2. Do not apply amendment materials during wind conditions strong enough to displace material onto adjacent areas. 3. **Application should not be performed when wind gusts exceed 20 mph.**
3. Application and incorporation methods	1. Agricultural manure spreaders shall be used to apply organic material uniformly up to 6 inches in depth. 2. Localized application greater than 6 inches in depth is not allowed. 3. Immediately after application, rip the soil and amendment to a 6-inch minimum depth at 12-inch centers. 4. Till the soil to a 6-inch depth using an agricultural cone shaped disc (20-inch diameter) at 6-inches. Multiple passes, staggering the disc placement is recommended to achieve incorporation. 5. Complete tillage to achieve a uniform incorporation of the organic amendment and soil to a depth of 6 inches.
4. Incorporation completion	1. All incorporation shall be completed as soon as possible after amendment in applied to the landscape.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT The following documents should be referenced to assist in completing the associated task.	
DRAWINGS	BRES Quadrant Maps, Aerials
RELATED SMP's / WORK PLANS	
FORMS/CHECKLIST	BRES Field Evaluation Report Reclaimed Areas Recommendation Summary Report

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OPERATOR	**DATE**
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Revisions:

Rev.	Description	Date	Approval

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BPSOU RECLAIMED AREAS M&M SMP - 5
BARREN AREAS

PURPOSE	To establish a uniform procedure to safely, consistently, and effectively perform inspection and maintenance tasks at sites listed under the BPSOU Reclaimed Areas.
SCOPE	This SMP describes routine work instructions to implement corrective action of barren areas described in the BRES. Corrective actions described below are consistent with Butte Hill Revegetation Specifications and BRES requirements.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, field personnel must bring the issue to the attention of the O&M Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1. Area of Concern	1. Remedial action shall be applied to the barren area(s) within the specified within the applicable polygon described in the BRES Field Evaluation report. 2. Non-barren areas are excluded from this action. Rock outcrops do not count as barren areas.
2. Records Review	1. Review pertinent historic corrective action plans as needed for the area of concern prior to implementation of corrective action. 2. If no pertinent site data exists, consult the Department of Reclamation & Environmental Services Director and/or O&M Manager as needed.
3. Review Site	1. Areas less than 100 square feet may be addressed at the discretion of the O&M Manager.
4. Additional Testing	1. Review additional testing requirements to determine appropriate corrective action. a. Soil pH – refer to SMP for Soil pH testing; Soil pH <5.5 will receive limestone stabilization. a. Nutrients (Walkley-Black) (P-K-N) per BHRS criteria.
3. Corrective Action Planning	1. Identify EPA-approved cover soil source. 2. Prepare an engineering estimate or the total volume of material required to complete the corrective action. 3. Coordinate completion of corrective action with appropriate departments.
4. Cover Soil	1. Apply 6-inches of approved cover soil to the barren areas(s) described in the BRES Field Evaluation report. 2. Grading of cover soil must match existing topography and prevent erosion areas. 3. Final application of cover soil must be completed to support a seedbed described in the BHRS.
5. Soil Amendments	1. Lime Stone a. Stabilize low pH soil with limestone applied to approximately 2 inches uniform depth (350 tons/acre) across the low pH region. 2. Organic amendments, compost or cattle manure, that meet specifications attached to this procedure may be applied at an application rate of 3% amendment in the upper 6 inches of cover soil. 3. Fertilizer may be applied at rates to achieve soil concentrations described below. a. Nitrogen (N) - 60 lbs/acre b. Phosphorous (P_2O_5) – 80 lbs/acre c. Potassium (K_2O) – 150 lbs/acre

6.Application and Incorporation	1. Perform spreader application calibrations prior to field deployment, and provide calibration documentation upon request. 2. Apply a uniformly regulated amount of material organic amendments using an agricultural manure spreader, or approved alternative method. See SMP-4. 3. Do not apply localized application areas thicker than 6 inches depth 4. Do not apply amendments during windy conditions strong enough to displace material during application (local speed < 20 mph) 5. Immediately after amendment is placed, till the soil to a minimum depth of 6 inches using an agriculture cone-shaped disc (20- inch diameter). 6. Multiple passes may be required to achieve depth requirements.
7. Seeding	**1. Apply seed as described in SMP-6** 2. Areas prepared for seeding during the period of October 15through June 15 may be permanently seeded at anytime conditions allow seed placement. 3. No seeding is allowable within the application period from June 15 to October 15. 4. Seed application rate a. Drill seed application will be applied at a rate of 17 pounds per acre. b. Broadcast seed application will be applied at a rate of 34 pounds per acre.
7. Reporting	1. Provide documentation of final corrective action to the Operations Manager, and Database Manager. 2. Final reports will be provided to the Agencies. 3. Final reports will contain a summary of corrective actions performed including types and quantities of cover soil, fertilizer, amendments, and seeding. 4. Complete details of reporting requirements are provided in the *BPSOU Reclaimed Areas M&M Plan*.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT The following documents should be referenced to assist in completing the associated task.	
DRAWINGS	BRES Quadrant Maps, Aerial
RELATED SMP's / WORK PLANS	SMP 1 – Cover Soil SMP 3 – Organic Amendment SMP 6 – Seeding
FORMS/CHECKLIST	BRES Field Evaluation Report Reclaimed Areas Recommendation Summary Report

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LEAD OPERATOR	**DATE**
OPERATOR	**DATE**
OTHER	**DATE**
OTHER	**DATE**

Revisions:

Rev.	Description	Date	Approval
1	Updated roles and responsibilities	1/2021	

PURPOSE	To establish a uniform procedure to safely, consistently, and effectively perform inspection and maintenance tasks at sites listed under the BPSOU Reclaimed Areas.
SCOPE	Work described in this procedure includes sampling, soil preparation, material placement, and incorporation required to complete corrective action recommendations of BRES sites.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, operations personnel must bring the issue to the attention of the O&M Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1.Seed application periods	1. Areas prepared for seeding during the period of October 15through June 15 may be permanently seeded at anytime conditions allow seed placement. 2. Slopes and areas prepared for seeding during the period June 16 through October 14 shall receive an annual cover crop from the straw mulch seed to protect the in-place cover soils during this period. 3. No application of perennial seed mix will be performed from June 15 through October 15. 4. The perennial seed mix shall then be applied to the areas after October 15.
2. Seed Mix and Source	The preferred seed mix for all BRES and BHRS related planting shall be comprised of the following: Wheatgrass, Bluebunch 30% (5.1 lbs/acre) Fescue, Idaho 40% (6.8 lbs/acre) Fescue, Rough 10% (1.7 lbs/acre) Prairie Junegrass 10% (1.7 lbs/acre) Sandberg Bluegrass 10% (1.7 lbs/acre) Approved Source: Circle S Seeds 14990 Madison Frontage Road Three Forks, Montana 59752
3. Preparation	1. Compacted soils in areas to be seeded must be loosened prior to soil placement. 2. Disc or till the area to loosen the soil in the area to be seeded to a depth of 6 inches 3. Perform disc and tilling paths perpendicular to natural flow of water. 4. Remove large clods and clumps in the soil. 5. Excessively loose soil will be compacted to perform a uniform rough-textured surface suitable for seeding. 6. Apply fertilizer to the prepared seedbed as described in the Fertilizing section below.
4. Fertilizing	1. Fertilizer will be applied uniformly across seedbed areas for newly reclaimed areas. 2. Mechanical or hydraulic methods can be utilized to apply fertilizer to achieve soil concentrations listed below: Nitrogen – 60 lbs/acre P_2O_5 – 80 lbs/acre K_2O - 150 lbs/acre

	3. Fertilizer will be blended with the top layer of soil using methods described in the Preparation section. 4. Fertilizer applied after seeding is complete does not require blending with the soil. 5. Granular fertilizer amendment may be applied at a rate of 25 pounds (lbs) of nitrogen (N) per acre, 0.0 lbs of phosphorus (P) per acre, and 0.0 lbs of potassium (K) per acre (NPK = 25-0-0) to a site to improve the cover of existing vegetation. 6. Fertilization must take place in the spring. Fall fertilization is discouraged to minimize plant growth prior to the winter season.
5. Seed application	1. Drill seeding is the preferred application method. 2. All seeding equipment shall be operated and seed placed perpendicular to any slopes. 3. Uniformly distribute seeding to the area being seeded. 4. Application planting using drill seeding can be completed to a depth of ¼ to 1 inches, and rows spaced no to exceed 8 inches apart. 5. Planted seeds cannot be covered by soil greater than 1-inch in depth. 6. Seed application rate a. Drill seed application will be applied at a rate of 17 pounds per acre. b. Broadcast seed application will be applied at a rate of 34 pounds per acre.
6. Alternative application methods	1. Broadcast seeding may be performed by hand or mechanical methods in areas inaccessible to drill seed equipment. 2. Broadcast seeded areas must be hand raked to cover seeds for germination. 3. Broadcast seed application rates are double the application rate of drill seeding. 4. Hydraulic seeding may be used when the seedbed surface is too saturated to permit seeding by drill. Wood fiber or vegetative mulch slurry will be used to cushion the seed against damage. At no time shall seed and fertilizer remain in slurry for more than 45 minutes. **Hydraulic seeding methods shall not be used during adverse weather**

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT The following documents should be referenced to assist in completing the associated task.	
DRAWINGS	BRES Quadrant Maps, Aerials
RELATED SMP's / WORK PLANS	SMP-1 – Cover Soil SMP-3 – Organic Amendment Butte Hill Revegetation Specification Cover Soil Butte Hill Revegetation Seed Mix
FORMS/CHECKLIST	BRES Field Evaluation Report Reclaimed Areas Recommendation Summary Report

APPROVALS/CONCURRENCE

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OPERATOR	**DATE**
OTHER	**DATE**
OTHER	**DATE**

Revisions:

Rev.	Description	Date	Approval
1	Address Agency Comments	4/2019	

BPSOU RECLAIMED AREAS M&M SMP-7
SITE CAPPING

PURPOSE	To establish a uniform procedure to safely and effectively perform inspection and maintenance tasks at sites listed under the BPSOU Reclaimed Areas.
SCOPE	Work described in this procedure includes site investigations and verification, field sampling, and engineering estimates required to make corrective action recommendations of BRES sites.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, operations personnel must bring the issue to the attention of the O&M Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1. Soil pH Sampling	a. Refer to soil pH measurements procedures – SMP-1.
2.Stabilization	a. Stabilization – Limestone Placement SMP-3.
3. Capping	1. Apply 6-inches of approved cover soil to the barren areas(s) described in the BRES Field Evaluation report. 2. Grading of cover soil must match existing topography and prevent erosion areas. 3. Final application of cover soil must be completed to support a seedbed described in the BHRS.
4. Fertilizing	1. Organic amendments, compost or cattle manure, that meet specifications attached to this procedure may be applied at an application rate of 3% amendment in the upper 6 inches of cover soil. 2. Fertilizer may be applied at rates to achieve soil concentrations described below. a. Nitrogen (N) - 60 lbs/acre b. Phosphorous (P_2O_5) – 80 lbs/acre c. Potassium (K_2O) – 150 lbs/acre
5. Application and Incorporation	1. Perform spreader application calibrations prior to field deployment and provide calibration documentation upon request. 2. Apply a uniformly regulated amount of material organic amendments using an agricultural manure spreader or approved alternative method. See SMP-4. 3. Do not apply localized application areas thicker than 6 inches depth 4. Do not apply amendments during windy conditions strong enough to displace material during application (local speed < 20 mph) 5. Immediately after amendment is placed, till the soil to a minimum depth of 6 inches using an agriculture cone-shaped disc (20 inch diameter). 6. Multiple passes may be required to achieve depth requirements.
6. Seeding	1. Seeding will be performed before June 15, or after October 15. 2. No seeding will be applied between the period from June 15 to October 15. 3. Apply seed as described in SMP-6. 4. Seed application rate a. Drill seed application will be applied at a rate of 17 pounds per acre. a. Broadcast seed application will be applied at a rate of 34 pounds per acre.
7. Evaluation	a. Continue to evaluate the site per the BRES Field Evaluation Schedule.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT The following documents should be referenced to assist in completing the associated task.	
DRAWINGS	BRES Quadrant Maps, Aerial
RELATED SOP's / WORK PLANS	SMP-1 – Cover Soil SMP-3 – Organic Amendment SMP-6 – Seeding Butte Hill Revegetation Specification Cover Soil Butte Hill Revegetation Seed Mix BSB Dirt Moving and Excavating Ordnance
FORMS/CHECKLIST	BRES Field Evaluation Report Reclaimed Areas Recommendation Summary Report

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APPROVALS/CONCURRENCE	
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OTHER	**DATE**

Revisions:

Rev.	Description	Date	Approval

BPSOU RECLAIMED AREAS M&M SMP - 8
EROSION

PURPOSE	This Standard Maintenance Procedure (SMP) is written to establish a uniform, consistent method to safely and effectively perform maintenance tasks at sites listed under the BPSOU Reclaimed Areas.
SCOPE	This procedure describes routine work instructions to implement corrective action of erosion areas described in the BRES caused by surface flow and/or wind. Corrective actions described below are consistent with Butte Hill Revegetation Specifications and BRES requirements. Erosion on very steep slopes (>30% slope gradient) may require an engineering assessment.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, operations personnel must bring the issue to the attention of the O&M Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1.Visual and Engineering Assessment	Erosion will be addressed by the following steps to correct the eroded areas and prevent further degradation Initial assessment includes testing soil quality to determine if vegetation is capable of growth. Test soil to determine soil meets minimum characteristics listed in the BHRS. 1. Lack of vegetation – soil amendments, fertilizer, seeding. 2. Excessive flow – need controls. 3. Steep terrain, fabric & over seed.
2. Perform soil testing	Confirm soil meets Butte Hill Cover Soil required in the BHRS. • Secure a minimum of three soil samples from the area and submit for laboratory analysis of the following: • Texture class and particle size, pH, % saturation, EC (mmohs/cm), % organic matter, NO_3 – N, P, and K. • Test soil for metals (As, Cd, Cu, Pb, Zn).
3. Determine approach based on soil analysis results.	Soil that meets the minimum requirements of the BHRS should allow vegetative growth, and may be mitigated with an aggressive, fast yield cover crop (reference improved seed mix). Soil that does not meet BHRS will be amended, or fertilized. Soil that indicates mine waste is present will be removed and remediated as described in the Exposed Waste Rock (SMP-8).
4. Determine if erosion is localized or sitewide.	Localized erosion may be due to concentrated flows due to terrain features that concentrate flows, high volume precipitation event, or loss of vegetation. Sitewide erosion is characteristic of erosion occurring at multiple locations across the site, or evidence of sheet flow across the site. Perform an engineering evaluation 1. Determine Engineered Controls – Run-on/run-off controls 2. Identify placement of ditches, curb and gutters, etc. 3. Determine additional dissipation requirements (re-establishment of vegetation using, checks, cross-tracking, straw mats).

5.Mitigation	Localized Erosion 1. Armor localized areas using angular rock >6inches. 2. Create check dams at established intervals. 3. Utilize seed mix with aggressive, fast-growth cover crop. Apply seed cross slope re-vegetation perpendicular to the slope. 4. On slopes up to 3:1 re-utilize installation of rock checks, cross-tracking, or straw mats. 5. On slopes > 3:1 utilize geotextile fabric on top of over-seeded areas to allow re-establishment of vegetation. Sitewide mitigations measure will be identified through completion of an engineering assessment. Sitewide mitigation measures identified through the assessment may include the following: Engineered Controls – Run-on/run-off controls, Perpendicular cross slope re-vegetation perpendicular to the slope Seed with aggressive fast growth cover crop (refer to BHRS revised approved seed mix).
6.Re-grading	Site Run-on and Run-off control should be applied where erosion is a result of up-gradient storm water entering the site. Refer to appropriate storm water controls SMPs. Permanent/differentiated site edges such as channels, or curb and gutter systems should be evaluated for control methods.
7.Energy Dissipation Methods	Additional energy dissipation methods are provided below to maintain surface flow velocities, and minimize localized erosion effects. Dissipation methods should be applied to promote vegetation establishment and growth as the preferred long term erosion control method. **Sitewide erosion control methods:** Apply hydro-seed with tackifier and binding agent as described in the BHRS. Erosion control blankets and rolled erosion control products **Localized erosion control methods:** Check dams or wattles (rock walls, logs, woven fence, etc.) installed at intervals to break longer slopes into a series of shorter slopes. Install at intervals of not less than 100 feet and no greater than 250 feet. Channel armoring will be installed at localized areas of erosion where slopes exceed 3:1. Install angular riprap armoring at channel inlet/outlets.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT The following documents should be referenced to assist in completing the associated task.	
DRAWINGS	BRES Quadrant Maps, Aerial
RELATED SMP's / WORK PLANS	BHRS approved seed mix
FORMS/CHECKLIST	BRES Field Evaluation Report

APPROVALS/CONCURRENCE By signing this document, all parties acknowledge the completeness and applicability of this SMP for its intended purpose. Also, by signing this document, it serves as acknowledgement that I have received training on the procedure and associated competency testing.	
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OPERATOR	**DATE**
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OTHER	**DATE**

Revisions:

Rev.	Description	Date	Approval

BPSOU RECLAIMED AREAS M&M SMP-9
EXPOSED WASTE ROCK

PURPOSE	This Standard Maintenance Procedure (SMP) is written to establish a uniform, consistent method to safely and effectively perform maintenance tasks at sites listed under the BPSOU Reclaimed Areas.
SCOPE	This SMP describes routine work instructions to implement corrective action of exposed waste rock described in the BRES. Corrective actions described below are consistent with Butte Hill Revegetation Specifications and BRES requirements.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, field personnel must bring the issue to the attention of the O&M Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1. Area of Concern	1. Remedial action shall be applied to the barren area(s) within the specified within the applicable polygon described in the BRES Field Evaluation report. 2. Non-waste rock outcroppings are excluded from this action.
2. Records Review	1. Review pertinent historic corrective action plans as needed for the area of concern prior to implementation of corrective action. 2. If no pertinent site data exists, consult the Superfund Program Manager as needed.
3. Assessment	1. An Engineering Assessment of the area shall be performed as described in the Engineering Assessment SMP-11 to determine the appropriate course of action (removal or burial). 2. Prepare an engineering estimate for the total volume of material required to complete the corrective action, and include quantity estimates with CAP.
4. Material Removal	1. Material removed will be excavated to a depth approximately 6-inches below waste depth. 2. All excavated material will be removed and hauled to the Butte Mine Waste Repository. 3. Reference BSB Dirt Moving and Excavating protocol.
5. Material Left in Place	1. Material may left in place will be stabilized with limestone, capped with cover soil, fertilized, and seeded as described in associated SMPs (SMP-3, -4, and -7). 2. Coordinate completion of corrective action with appropriate departments.
6. Limestone Stabilization	**Reference SMP-3** 1. Apply limestone and spread to provide a uniform layer (approximately 2 inches thickness) across the entire low pH area. Note: limestone must be applied prior to cover soil placement.
7. Cover Soil	**Reference SMP-2** 1. Apply 18-inches of approved cover soil to the areas(s) described in the BRES Field Evaluation report. 2. Grading of cover soil must match existing topography and prevent erosion areas. 3. Final application of cover soil must be completed to support a seedbed described in the BHRS.
8. Approvals	1. Agency approval must be provided within 30 days of the corrective action being submitted. 2. Corrective actions utilize previously approved standardized procedures to expedite the approval process.
9. Implementation	1. Corrective action will be implemented within 60-days of final approval. All corrective action will be completed within the calendar year.
10. Reporting	1. Final documentation of corrective action implemented will be provided with the annual Reclaimed Areas M&M report.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT The following documents should be referenced to assist in completing the associated task.	
DRAWINGS	BRES Quadrant Maps, Aerial
RELATED SMP's / WORK PLANS	SMP-2 – Cover Soil Placement SMP-3 – Limestone Placement SMP-4 – Organic Amendment SMP-11 – Engineering Assessment Butte Hill Revegetation Specification Cover Soil Butte Hill Revegetation Seed Mix BSB Dirt Moving and Excavating Ordnance
FORMS/CHECKLIST	BRES Field Evaluation Report Reclaimed Areas Recommendation Summary Report

APPROVALS/CONCURRENCE By signing this document, all parties acknowledge the completeness and applicability of this SMP for its intended purpose. Also, by signing this document, it serves as acknowledgement that I have received training on the procedure and associated competency testing.	
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Revisions:

Rev.	Description	Date	Approval

BPSOU RECLAIMED AREAS M&M SMP-10
BOUNDARY REVISION/CREATION

PURPOSE	To establish a uniform procedure to safely and effectively perform inspection and maintenance tasks at sites listed under the BPSOU Reclaimed Areas.
SCOPE	Work described in this procedure includes review of existing aerial photos and GIS data, site investigations and verification, and final boundary revisions.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, operations personnel must bring the issue to the attention of the Project Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1.Aerial Photo Review	a. Evaluate aerial photo documentation to identify obvious areas that do not appear to be remediated, or remediation does not match existing boundaries. b. Review and verify existing boundary .shp files.
2.GIS Data Review	a. Perform verification of .shp boundaries by comparison with relevant documents related to boundary determination, site features, landmarks, etc. b. Make preliminary boundary adjustments as needed.
3. Site Visit	a. Perform field verifications utilizing GPS enabled devices. b. Physically walk the boundary while possessing the GPS enabled device (mobile phone, tablet, computer, etc.) to create log file of the boundary path.
4. Desktop comparison	a. Perform desktop comparison of proposed and field generated boundaries and match discrepancies. Submit boundary revisions to the QAM for review and approval.
5. Polygon and Boundary Revision	a. Finalize boundary delineations, and submit to EPA/DEQ for approval b. After EPA/DEQ approval of the boundary revision, upload BRES Quadrant Boundary to BSB database.
6. New boundary designation	a. Newly reclaimed areas require a newly created boundary. b. Assign new boundaries with a BRES Site Number, and quadrant number. c. Upload the .shp file to the BRES maintenance database and prepare for four-year review cycle.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT

The following documents should be referenced to assist in completing the associated task.

DRAWINGS	BRES Quadrant Maps, Aerials

RELATED SOP's / WORK PLANS	
FORMS/CHECKLIST	

APPROVALS/CONCURRENCE By signing this document, all parties acknowledge the completeness and applicability of this SOP for its intended purpose. Also, by signing this document, it serves as acknowledgement that I have received training on the procedure and associated competency testing.	
MANAGER	**DATE**
LEAD OPERATOR	**DATE**
OPERATOR	**DATE**
OTHER	**DATE**
OTHER	**DATE**

Revisions:

Rev.	Description	Date	Approval
1	Updated per Agency comments 4/5/2016	5/15/2019	

BPSOU RECLAIMED AREAS M&M SMP-11

VEGETATION OR RECLAMATION IMPROVEMENT AND ENGINEERING ASSESSMENT

PURPOSE	This Standard Maintenance Procedure (SMP) is written to establish a uniform, consistent method to safely and effectively perform assessment tasks at sites listed under the BPSOU Reclaimed Areas.
SCOPE	Work described in this procedure includes site investigations and verification, field sampling, and engineering estimates required to make corrective action recommendations of BRES sites related to vegetative or reclamation improvements, or engineering assessments.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, operations personnel must bring the issue to the attention of the Project Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1. Introduction	a. Vegetation or Reclamation Improvement - For polygons or sites in the lowest vegetation cover category (less than 21 percent) or meet the barren area criterion, a Vegetation Improvement (VI) or Reclamation Improvement (RI) plan is implemented for those polygons or sites. If a site undergoes VI and then falls into the less than 21 percent live cover category again during any future BRES evaluations, the polygon is then required to undergo an RI, in order to meet the BHRS. The VI or RI must be conducted by qualified personnel within their range of expertise. In general, small-scale VI items may be directly addressed by BSB whereas moderate- to large-scale VI or RI may require the use of a reclamation specialist to design and implement a corrective action. b. Engineering Assessment - An Engineering Assessment (EA) at a site is performed to determine the appropriate type of corrective action to address erosion, site edge, exposed waste, bulk soil failure or mass instability, and gully trigger items identified during a BRES site evaluation. The EA must be conducted by qualified personnel within their range of expertise. In general, small-scale EA trigger items may be directly addressed by BSB whereas moderate- to large-scale EAs may require the use of a professional engineer to design and implement a corrective action.
2. Review Field Report	a. The BSB Operations Manager will review the annual BRES evaluation to determine initial site characteristics and deficiencies and then assess the need for a VI, RI, or EA. Additionally, the need for inclusion of a reclamation specialist or professional engineer to assist with the design and implementation of the corrective action will be determined by the BSB Operations Manager . b. A site investigation will be performed by the BSB Operations Manager and appropriate field crew lead to validate the BRES field evaluation. Additional personnel may be included in the field evaluation, at the discretion of BSB, such as Agency BRES oversight or subcontractor(s) to determine appropriate corrective actions.
3. Determine Appropriate Trigger Item	a. The field investigation described above is utilized to determine the appropriate BRES trigger item(s) and corrective action(s) required.

4. Soil Sampling	a. Determine soil pH to classify soil as potentially waste material if soil pH < 5.5. Refer to SMP-1. One complete pH sample is recommended per ¼ acre. b. XRF analysis per SMP-13 to determine if the action more than 1 sample per 100 square feet (ft^2). Note: Follow the sampling requirements for a site or location as specified in the site-specific SAP. Composite soil samples: 1. One composite sample will be collected from 0 to 6 inches from top of surface and will be analyzed for organic compounds (Walkley-Black), nitrogen, phosphorus, and potassium. 2. One composite sample will be collected from 6 to 18 inches from the top of surface and will be analyzed for analyzed for metals (As, Cd, Cu, Pb, Zn). Composite samples will be collected at a frequency of not less than 1 sample per 5 acres, and no more than 1 sample per 100 square feet ($ft^{\wedge 2}$).
5. Waste Area Quantification	a. Determine the amount of exposed waste using available survey data b. Field estimation methods or aerial photo data may be used at the discretion of the Operations Manager and verified with survey data.
6. Corrective Measures	a. Removal is required for quantities > 10 c.y. b. Stabilization – Limestone Placement SMP-3
7. Capping	a. Cover Soil Capping SMP-7 b. Final depth to be determined by the BSB O&M Manager in concurrence with Agency recommendations.
8. Fertilizing and Seeding	a. Fertilize, amendments, and seeding completed as described in the referenced SMP-4.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT The following documents should be referenced to assist in completing the associated task.	
DRAWINGS	BRES Quadrant Maps, Aerials
RELATED SMP's / WORK PLANS	SMP-1 – Soil pH Testing SMP-3 – Limestone Placement SMP-4 – Organic Amendment SMP-7 – Cover Soil Capping Butte Hill Revegetation Specification Cover Soil Butte Hill Revegetation Seed Mix
FORMS/CHECKLIST	BRES Field Evaluation Report Reclaimed Areas Recommendation Summary Report

APPROVALS/CONCURRENCE By signing this document, all parties acknowledge the completeness and applicability of this SMP for its intended purpose. Also, by signing this document, it serves as acknowledgement that I have received training on the procedure and associated competency testing.	
MANAGER	**DATE**
LEAD OPERATOR	**DATE**
OPERATOR	**DATE**
EPA	**DATE**
MDEQ	**DATE**

Revisions:

Rev.	Description	Date	Approval
1	Agency Comments 4/5/2019	4/26/2019	

BPSOU RECLAIMED AREAS M&M SMP-12
WEED CONTROL

PURPOSE	Establish a uniform procedure to safely, consistently, and effectively perform inspection and maintenance tasks at sites listed under the BPSOU Reclaimed Areas.
SCOPE	Work described in this procedure includes placement and incorporation required to complete corrective action recommendations of BRES sites to subdue noxious weeds.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, operations personnel must bring the issue to the attention of the O&M Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1.Application periods	1. Areas recommended for aggressive weed control will be sprayed repeatedly over spring, summer, and fall spraying seasons. 2. Application will not be available to newly seeded areas.
2. Application	1. Areas will be spot-sprayed, directly on the weeded areas of concern. 2. No boom spraying will be performed. 3. Application will be complete prior to application of any seeds. 4. Perform application in spring, summer, and fall for two complete cycles. Additional application can be considered on a site-by-site basis.
3. Herbicide selection	1. The preferred herbicide used for weed control is amine 2, 4-D weed killer. Montana Field Guide recommends this weed control method based on site soil characteristics. Additional specific weed control products may be used on a case-by-case basis upon prior approval.
4. Weed Control Delineation	1. The affected area(s) will be delineated in the field using the Arcmap tracking tool on Ipads by personal conducting weed spraying. 2. A maintenance polygon will be created to provide location and maintenance tasks needed. 3. Assign new polygon (SMP-14) within an existing site number, and quadrant number. 4. Upload the .shp file to the BRES maintenance database and prepare for ongoing maintenance activity and progress tracking, and the four-year review cycle.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT The following documents should be referenced to assist in completing the associated task.	
DRAWINGS	BRES Quadrant Maps, Aerials
RELATED SMP's / WORK PLANS	Amine 2, 4-D Safety Data Sheet
FORMS/CHECKLIST	BRES Field Evaluation Report Reclaimed Areas Recommendation Summary Report

APPROVALS/CONCURRENCE By signing this document, all parties acknowledge the completeness and applicability of this SMP for its intended purpose. Also, by signing this document, it serves as acknowledgement that I have received training on the procedure and associated competency testing.	
MANAGER	**DATE**
LEAD OPERATOR	**DATE**
OPERATOR	**DATE**
OTHER	**DATE**
OTHER	**DATE**

Revisions:

Rev.	Description	Date	Approval
1	Agency comments 4/5/209	5/15/2019	

PURPOSE	Establish a uniform procedure to safely, consistently, and effectively operating XL3 X-Ray Fluorescence (XRF) analyzer under the Reclaimed Areas Maintenance and Monitoring Plan within Butte Priority Soils Operating Unit (BPSOU).
SCOPE	This procedure has been prepared for the Butte Silver Bow Department of Reclamation & Environmental Services personnel. All personnel conducting field XRF sampling shall be trained and competent in work described below.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, operations personnel must bring the issue to the attention of the BSB Superfund Project Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1. Assemble XRF stand.	a. Open the case containing the stand and insert 4 legs into base of stand. b. Place stand on a solid, level surface.
2. Prep XRF sample for analysis.	a. Wearing latex or nitrile gloves, remove any large aggregate from the sample and place in a separate bag for disposal. For gravel or rocky soils, a sieve can be used to remove the large aggregates. If a sieve is used, it needs to be decontaminated between samples. Equipment Decontamination SOP for instructions. b. Consolidate the sample into the bottom of the baggie. c. Open the lid to the XRF stand and place sample inside, making sure that sample is flush against the opening on the inside of the XRF stand. d. Close the lid to the XRF stand.
3. Turn on XRF analyzer.	a. Open the XRF case and remove XRF gun from case. b. Slide XRF battery onto bottom of XRF gun handle. c. Press and hold power button (⏻) until XRF gun turns on and wait for system to start. d. Press where it indicates 'press to logon.' A warning message appears asking to verify that the user is aware of the radiation source in the XRF unit. e. Press 'Yes' to continue.
4. Log in and calibrate detector.	a. Type password (1234) when prompted. b. Click 'E' to log in. After logging in, a screen appears with 7 icons appears, this is the Main Menu screen. c. Tap the 'System Check' icon. d. Tap 'Yes.' e. The XRF unit will then go through an internal calibration. f. When the calibration is done, tap 'CLOSE' on the XRF gun to return to the Main Menu screen. **The detector should be calibrated at the start of each day of operation.**
5. Set up XRF run test.	a. Set parameters (e.g., analysis types, time, and analytes) required for the analysis as detailed in the XL3 user's manual, Sampling and Analysis Plan (SAP), or Work Plan (WP). b. Once logged into XRF system, tap the 'Analyze' icon on XRF screen. A screen

	appears. c. On the next screen tap 'Soils.' d. On the next screen tap 'Data Entry.' A Data Entry screen appears showing several options (Sample Name, Sampler, Date, etc.). e. In the upper right-hand corner, next to the 'Sample Name' icon, click the symbol that looks like a miniature keyboard to display a keyboard on the screen. f. Type in the sample name (do not press return yet). g. Insert XRF gun into the bottom of the XRF stand with the XRF gun handle pointing away from you. Be sure that the XRF gun is securely in place in the bottom of the stand. h. Press 'return' in the lower right corner of the keyboard screen. i. To activate the unit, pull the trigger on the gun handle. The analysis will take approximately 2 minutes to complete.
6. Record data.	a. After the XRF analysis is complete, results from the analysis will appear on the screen. b. Record the results and Test Number displayed on the screen; use the up and down arrows on the XRF gun to scroll through data. c. Open the lid on the XRF stand and remove the sample. d. Mark the sample baggie as "RAN" so that sample does not get analyzed twice. Place ran samples in a labeled box for storage and record keeping.
7. Run additional samples.	a. With the XRF gun still in the XRF stand, press the return button (↵) on the XRF gun. This will display the 'Data Entry' screen. b. On the Data Entry Screen, press the keyboard symbol located to the right of 'Sample Name' to display the keyboard. c. Type the next sample name (do not press return yet). d. Place the sample into the XRF stand and close the lid to the stand (as discussed in Task 2). e. Repeat the steps in Task 5 to activate the XRF unit. f. Repeat Tasks 6 and 7 until all samples are analyzed.
8. Turn off XRF.	a. After all samples have been analyzed, remove the XRF gun from the bottom of the stand (press and hold buttons on the side of the stand to allow XRF gun to be removed from stand). b. Press the return button (↵) on the XRF gun until the Main Menu screen appears. c. Press and hold the power button (⏻) until the XRF turns off. d. Remove the battery from the gun and place these items back into the appropriate case. e. Disassemble the XRF stand and place back into the appropriate case.
Quality Assurance/Quality Control (QA/QC) Requirements.	Required QA/QC tasks: 1. Run the Niton-supplied XRF blanks and NIST standards at the start of each day. 2. Record the results in the field logbook or on the XRF field datasheet or equivalents. If the results are not within the ranges supplied by NITON in the user manual, initiate troubleshooting tasks on the analyzer (refer to the user's manual).

	3. Run the blank and one standard QA/QC samples during sample analysis at the rate of 1 for every 20 samples analyzed. QA/QC includes analyzing a replicate sample every 20 samples and a duplicate sample (see the steps below). **Analyze a field replicate sample (1 for every 20 samples analyzed)** 1. After recording the initial reading for a sample, DO NOT remove the sample from the holder. 2. Restart the XRF gun and rerun the sample. 3. Record the information on the field data form or logbook as a replicate (or R sample). Replicates samples help track the precision of the XRF. **Analyze a field duplicate sample (after every 20 samples analyzed)** 1. After every 20 samples, analyze a duplicate sample by recording the results of the 20^{th} sample. 2. Remove the sample bag from the XRF stand, remix the sample, and replace it in the XRF stand. 3. Reanalyze the sample. 4. Record the results as a duplicate (or D sample). Duplicates help to determine the precision of the XRF analysis as well as the homogeneity of the sample matrix. 5. Run a NITON-supplied blank or NIST standard after the replicate/duplicate QA/QC samples to monitor the accuracy of the XRF results. **Confirmatory Samples** 1. Samples may be sent to the laboratory for further XRF testing in order to develop a statistical relationship to the field XRF results. This confirmatory analysis can be used to verify the quality of the field XRF data.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT The following documents should be referenced to assist in completing the associated task.	
DRAWINGS	
RELATED SOPs/PROCEDURES/ WORK PLANS	Equipment Decontamination SOP.
TOOLS	XRF and hand tools.
FORMS/CHECKLIST	Field Logbook

APPROVALS/CONCURRENCE By signing this document, all parties acknowledge the completeness and applicability of this SOP for its intended purpose. Also, by signing this document, it serves as acknowledgement that I have received training on the procedure and associated competency testing.	
MANAGER	**DATE**

APPROVALS/CONCURRENCE By signing this document, all parties acknowledge the completeness and applicability of this SOP for its intended purpose. Also, by signing this document, it serves as acknowledgement that I have received training on the procedure and associated competency testing.	
LEAD OPERATOR	**DATE**
OPERATOR	**DATE**
OTHER	**DATE**

Revisions:

Revision	Description	Date	Approval
1	Updated per Agency Comments 4/5/2019	5/15/2019	

BPSOU RECLAIMED AREAS M&M SMP-14

MAINTENANCE POLYGON CREATION

PURPOSE	To establish a uniform field procedure to safely and effectively perform inspection and maintenance tasks at sites listed under the BPSOU Reclaimed Areas.
SCOPE	Work described in this procedure includes creating temporary maintenance polygons to accurately delineate areas in need of maintenance or further evaluation. Areas may identify erosion, vegetation issues, weed spraying, vandalism, etc. Aerial photo and GIS data review must be conducted prior to this field procedure.

WORK INSTRUCTIONS

The following instructions are intended to provide sufficient guidance to perform the task in a safe, accurate, and reliable manner. Should these instructions present information that is inaccurate or unsafe, operations personnel must bring the issue to the attention of the O&M Manager and the appropriate revisions made.

TASK	INSTRUCTIONS
1. Launch Collector Application	a. Once onsite, launch the iPad collector application, sign in and open BRES mapping application b. Zoom to current GPS location as indicated by blue dot on the screen. Verify that the location arrow icon is filled to indicate the current GPS location.
2. Collecting Features	a. To create a new polygon, tap the (+) arrow on the upper right-hand side of the screen to open the data collection menu. b. In the "filter" bar, search for the line that best describes maintenance area (barren area, exposed waste, etc). Alternatively, a "Generic_Line" can be used with descriptive attribute information. c. Enter the attribute information prior to streaming. Streaming can be paused to add more attribute information. Include existing Site Number and Quadrant Number.
3. Maintenance Polygon Creation	a. Walk to determined maintenance area. These areas can be determined in the field or through desktop aerial photo and GIS data review b. To start polygon collection, turn on the "Start Streaming" icon. c. Physically walk the boundary while possessing GIS enabled iPad to create log file. Click the "Submit" icon once polygon path is complete.
4. Maintenance Polygon Upload	a. Finalize boundary delineations and verify that upload of BRES Maintenance Polygon to BSB database occurred. b. Verify that automatic upload the .shp file to the BRES maintenance database occurred and prepare for four-year review cycle.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT

The following documents should be referenced to assist in completing the associated task.

DRAWINGS	BRES Quadrant Maps, Aerials
RELATED SOP's / WORK PLANS	SMP-10 Boundary Revisions
FORMS/CHECKLIST	

APPROVALS/CONCURRENCE By signing this document, all parties acknowledge the completeness and applicability of this SOP for its intended purpose. Also, by signing this document, it serves as acknowledgement that I have received training on the procedure and associated competency testing.	
MANAGER	**DATE**
LEAD OPERATOR	**DATE**
OPERATOR	**DATE**
OTHER	**DATE**
OTHER	**DATE**

Revisions:

Rev.	Description	Date	Approval

Appendix B.2
Engineered Covers Field Form

Butte Reclamation Evaluation System (BRES)
Raw Data Field Form for Engineered Caps

Date_____ **Site Name/Number**_____
Field Team Members_____
Area Description_____

Rock Cap
Type of rock (limestone, pit run gravel, etc.)_____ Design thickness_____
Surface staining: None_____ Moderate_____ Excessive_____ Describe stain pattern/color_____

Displaced rock: None_____ Moderate_____ Excessive_____ Pattern of displacement: Localized_____ Universal_____
Describe movement (storm water rills, steep slope instability, vehicular, etc.)_____

Does rock cap have a geotextile liner? Yes_____ No_____ If yes, describe condition of liner (good, exposed, torn, poorly anchored, etc.)_____
Exposed subgrade materials? Yes_____ No_____ Describe exposed subgrade if noted (area, localized, dispersed, etc.)_____

General comments regarding rock cap:_____

Concrete or Shotcrete Cap
Did design specify for sulfate resistant concrete? Yes_____ No_____ Unknown_____ Design thickness_____
Type of reinforcing (fiber, re-bar, welded wire fabric.)_____ Control joints? Yes_____ No_____
Surface staining: None_____ Moderate_____ Excessive_____ Describe stain pattern/color_____

Surface cracking: None_____ Moderate_____ Excessive_____ Describe the approximate frequency, length, and average thickness of the cracks if noted._____

Surface spalling: None_____ Moderate_____ Excessive_____ Describe the spalling pattern if noted._____

Exposed subgrade materials? Yes_____ No_____ Describe exposed subgrade if noted (area, localized, dispersed, etc.)_____

Evidence of undercutting at edges of cap? None_____ Moderate_____ Excessive_____ Describe undercutting of subgrade soil at edges of cap if noted_____
General comments regarding concrete/shotcreet cap:_____

Asphalt Cap
Design Thickness_____ Is there a layer of base course under asphalt? Yes_____ No_____ Base course thickness_____
Surface cracking: None_____ Moderate_____ Excessive_____ Describe the frequency, length, and average thickness of the cracks if noted._____

Holes in asphalt? Yes_____ No_____ Describe number, size, shape of holes in asphalt if noted._____

Exposed subgrade materials? Yes_____ No_____ Describe exposed subgrade if noted (area, localized, dispersed, etc.)_____

Evidence of undercutting at edges of cap? None_____ Moderate_____ Excessive_____ Describe undercutting of subgrade soil at edges of cap if noted_____
General comments regarding asphalt cap:_____

BRES FIELD FORM

Site Name: _____ Date: _____

Team Members (Circle your name): _____

Number of Polygons: _____ Slope: _____ Aspect: _____ Area Description: _____

_____

Polygon Evaluation	1	2	3
Vegetation (% live)			
Erosion (BLM score)			
% live weedy species			

Vegetation: % of ground covered by:	POLYGON 1	2	3
Live (desirable) species			
*Live (undesirable weedy) species			
*Noxious weeds			
TOTAL % LIVE			
Litter			
Rocks > 2"			

*Up to 5% of undesirable species and 0% of noxious weeds may count toward live cover.

Erosion (BLM Form)	POLYGON 1	2	3
Surface Litter			
Surface Rock Movement			
Pedestalling			
Flow Patterns			
Rills			
Gullies			
Soil Movement			

Other BRES Trigger Items
Identify trigger areas (using #) on air photo

3. Site Edges: Are polygon edges (outer edges of site only) significantly different than remainder of the polygon?
Y_____ N_____ (check applicable items)

- ☐ **lime rock barrier** ☐ **depositional area**
- ☐ **more weeds** ☐ **steeper slope**
- ☐ **increased erosion** ☐ **less vegetation**
- ☐ **gullies** ☐ **other**_____

Estimate width of affected edge _____

4. Exposed Waste Material? Y_____ N_____

- Estimated pH_____
- Approximate area _____
- Number of areas with exposed waste _____

1. Percent live: please check appropriate category:

1	☐ **0-20**	☐ **21-39**	☐ **40-100**
2	☐ **0-20**	☐ **21-39**	☐ **40-100**
3	☐ **0-20**	☐ **21-39**	☐ **40-100**

2. Total BLM score 1____, 2____, 3____. Please check appropriate category.

1	☐ **0-55**	☐ **56-100**
2	☐ **0-55**	☐ **56-100**
3	☐ **0-55**	☐ **56-100**

5. Is there evidence of: Y_____ N_____

- ☐ **bulk soil failure** ☐ **land slumps**
- ☐ **subsidence**

Species Present:	Dominant	Frequent	Infreq
Sheep fescue			
Crested wheatgrass			
Slender wheatgrass			
Yellow sweetclover			
Alfalfa			
Other:			
_____			
_____			
_____			
_____			

Use polygon number in boxes

Weeds Present:	Dominant	Frequent	Infreq
Spotted knapweed			
Dalmation toadflax			
Cheatgrass			
Baby's breath			
Kochia			
Thistle			
Other:			
_____			
_____			
_____			

Use polygon number in boxes

6. Barren Areas: Y_____ N_____

- At Least 75 ft^2 • Not a rock outcrop
- Less than 10 % total cover (live & litter)

Number of barren areas _____
Do barren areas cover over 25% of polygon? Y____N____
Polygon barren area(s) located in (circle) 1 2 3

7. Gullies (over 6" in depth):
Y_____ N_____
Are any gullies actively eroding?
Y_____ N_____
Number of gullies _____

Comments.

Additional Vegetation:

Species	Dominant	Frequent	Infreq

BUTTE HILL COVER SOIL APPROVAL SUBMITTAL

Source:
Sample #:

Date_____

Description		Specification		Sample	Specification Met Yes	Specification Met No	Other Information Requested
Chemical (mg/kg)							**Organic Matter (%)**
	As	<	97				WB
	Cd	<	4				
	Cu	<	250				**Soil Nutrients**
	Pb	<	100				NO_3 (ug/g)
	Zn	<	250				P (ug/g)
							K (ug/g)
pH (s.u.)							
		>	5.5				
		<	8.5				
SAR							
		<	12				
Saturation (%)							
		<	85				
		>	25				
EC (mmhos/cm)							
		<	4				
Textural Classification (USDA) <2.0 mm							**Particle Size**
			Loam				Sand (%)
			Sandy loam				Silt (%)
			Sandy clay loam				Clay (%)
			Sandy clay				
			Clay loam				
			Silty clay				
			Silty clay loam				
			Silt loam				
			Silt				
			*Per EPA Approval (Loamy sand)				
Rock Content (%) (by volume)		<	45				

Legend:

# Value	- Criteria met
# Value	- Does not meet Criteria

B-SB Representative _____ Date: _____

EPA Representative: _____ Date: _____

Appendix B.3
Butte Hill Revegetation Specifications

BUTTE HILL REVEGETATION SPECIFICATIONS

(Revised October 2021)

BUTTE HILL LIMESTONE STABILIZATION

GENERAL

Work described in this section shall consist of preparing the ground surface for limestone stabilization, hauling, placing, and spreading the limestone and fill on prepared areas in accordance with this Specification at the locations shown on the Drawings.

MATERIALS

Limestone sources will be approved by EPA. Limestone may be from any approved source and shall have a calcium carbonate equivalent content of not less than 65%. All limestone must be <1 inch in diameter and 50% (weight basis) must pass a 60 mesh (<0.25 mm) sieve.

CONSTRUCTION REQUIREMENTS

pH Testing of Subgrade

Atlantic Richfield Company shall test the subgrade soil pH of all areas to be revegetated. The frequency of testing shall not be less than one test per 40,000 square feet (approximately 200-x-200 foot grid). Limestone addition shall include areas to be revegetated where the subgrade soil has a pH of less than 5.5. Acid-base accounting (ABA) may be required by EPA under certain circumstances, such as the presence of acid-generating minerals, and the method used to determine ABA shall be as described in EPA-600/2-78-054. Documentation of this sampling effort, including a map showing sampling locations and sample results, shall be included in the final construction completion document(s) for the project.

Installation of Limestone

The surface of the subgrade in the area to be covered shall be brought to grade and finished smooth and uniform immediately prior to dumping and spreading the limestone. The limestone shall be placed prior to the placing of the cover soil. A minimum 350 tons/acre (approximately a 2-inch thick layer) of limestone shall be placed on the low pH soil. Placement of the limestone layer on a site will be based on site-specific data and approved by EPA prior to placement of limestone.

Grades on the area to be covered shall be maintained in a true and even condition. Where grades have not been established, the areas shall be graded and sloped to drain. The surface shall be left smooth in an even and properly compacted condition to prevent, insofar as practical, the formation of low places or pockets where water will stand.

BUTTE HILL COVER SOIL

GENERAL

The work of this section covers all operations required for furnishing, excavating, hauling, stockpiling, spreading, and seedbed preparation of approved cover soil.

SUBMITTALS

Cover soil submittals will be provided in the Design Report or under separate cover and approved by EPA prior to use. The following submittals shall be provided to EPA for each cover soil source:

- The intended cover soil source site location, including details on the area and depth to be excavated at the source site location.

- For each cover soil source, Atlantic Richfield Company shall be required to secure at least 3 soil samples from the source area. EPA will be notified in advance of the sampling effort and the approximate location and depth where samples will be collected.

- Each of the above 3 soil samples shall be analyzed by an approved laboratory for the following parameters: texture class and particle size; pH; saturation percent; electrical conductivity (EC) in mmhos/cm; organic matter percent; NO_3 - nitrogen; available phosphorus (P); and available potassium (K). The above parameters shall be analyzed using USDA classification and test methods as described in ASA/SSSA Monograph No. 9, Methods of Soil Analysis, Parts 1-2, most recent edition or as described in EPA approved Clark Fork River Superfund Site Investigations documents. Also, each of the above 3 soil samples shall be analyzed by an approved laboratory for the following soil metals parameters: arsenic, cadmium, copper, lead, and zinc. Cover soil placement shall not begin until test results of the soil samples are known.

MATERIALS

Cover soil sources will be approved by EPA. Cover soil thickness shall be a minimum of 18 inches, unless otherwise approved by EPA in writing. Eighteen inches is considered the minimum thickness required for long-term vegetation success. Sufficient cover soil should be applied to account for settling, sloughing, and erosion. Cover soil material shall be reasonably free of any trash, rocks, lumps of soil, stumps, and brush. Rock content (i.e., particles >2.0 mm) must constitute <45% (by volume) of the cover soil and the maximum allowable rock size is 6 inches in diameter. To the extent possible, the cover soil source should be free of any noxious weeds.

Cover soil shall be a friable material and the <2.0 mm fraction characterized as loam, sandy loam, sandy clay loam, sandy clay, clay loam, silty clay, silty clay loam, silt loam, or silt in accordance with the USDA Soil Conservation Service textural classification provided below.

Per approval of EPA, loamy sand may be acceptable from 6 to 18 inches in certain circumstances.

The soil pH shall be between 5.5 and 8.5. The soil SAR shall be <12. Soil saturation percent will be less than 85% and greater than 25%. The soil shall have an EC less than 4 mmhos/cm. NO_3, P, and K will be used by EPA and Atlantic Richfield Company to verify fertilizer rates.

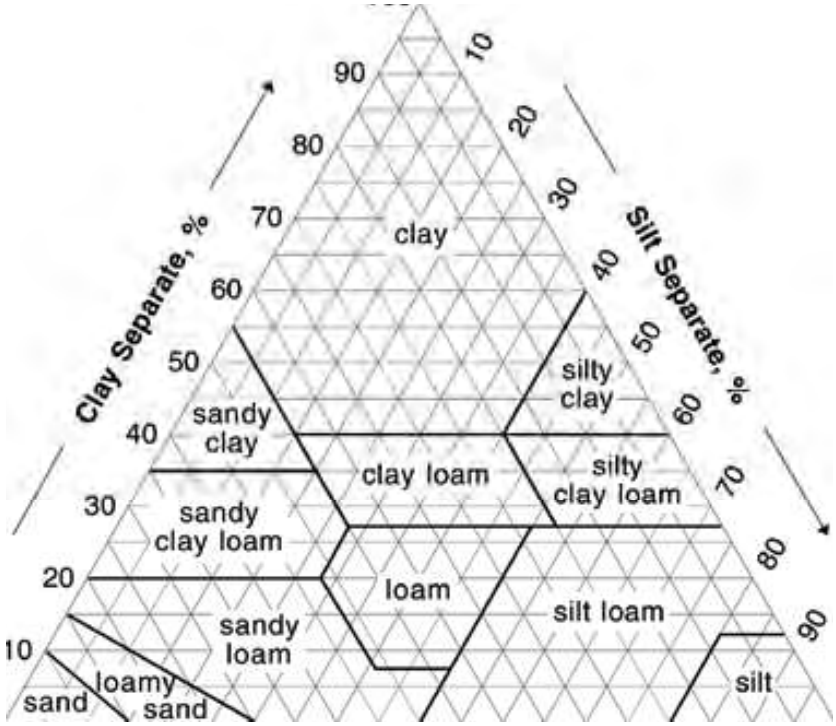

Figure 1. Graphic guide for textural classification of the less than 2 mm portion. (Source: USDA Soil Conservation Service).

The following chemical suitability criteria are general guidelines to be followed as screening standards:

As	<97 mg/kg
Cd	<4 mg/kg
Cu	<250 mg/kg
Pb	<100 mg/kg
Zn	<250 mg/kg

With the exception of zinc, these suitability criteria were established for parks, play areas, and residential yards in the Final Work Plan for Residential Areas, Butte Priority Soils Expedited Response Action prepared by AERL dated May 1, 1995. These values were provided in a February 14, 1995, letter from Sara Weinstock (EPA) to Dave Sinkbeil (AERL) providing final comments on the above work plan. The criterion for zinc was reduced to <250 mg/kg from <500 mg/kg to take into account potential phytotoxic effects noted at the higher level in the Final Baseline Ecological Risk Assessment, Anaconda Regional Water, Waste, and Soils Operable Unit, Anaconda Smelter NPL Site, Anaconda, Montana, prepared in October 1997 by CDM Federal Programs Corporation for EPA. The chemical suitability criteria listed above were established for the Butte Hill and may not be appropriate for use at other Clark Fork River Basin Superfund Sites.

It should be noted that some exceedances of the above criteria may still allow successful long-term vegetation. Therefore, if cover soil sampling shows a variance from the chemical suitability criteria, Atlantic Richfield Company will notify EPA and a plan to address the usability of that cover soil source will be discussed. EPA must approve in writing any cover soil sources which exceed the above suitability criteria.

CONSTRUCTION REQUIREMENTS

Visual inspection of excavated cover soil shall be a continuous process to carefully observe and recognize changes in source material characteristics. Visual inspection, in conjunction with hand-texturing of the <2.0 mm fraction, will be used to determine the adequacy of the borrow material ahead of excavation, to assure that current material meets textural criteria, and to identify areas to move to if material begins to fall out of specification. Each inspection shall record the location, test number for that day, date, time, estimated rock content percentage, and soil texture (<2.0 mm fraction). The frequency of inspection is dependent on the variability of the cover soil source material, but must be performed and recorded at least once daily during periods of source material excavation and transport. It is desirable to have the same person perform the inspections for the duration of excavation at a particular source area. In addition to the above visual inspections, textural analysis by laboratory hydrometer testing may be requested by EPA at a rate not to exceed one test for every 5,000 cubic yards of cover soil material excavated. These tests will be used for comparison and guidance for field testing and field observations. Copies of all inspection records and laboratory analyses shall be provided to EPA for review. Summaries of inspection records and analyses shall be included in the final construction completion documents for the project.

For revegetation purposes, slopes must not exceed a maximum of 3:1 (3 horizontal to 1 vertical) unless previously agreed to by EPA and Atlantic Richfield Company because of site specific requirements. Cover soil shall not be placed until the areas to be covered have been properly prepared, the limestone layer appropriately applied (if required), all construction work in the area has been completed and approved by Atlantic Richfield Company, and EPA notified that all subgrade preparations have been completed.

After the cover soil has been spread, large clods, hard lumps, rocks, and large roots over 6 inches in diameter; litter; or other foreign material (exposed iron, timbers, etc.) shall be raked up, removed from the cover soil and disposed of properly. Further preparation of the cover soil for seeding is provided in the specifications for Seeding and Fertilizing.

Atlantic Richfield Company shall grade the source area borrow site(s) to existing contours at slopes not to exceed 3:1 (unless previously agreed to by EPA and Atlantic Richfield Company because of site specific requirements) and to provide positive drainage. Atlantic Richfield Company shall replace stockpiled topsoil to the borrow area. The borrow area shall be prepared for seeding, mulching, and fertilizing as are other areas receiving cover soil.

BUTTE HILL ORGANIC AMENDMENT APPLICATION

GENERAL

Organic amendment application shall consist of furnishing, applying, and incorporating soil amendments, such as manure and compost, at locations and rates designated on the Drawings.

SUBMITTALS

Organic amendment submittals will be provided in the Design Report or under separate cover and approved by EPA prior to use. The following submittals shall be provided to EPA for each organic amendment source:

- Location of Supplier;
- For each supplier, at least three organic amendment analyses, including gravimetric water content, rock and other fragment content, and organic matter content, as described further under Materials; and
- Proposed organic amendment application and incorporation methods and equipment.

MATERIALS

Analyses for organic amendments (such as manure, compost, etc.) shall include the gravimetric water content (%, dry weight), the percentage of rock and/or other fragments >2.0 mm fraction (%, dry weight), and organic matter content of the <2.0 mm fraction (%, dry weight). The organic matter content of the <2.0 mm fraction shall be determined in the laboratory using Walkley-Black procedure, ASA, Meth. Soil Anal., 1986, Method 29-3.5.2.

If manure is used as the organic amendment source, cattle manure shall be the preferred manure type. Straw bedding material mixed into the manure is acceptable, but it shall not constitute more than 20% of the dry weight.

Application Rate

The field application rate shall be calculated using 3% organic amendment on a dry weight basis in the upper 6 inches of cover soil. Upon approval or direction from EPA, the 3% application rate may be modified to account for site-specific conditions. Analyses for organic amendments shall be submitted for each Supplier on a regular basis to determine if adjustments to the field application rates are necessary. The water and rock and/or other fragment content shall be deducted in calculating the field organic amendment application rate. Documentation of the organic amendment application, including application rate calculations, shall be included in the final construction completion documents(s) for the project.

CONSTRUCTION REQUIREMENTS

Stockpiling Organic Amendment

Prior to stockpiling organic amendment on site, the Contractor shall develop an acceptable stockpiling plan for Atlantic Richfield Company review and approval. The plan shall include the location of the stockpile and adequate measures to prevent contamination of underlying and adjacent soils and prevent air or water pollution.

Site Grading

Prior to placement of the organic amendment, all areas shall be graded as necessary to approximately restore the design contours of the ground or to produce a contour that will blend with contours of adjacent areas. This shall include grading erosion channels in revegetated areas that are to receive organic amendment.

Organic Amendment Application

Organic Amendment shall be applied with agricultural manure spreaders or other approved application equipment that enables spreading a uniformly regulated amount of material.

For a specified application rate, the Contractor shall apply the organic amendment in a uniform manner across the landscape. Localized organic amendment application thicker than 6 inches is unacceptable.

Contractor shall calibrate the organic amendment spreader prior to each use of the equipment unless site conditions have not changed and equipment settings have not been altered since previous calibration. Calibration records shall be furnished to Atlantic Richfield Company. Upon request, copies of equipment calibration shall be provided to EPA for review. All calibration records shall be included in the final construction completion document(s) for the project.

Under no circumstances shall the Contractor apply the organic amendment during wind conditions strong enough to displace material onto adjacent sites.

Organic Amendment Incorporation

Following organic amendment application, the soil shall be ripped to a 6-inch depth at 12-inch centers. The soil shall then be tilled to a depth of 6 inches with a disc, rototiller, moldboard plow, or chisel plow. An agricultural disc with a disc diameter of approximately 20 inches having cone-shaped discs at a spacing width of 6-8 inches is recommended. Multiple tilling equipment passes may be required to achieve adequate incorporation. Adequate incorporation will be a complete and uniform mixing of the manure and soil to a depth of 6 inches. All tillage procedures shall be completed as soon as practicable after amendment application.

BUTTE HILL SEEDING AND FERTILIZING

GENERAL

Revegetation work described in this section includes fertilization, seeding, and mulching on all project designated and disturbed areas upon completion of construction work. These areas include finished embankment slopes, borrow areas, areas to be revegetated, and disturbed areas.

MATERIALS

Seed

Hand collected native species and some of the special wetland species collected cannot meet the following requirements. All seed shall comply with, and be labeled in accordance with, the Montana Seed Law. Montana Code Annotated (MCA) 80-5-104 (2) states ... Indigenous seeds, as defined in 80-5-101, in amounts of one pound or more, whether in packages or bulk, must be labeled with the following information:

1. The statement “Labeled only for reclamation purposes”;

2. Lot number or other distinguishing mark;

3. The common name, genus, species, and subspecies, when applicable, including the name of each kind of seed present in excess of 5 percent. When two or more kinds of seed are named on the label, the label shall specify the percentage of each. When only one kind of seed is present in excess of 5 percent and no variety name or type designation is shown, the percentage must apply to seed of the kind named. If the name of the variety is given, the name may be associated with the name of the kind. The percentage in this case may be shown as shown as pure “live seed” and must apply only to the seed of the variety named;

4. State or county of origin;

5. The approximate percentage of viable seed, together with the date of test. When labeling mixtures, the percentage viability of each kind shall be stated;

6. The approximate percentage, by weight, of pure seed, meaning the freedom of seed from inert matter and from other seeds;

7. The approximate percentage, by weight, of sand, dirt, broken seeds, sticks, chaff, and other inert matter;

8. The approximate total percentage, by weight, of other seeds;

9. The name and approximate number of each kind of species of prohibited and restricted noxious weed seeds occurring per pound of seed; and

10. The full name and address of person, firm, or corporation selling the seed.

As listed in the Montana Seed Law, seed shall contain no "PROHIBITED" noxious weed seed. The seed shall contain no "RESTRICTED" noxious weed seed in excess of the maximum numbers per pound, as specified by MCA 80-5-105, or as specified by the appropriate BSB County Weed Board, whichever is more stringent.

As defined by MCA 80-5-101(4), indigenous seeds include the seeds of those plants that are naturally adapted to an area where the intended use is for revegetation of disturbed sites. These species include grasses, forbs, shrubs, and legumes.

The Contractor must supply Atlantic Richfield Company with all seed bag tags and certification from the supplier stating that the seed complies with the Federal Seed Act and the Montana Seed Laws (MCA 80-5-101- through 305). Upon request, copies of said tags shall be submitted to EPA for review. Copies of seed bag tags and certification shall be included in the final construction completion documentation the project.

When legumes are seeded as the predominant mixture, the seed supplier shall include inoculants (rhizobia) and provide documentation as specified in the Seed Certification. Seed Certifications shall be submitted to Atlantic Richfield Company prior to any seeding. The Contractor shall also submit a copy of the bill or other documentation from the seed supplier showing actual bulk weights of the individual seed types combined in the mix an verification of legume inoculation. The required certifications and documentation shall be provided to Atlantic Richfield Company at least three days prior to the seeding.

Fertilizer

Fertilizer shall be delivered in standard-size bags of the manufacturer showing weight analysis and manufacturer's name, or in bulk quantities accompanied with written certifications from the manufacturer stating that the fertilizer supplied complies with applicable Specifications.

Fertilizer shall be soluble commercial carrier of available plant food element or combination thereof. The fertilizer to be used on the project shall supply the quantities of available chemical elements stipulated below. The fertilizer shall be of uniform composition and in good condition for application by suitable equipment. It shall be labeled with the manufacturer's guaranteed analysis, as governed by applicable fertilizer laws. Any fertilizer that becomes contaminated or damaged, making it unsuitable for use, shall not be accepted. All required fertilizer certificates shall be provided to Atlantic Richfield Company a minimum of three days prior to fertilizing.
The certification shall include the guaranteed analysis of the fertilizers stated in the terms of the percentages of nitrogen, and available phosphorous, potash, and boron, in that order.

Mulch

Vegetative mulch shall be either grass hay or straw. Grass hay material shall be composed primarily of perennial grasses. The grass hay mulch shall contain greater than 70 percent grass by weight and shall not contain more than 10 percent alfalfa, crested wheatgrass or yellow sweet clover. Grass hay shall be relatively free of noxious weeds and other undesirable species.

Straw mulch material shall be clean grain straw, shall be relatively free of noxious weeds and other undesirable species, and shall not contain greater than 5 percent cereal seed by weight, i.e., seed heads. Wheat straw will be used whenever possible. Harvesting will be performed with modern combines, which leave less grain in the straw. Written approval of straw and hay sources from the supervisor of the BSB County weed board shall be obtained.

Chopped or ground material is not acceptable. The mulch material is not acceptable if it is damaged by rotting, molding, etc. to seriously limit its use for mulch. It shall be relatively free of stones, dirt, roots, stumps, or other foreign material.

Application rates shall be 3,000 lbs/acre on flat non-critical erosion and potential dust generating areas and 4,000 lbs/acre on all critical runoff and potential dust generating areas. Exact application rates will be adjusted in the field to accommodate differences in mulch material and seedbed conditions.

CONSTRUCTION REQUIREMENTS

Seedbed Preparation

Prior to executing the seeding, fertilizing and mulching work items, the seed bed at all sites shall be prepared so these items can most efficiently be completed, with the areas resulting in reasonable conformity to specified line and grade. The fertilizing, seeding, and mulching work items shall be executed only after the seedbed condition has been approved by Atlantic Richfield Company. The cover soil shall be prepared as described in the Cover Soil specifications.

The seedbed surface must be in a condition that does not preclude growth at the time of application of seed. Conditions that may preclude growth include, but are not limited to: large clumps, clods, and impervious crusts of dirt; areas too tightly compacted to allow seed growth; and areas of loose soils which could possibly become too compacted during the seed applications to allow growth. The decisions on the conditions of the seedbed shall be made by Atlantic Richfield Company. If Atlantic Richfield Company determines the seedbed is inadequate for seeding, the Contractor shall treat the inadequate areas, as directed by Atlantic Richfield Company, to attain as nearly as practicable the adequate condition at no additional cost to Atlantic Richfield Company.

Excessively tight or compacted soils shall be loosened to the minimum depth of 6 inches. Disking, chiseling, or tilling of the soils shall be done at right angles to the natural flow of water on the slopes, unless otherwise directed or approved by Atlantic Richfield Company. Compaction of the soil, when required, shall be performed by equipment that shall produce a uniform rough-textured surface ready for seeding and mulching. Existing structures and facilities shall be adequately protected, and any damage done by the Contractor shall be repaired or adjusted to the satisfaction of Atlantic Richfield Company.

Seed Application

General

Slopes and areas finished during the period of October 15 through June 15 may be permanently seeded within this time period. The Contractor must obtain Atlantic Richfield Company permission to commence seeding operations. Slopes and areas finished during the period June 16 through October 14 shall receive an annual cover crop from the straw mulch seed to protect the in-place cover soils during this period. The control of noxious weeds and other undesirable species will also be addressed during this period. The perennial seed mix shall then be applied to the areas after October 15. EPA shall be notified prior to commencement of seeding activities.

Specifications of each type of seed mix are outlined below. The seeding of steep slopes, narrow medians, or small areas that are impractical to seed by drill may be performed by using the hydraulic seeding methods, when approved by Atlantic Richfield Company. The hydraulic seeding methods shall be used when the seedbed surface is too wet or swampy to permit seeding by drill. Hydraulic seeding methods shall not be used during adverse weather, as determined by Atlantic Richfield Company.

The applied seed, regardless of the method of application, shall not be covered by a soil thickness greater than 1 inch in depth.

Seed Application Equipment

Drill Seeding

Seeding equipment used for applying grass/forb seed must be designed, modified or equipped to regulate the application rate and planting depth of the seed mixture. Seed must be uniformly distributed in the drill hopper during the drilling operation. Acceptable drills are: custom seeders, furrow drills, disc drills or other drills approved by Atlantic Richfield Company. All seeding equipment shall be operated perpendicular to the slope. Contractor shall calibrate the drill seeder prior to each use of the equipment unless site conditions have not changed and equipment settings have not been altered since previous calibration. Calibration records shall be furnished to Atlantic Richfield Company. Upon request, copies of equipment calibration shall be provided to EPA for review. A summary of all calibration records shall be included in the final construction completion document(s) for the project.

Planting depth shall be regulated by depth bands or coulters. The drill box shall be partitioned by dividers no more than 24 inches apart, in order to provide for more even distribution on sloping areas. The rows or planted seed shall be a maximum of 8 inches apart. Drilling depth shall be from 1/4 to 1 inch.

Broadcast Seeding

Seeding by hand or mechanical broadcasting shall be permitted on areas inaccessible to drills or impractical to seed by other prescribed methods. The broadcast seeding rate shall not be less than twice the drill seeding rate. Following the seeding, the soil shall be hand-raked to cover the seed. Broadcast seeding requires the prior approval of Atlantic Richfield Company.

Hydraulic Seeding

The Contractor must provide one pound of wood fiber mulch per each 3 gallons water in the hydraulic seeder as a cushion against seed damage. The mulch used as a cushion may be part of the total required mulch with the remainder applied after the seed is in place. The Contractor may be required to use extension hoses to reach the extremities of slopes.

When using vegetative mulch, the Contractor may mix the seed with the fertilizer if his hydraulic seed equipment is capable of uniformly mixing water, fertilizer, and seed, in that order, and power blowing or spraying the mixture uniformly over the seedbed. After blending, the slurry shall be applied to the seedbed within 45 minutes after the seed has been added to the water- fertilizer mixture. If the slurry cannot be applied within the specified time, it shall be fortified, at no cost to Atlantic Richfield Company, with the correct ratio of seed to the remaining slurry and a new 45-minute time frame established for applying the fortified mixture. At no time shall seed and fertilizer remain in a slurry for more than 45 minutes.

Seed Application Areas/Rates - The primary Butte Hill Primary General Seed Mixtures include: the following:

Pal Mixture, 2020		
Common Name	**Species**	**lbs PLS/Acre**
Bluebunch wheatgrass	*Pseudoroegneria spicata*	11.1
Idaho fescue	*Festuca idahoensis*	3.6
Western wheatgrass	*Pascopyrum smithii*	3.6
Prairie junegrass	*Koeleria macrantha*	0.2
Sandberg bluegrass	*Poa sandbergii*	0.5
Quick guard (sterile triticale)	*Triticale*	5.8
Blue flax	*Linum lewisii*	0.2
Rubber rabbitbrush	*Ericameria nauseosa*	0.1
	Total	**24.9**

lbs: pound. PLS: pure live seed.

Pal Mixture, 2017		
Common Name	**Species**	**lbs PLS/Acre**
Bluebunch wheatgrass	*Pseudoroegneria spicata*	11.12
Idaho fescue	*Festuca idahoensis*	2.7
Prairie junegrass	*Koeleria macrantha*	0.08
Sandberg bluegrass	*Poa sandbergii*	0.28
Western wheatgrass	*Pascopyrum smithii*	3.96
Perennial Lupine	*Lupinus perennis*	5.33
Rocky Mountain Beeplant	*Cleome serrulata*	0.66
Canada Milkvetch	*Astragalus canadensis*	0.48
Common Sunflower	*Helianthus annuus*	0.73
Blanketflower	*Gaillardia aristata*	0.2
Blue flax	*Linum lewisii*	0.19
Mountain Big Sage	*Artemesia tridentata*	0.03
Rubber rabbitbrush	*Ericameria nauseosa*	0.13
	Total	**25.9**

lbs: pound. PLS: pure live seed.

Pall Mixture, 2015		
Seed Mixture	**Rate**	
Bluebunch Wheatgrass	11.12	PLS/Acre
Idaho Fescue	3.58	PLS/Acre
Rouch Fescue	1.96	PLS/Acre
Prairie Junegrass	0.17	PLS/Acre
Sandberg Bluegrass	0.47	PLS/Acre
Quick Guard (Sterile Triticale)	5.76	PLS/Acre
Blue Flax	0.19	PLS/Acre
Rubber Rabbitbrush	0.06	PLS/Acre
Total	23.3	PLS/Acre

PLS: pure live seed.

Butte Hill
Alternate Seed Mixture No. 1 - Gentle Sloped Areas (Less than 10:1) Revegetation Mix

Seed Mixture	Rate, #PLS/Acre	Planting
Bozoisky Russian Wildrye	5.0	Initial seeding, drill seeded on 15 to18 inch centers.
Ladak Alfalfa	2.0	Inter-seeded during following years as determined by vegetation monitoring.
Total	**7.0**	PLS/Acre

PLS: pure live seed.

Butte Hill
Alternate Seed Mixture No. 2 B Grass-lined Ditches

Seed Mixture	Rate, #PLS/Acre
Smooth Broughm	5.0
Birdsfoot Trefoil	1.0
Red Clover	0.5

PLS: pure live seed.

Butte Hill
Alternate Seed Mixture No. 3 – General Seed Mixture

Common Seed Name	Rate	
Bluebunch wheatgrass	11.12	PLS/Acre
Idaho fescue	2.71	PLS/Acre
Rough fescue	0.87	PLS/Acre
Prairie junegrass	0.08	PLS/Acre
Sandberg bluegrass	0.28	PLS/Acre
Western wheatgrass	3.96	PLS/Acre
Quick guard (sterile triticale)	5.76	PLS/Acre
Silky lupine	5.33	PLS/Acre
Canada mikvetch	0.48	PLS/Acre
Rocky Mountain Beeplant	0.66	PLS/Acre
Common sunflower	0.73	PLS/Acre
Blanket flower	0.20	PLS/Acre
Fuzzy-tongue Penstemon*	0.12	PLS/Acre
Blue flax	0.19	PLS/Acre
Big sage brush	0.03	PLS/Acre
Rubber rabbitbrush	0.13	PLS/Acre
Grand Totals	**32.6**	PLS/Acre

* Fuzzy-tongue Penstemon only used in Fall (after October 15) seeding applications.
PLS: pure live seed.

Pure live seed application rates shall be as specified in the tables.

The 2015 primary seed mixture was proposed by BSB County in collaboration with Montana Tech native species vegetation specialist and is based upon monitoring results for successful revegetation within the Butte area and has been reviewed and approved by BSB County, EPA and the State for use in upland areas of the Butte Priority Soils Operable Unit. The Alternate Seed Mixture No. 1 will only be used in areas with slopes of <10:1 that are particularly susceptible to weed infestation. Additional optimal conditions for use of the alternative seed mix include locations with high moisture holding capacity and shelter from strong wind conditions. The Alternate Seed Mixture No. 2 has been proposed by BSB County and is an option for hand seeding grass-lined ditches and detention basins.

Calculations of pure “live seed” may be made on the basis of either a germination test or a tetrazolium test in addition to the purity analysis. Seed shall be applied on a pure “live seed” basis. The quantity of pure “live seed” in a 100-lb. container shall be determined by the formula: 100 multiplied by germination percentage, and this product multiplied by the purity percentage. For example, if the seed is 85 percent pure and test 90 percent germination, then a 100-lb. container would contain 76.5 pounds of pure “live seed”.

Fertilizer Application

If surface soil nutrient availability data are not available, fertilizer will be applied at a rate to achieve soil concentrations of 60 lbs. of nitrogen (N) per acre, 80 lbs. of P_2O_5 per acre, and 150 lbs. of K_2O per acre. Mechanical or hydraulic methods of application are allowed, providing a uniform application at the specified rate is accomplished. The application method is subject to approval by Atlantic Richfield Company. When scheduling and soil conditions permit, the fertilizer shall be incorporated into the soil by disking, raking, or shallow plowing to the full depth of the topsoil or to a maximum depth of six inches, whichever is less.

Fertilizer shall be applied to the prepared seedbed prior to seeding or mulching and shall be blended with the top layer of soil or concurrently with the seed (as "no-till" drills allow). Upon EPA approval, fertilizer may be applied subsequent to seeding and mulching. Refertilization following seedling establishment will not require incorporation. In no instance shall subsoil be incorporated into the seedbed as a result of the fertilization operation.

Mulch Application

Mulch is usually applied during the summer and early fall and drill seeded after October 15th. The mulch shall be applied in a uniform manner by a mulch spreader at rates varying from 2,000 to 4,000 lbs. per acre. The actual rate utilized shall depend upon site conditions (i.e., slope, erosion potential, etc.) and shall be approved by Atlantic Richfield Company and EPA prior to application. The mulch spreader shall be designed specifically for this type of work. The vegetative material shall be fed in the mechanical spreader at an even, uniform rate.

The mulch shall be anchored into the seedbed by using a mulch tiller (crimper). Straw or hay shall be clean grain straw and shall be pliable.

Mulch tillers shall have round, flat, notched blades of these approximate dimensions: 0.25-inch thick by 18 inches in diameter and spaced 8 inches apart. The tiller shall have sufficient weight to force the vegetative mulch a minimum of 3 inches into the soil and shall be equipped with disc scrapers. Mulch tilling shall be done on all slopes capable of being safely traversed by a tracked vehicle. All mulch tilling shall be done perpendicular of the flow-line of the slope.

Mulch, where required, will be applied to seeded areas as close as possible to the completion of seeding operations for the area. Mulch shall not be applied in the presence of free surface water, but may be applied upon damp ground.

Mulch shall not be applied to areas having a substantial vegetative growth, such as grasses, weeds, and grains. Areas not to be mulched shall be determined by Atlantic Richfield Company. Mulching shall not be done during adverse weather conditions or when wind prevents uniform distribution. Application shall be in a manner to not seriously disturb the seedbed surface.

BPSOU Reclamation Field Work Performance Periods		
Task	**Application/Field Work**	**No Work Performed**
Capping	March 2- November 30	December 1 - March 1
Seeding	October 16-30; March 1 - June 14	June 15 - October 15
Fertilizing	October 16-30; March 1 - June 14	June 15 - October 15
Mulching	June 1 – October 14	October 15 – May 31
Weed Spraying	March 2 - November 30	December 1 - March 1

Appendix C
Reports

Appendix C.1
Summary and Technical Recommendations Report

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

Reclaimed Areas Maintenance and Monitoring

20XX Evaluations Summary Report

Butte Silver Bow

January 20XX

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

BPSOU Reclaimed Areas Maintenance and Monitoring

20XX Evaluations Summary Report

Prepared for:

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Montana Department of Environmental Quality
Remediation Division
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Prepared by:

Butte Silver Bow
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January 20XX

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Revision No.	Author	Version	Description	Date
0	Name	Draft	Issued for Internal Review	Xx/xx/xxxx
01	Name	Draft Final	Issued for Agency Review	Xx/xx/xxxx

1.0 INTRODUCTION

Add the introduction here or change the title as necessary.

- Date of Site Evaluation – mm/dd/yyyy
- Date of Report – mm/dd/yyyy
- Year of Inspection – yyyy

2.0 SITE SUMMARIES

- Site summaries including conditions and trigger items are provided in tabular format.

2.1 Site Aerial Images

2.2 Field Evaluation Notes

3.0 CONCLUSION AND RECOMMENDATIONS

3.1 Corrective Action Plans

3.1.1 Additional Site Sampling

3.2 Engineering Evaluations

3.3 Localize Corrective Action

3.3.1 Standard Procedures

FIGURES

Figure 1. BPSOU, BRES Quadrant.

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Table 1. Recommendation Summary Report

Appendix A Field Evaluation Reports

Appendix B Site Aerial Photos

Appendix C.2
Corrective Action Plan

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

BPSOU Reclaimed Areas Maintenance and Monitoring

20XX Corrective Action Plan

Butte Silver Bow

January 20XX

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

Reclaimed Areas Maintenance and Monitoring

20XX Corrective Action Plan

Prepared for:

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Prepared by:

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January 20XX

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REVISION SUMMARY

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01	Name	Draft Final	Issued for Agency Review	Xx/xx/xxxx

1.0 INTRODUCTION

Add the introduction here or change the title as necessary.

- Date of Site Evaluation – mm/dd/yyyy
- Date of Report – mm/dd/yyyy
- Year of Inspection – yyyy

2.0 CORRECTIVE ACTION PLAN SUMMARY

Provide a summary description of BRES Field Evaluations including:

- Polygon related scores and required action;
- Local trigger items

2.1 Polygon Related Scores and Action

2.1.1 Vegetation Score (VI/RI)

2.1.2 Erosion Score (Monitor/Evaluation)

2.2 Local Trigger Items

- Vegetation Related Action Items
- Reclamation Related Action Items
- Erosion Related Action Items
- Site Edges Related Action Items
- Exposed Waste Related Action Items
- Land Slump Related Action Items
- Barren Areas Related Action Items
- Gullies Related Action Items
- Administration Related Action Items

2.3 Summary of Sampling

2.3.1 pH Soil Sampling

2.3.2 Composite Sampling

3.0 SITE SPECIFIC CORRECTIVE ACTION PLAN

Provide specific corrective action to address trigger items(s) described above. Include approximate material quantities, depths, application rates, SMPs, etc.

3.1 Recommendation Summary Report

4.0 REPORTING REQUIREMENTS

A summary final material quantities and equipment to complete corrective actions for each site listed are recorded and used to complete the Annual report.

5.0 SITE REVIEW

Site review may be completed by Agencies and BSB as needed.

6.0 APPROVALS

All CAPs require approval signatures and approval date by:

EPA Representative Approval Date

MDEQ Representative Approval Date

Butte Silver Bow Representative: Approval Date

FIGURES

Figure 1. BPSOU, BRES Quadrant.

TABLES

Table 1. Recommendation Summary Report

Appendix A Field Evaluation Reports

Appendix B Sampling and Analysis Plan

Appendix C.3
Annual Maintenance and Monitoring Report

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

BPSOU Reclaimed Areas Maintenance and Monitoring

20XX Annual Maintenance and Monitoring Report

Butte Silver Bow

March 20XX

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

BPSOU Reclaimed Areas Maintenance and Monitoring

20XX Annual Maintenance and Monitoring Report

Prepared for:

US Environmental Protection Agency
US EPA Region 8, Montana Office
Baucus Federal Building
10 West 15th Street, Suite 3200
Helena, Montana 59626

Montana Department of Environmental Quality
Remediation Division
P.O. Box 200901
Helena, Montana 59620-0901

Prepared by:

Butte Silver Bow
155 W. Granite
Butte, Montana 59701

March 20XX

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Revision No.	Author	Version	Description	Date
0	Name	Draft	Issued for Internal Review	Xx/xx/xxxx
01	Name	Draft Final	Issued for Agency Review	Xx/xx/xxxx

1.0 INTRODUCTION

Add the introduction here or change the title as necessary.

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ATTACHMENT B
TYPE B BORROW MATERIAL DATA APPROVAL SUBMITTALS

Attachment B-1 Pace Analytical Services, LLC Quality Assurance Laboratory Data Report

BUTTE HILL COVER SOIL APPROVAL SUBMITTAL

2/13/2024

Source: ***ARWW&S RDU 8 South Borrow Area***
Sample #: ***24-RMAP-TypeB-6***

Description		Specification		Sample	Specification Met: Yes	Specification Met: No
Chemical (mg/kg)						
	As	<	97	13.1	X	
	Cd	<	4	0.5	X	
	Cu	<	250	22.0	X	
	Hg	<	5	0.02	X	
	Pb	<	100	10.0	X	
	Zn	<	250	178.0	X	
pH (s.u.)		>	5.5	**N/A**		
		<	8.5			
SAR		<	12	**N/A**		
Saturation (%)		<	85	**N/A**		
		>	25			
EC (mmhos/cm)		<	4	**N/A**		
Textural Classification (USDA) <2.0 mm				**N/A**		
	Loam					
	Sandy loam					
	Sandy clay loam					
	Sandy clay					
	Clay loam					
	Silty clay					
	Silty clay loam					
	Silt loam					
	Silt					
	*Per EPA Approval (Loamy sand)					
Rock Content (%) (by volume)		<	45	**N/A**		

Other Information Requested	
Organic Matter (%)	**N/A**
Soil Nutrients	
N (mg/kg)	**N/A**
P (mg/kg)	**N/A**
K (mg/kg)	**N/A**
Particle Size	
Sand (%)	**N/A**
Silt (%)	**N/A**
Clay (%)	**N/A**

Legend:

# Value	- Criteria met
# Value	- Does not meet Criteria
N/A	- Not Applicable

Atlantic Richfield Representative: Mike McInulty ate: 02/14/24

EPA Representative: Date: 3/13/2024

MT DEQ Representative: Date: 3/7/2024

BUTTE HILL COVER SOIL APPROVAL SUBMITTAL

2/13/2024

Source: ***ARWW&S RDU 8 South Borrow Area***
Sample #: ***24-RMAP-TypeB-7***

Description	Specification	Sample	Specification Met Yes	Specification Met No	Other Information Requested
Chemical (mg/kg)					**Organic Matter (%)**
As	< 97	12.9	X		N/A
Cd	< 4	0.3	X		
Cu	< 250	21.9	X		**Soil Nutrients**
Hg	< 5	0.01	X		
Pb	< 100	9.9	X		N (mg/kg) N/A
Zn	< 250	173.0	X		P (mg/kg) N/A
					K (mg/kg) N/A
pH (s.u.)	> 5.5 < 8.5	N/A			
SAR	< 12	N/A			
Saturation (%)	< 85 > 25	N/A			
EC (mmhos/cm)	< 4	N/A			
Textural Classification (USDA) <2.0 mm		N/A			**Particle Size**
Loam					Sand (%) N/A
Sandy loam					Silt (%) N/A
Sandy clay loam					Clay (%) N/A
Sandy clay					
Clay loam					
Silty clay					
Silty clay loam					
Silt loam					
Silt					
*Per EPA Approval (Loamy sand)					
Rock Content (%) (by volume)	< 45	N/A			

Legend:

# Value	- Criteria met
# Value	- Does not meet Criteria
N/A	- Not Applicable

Atlantic Richfield Representative: Mike McInulty Date: 02/14/24

EPA Representative: Date: 3/13/2024

MT DEQ Representative: Date: 3/7/2024

Attachment B-1
Pace Analytical Services, LLC
Quality Assurance Laboratory Data Report

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

February 06, 2024

Jesse Schwarzrock
Pioneer Technical Services
307 E Park
Suite 421
Anaconda, MT 59711

RE: Project: BPSOU Park Sampling
Pace Project No.: 10682249

Dear Jesse Schwarzrock:

Enclosed are the analytical results for sample(s) received by the laboratory on January 26, 2024. 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,

Julia Fogarty
julia.fogarty@pacelabs.com
(612)607-1700
Project Manager

Enclosures

cc: AR Deliverables ESI, Environmental Standards, Inc.
BPEquis UploadEmail, BP EQUIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Pace Analytical Services, LLC - Minneapolis MN
1700 Elm Street SE, Minneapolis, MN 55414
A2LA Certification #: 2926.01
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
GMP+ Certification #: GMP050884
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 (A2LA) #: R-036
North Dakota Certification (MN) #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification (1700) #: CL101
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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10682249001	**24-RMAP-TypeB-6**	Solid	01/22/24 13:00	01/26/24 08:50
10682249002	**24-RMAP-TypeB-6**	Solid	01/22/24 13:00	01/26/24 08:50
10682249003	**24-RMAP-TypeB-7**	Solid	01/22/24 12:45	01/26/24 08:50
10682249004	**24-RMAP-TypeB-7**	Solid	01/22/24 12:45	01/26/24 08:50

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10682249001	**24-RMAP-TypeB-6**	EPA 6020B	GAS1	5	PASI-M
10682249002	**24-RMAP-TypeB-6**	EPA 7471B	HM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10682249003	**24-RMAP-TypeB-7**	EPA 6020B	GAS1	5	PASI-M
10682249004	**24-RMAP-TypeB-7**	EPA 7471B	HM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M

PASI-M = Pace Analytical Services - Minneapolis

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Date: February 06, 2024

Samples analyzed for method 6020 arsenic and lead were analyzed after they were dried and sieved using a number 60 sieve.

Pace Analytical Services, LLC
1700 Elm Street
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PROJECT NARRATIVE

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Method: **EPA 6020B**
Description: 6020B MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 06, 2024

General Information:
2 samples were analyzed for EPA 6020B 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.

Internal Standards:
All internal standards were within QC limits 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.

QC Batch: 930077

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 4879783)
  - Lead

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.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1700 Elm Street
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PROJECT NARRATIVE

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Method: **EPA 6020B**
Description: 6020B MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 06, 2024

Analyte Comments:

QC Batch: 930077

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 4879783)
  - Lead

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PROJECT NARRATIVE

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Method: **EPA 7471B**
Description: 7471B Mercury
Client: BPAR-PIONEER-MT
Date: February 06, 2024

General Information:
2 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.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Sample: 24-RMAP-TypeB-6 **Lab ID: 10682249001** Collected: 01/22/24 13:00 Received: 01/26/24 08:50 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**13.1**	mg/kg	0.49	0.14	1	02/01/24 13:53	02/02/24 10:44	7440-38-2	
Cadmium	**0.47**	mg/kg	0.078	0.029	1	02/01/24 13:53	02/02/24 10:44	7440-43-9	
Copper	**22.0**	mg/kg	0.97	0.30	1	02/01/24 13:53	02/02/24 10:44	7440-50-8	
Lead	**10**	mg/kg	0.49	0.17	1	02/01/24 13:53	02/02/24 10:44	7439-92-1	
Zinc	**178**	mg/kg	4.9	1.4	1	02/01/24 13:53	02/02/24 10:44	7440-66-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Sample: 24-RMAP-TypeB-6 **Lab ID: 10682249002** Collected: 01/22/24 13:00 Received: 01/26/24 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
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.015J**	mg/kg	0.019	0.0082	1	02/06/24 09:36	02/06/24 14:39	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis								
Percent Moisture	**4.4**	%	0.10	0.10	1		01/29/24 11:15		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Sample: 24-RMAP-TypeB-7 **Lab ID: 10682249003** Collected: 01/22/24 12:45 Received: 01/26/24 08:50 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**12.9**	mg/kg	0.50	0.14	1	02/01/24 13:53	02/02/24 12:04	7440-38-2	
Cadmium	**0.31**	mg/kg	0.080	0.029	1	02/01/24 13:53	02/02/24 12:04	7440-43-9	
Copper	**21.9**	mg/kg	1.0	0.30	1	02/01/24 13:53	02/02/24 12:04	7440-50-8	
Lead	**9.9**	mg/kg	0.50	0.17	1	02/01/24 13:53	02/02/24 12:04	7439-92-1	
Zinc	**173**	mg/kg	5.0	1.4	1	02/01/24 13:53	02/02/24 12:04	7440-66-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Sample: 24-RMAP-TypeB-7 **Lab ID: 10682249004** Collected: 01/22/24 12:45 Received: 01/26/24 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
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.013J**	mg/kg	0.019	0.0081	1	02/06/24 09:36	02/06/24 14:46	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis								
Percent Moisture	**4.8**	%	0.10	0.10	1		01/29/24 11:15		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: BPSOU Park Sampling
Pace Project No.: 10682249

QC Batch: 929593
QC Batch Method: EPA 7471B
Analysis Method: EPA 7471B
Analysis Description: 7471B Mercury Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10682249002, 10682249004

METHOD BLANK: 4877925 Matrix: Solid
Associated Lab Samples: 10682249002, 10682249004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/kg	<0.0078	0.018	0.0078	02/06/24 14:36	

LABORATORY CONTROL SAMPLE: 4877926

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.47	0.47	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4877928 4877929

Parameter	Units	10682249002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.015J	0.51	0.49	0.56	0.51	106	102	80-120	9	20	

SAMPLE DUPLICATE: 4877927

Parameter	Units	10682249002 Result	Dup Result	RPD	Max RPD	Qualifiers
Mercury	mg/kg	0.015J	0.014J		20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: BPSOU Park Sampling
Pace Project No.: 10682249

QC Batch: 930077
QC Batch Method: EPA 3050B
Analysis Method: EPA 6020B
Analysis Description: 6020B Solids UPD5
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10682249001, 10682249003

METHOD BLANK: 4879783 Matrix: Solid
Associated Lab Samples: 10682249001, 10682249003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	<0.14	0.50	0.14	02/02/24 09:48	
Cadmium	mg/kg	<0.029	0.080	0.029	02/02/24 09:48	
Copper	mg/kg	<0.30	1.0	0.30	02/02/24 09:48	
Lead	mg/kg	0.86	0.50	0.17	02/02/24 09:48	P8
Zinc	mg/kg	<1.4	5.0	1.4	02/02/24 09:48	

LABORATORY CONTROL SAMPLE: 4879784

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	49.8	50.4	101	80-120	
Cadmium	mg/kg	49.8	51.2	103	80-120	
Copper	mg/kg	49.8	54.2	109	80-120	
Lead	mg/kg	49.8	51.7	104	80-120	
Zinc	mg/kg	49.8	53.6	108	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4879785 4879786

Parameter	Units	10682249001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	13.1	48.6	50	64.2	65.5	105	105	75-125	2	20	
Cadmium	mg/kg	0.47	48.6	50	53.4	54.9	109	109	75-125	3	20	
Copper	mg/kg	22.0	48.6	50	74.8	75.6	109	107	75-125	1	20	
Lead	mg/kg	10	48.6	50	60.5	62.2	104	105	75-125	3	20	
Zinc	mg/kg	178	48.6	50	231	235	109	114	75-125	2	20	

SAMPLE DUPLICATE: 4879787

Parameter	Units	10682249001 Result	Dup Result	RPD	Max RPD	Qualifiers
Arsenic	mg/kg	13.1	13.3	1	20	
Cadmium	mg/kg	0.47	0.41	14	20	
Copper	mg/kg	22.0	22.3	2	20	
Lead	mg/kg	10	10.1	1	20	
Zinc	mg/kg	178	181	2	20	

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

Pace Analytical Services, LLC
1700 Elm Street
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QUALITY CONTROL DATA

Project: BPSOU Park Sampling
Pace Project No.: 10682249

QC Batch: 929445
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10682249002, 10682249004

SAMPLE DUPLICATE: 4877478

Parameter	Units	10682390001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	5.2	5.0	4	30	N2

SAMPLE DUPLICATE: 4877479

Parameter	Units	10682291004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	20.4	19.5	5	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

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: BPSOU Park Sampling
Pace Project No.: 10682249

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.

ANALYTE QUALIFIERS

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.
P8	Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10682249001	**24-RMAP-TypeB-6**	EPA 3050B	930077	EPA 6020B	930271
10682249003	**24-RMAP-TypeB-7**	EPA 3050B	930077	EPA 6020B	930271
10682249002	**24-RMAP-TypeB-6**	EPA 7471B	929593	EPA 7471B	930745
10682249004	**24-RMAP-TypeB-7**	EPA 7471B	929593	EPA 7471B	930745
10682249002	**24-RMAP-TypeB-6**	ASTM D2974	929445		
10682249004	**24-RMAP-TypeB-7**	ASTM D2974	929445		

WO# : 10682249

10682249

ry Management Program LaMP Chain of Custody Record

Page 1 of 1

lode Path: _____ Req Due Date (mm/dd/yy): _____ Rush TAT: x No ____

acility No: _____ Lab Work Order Number: _____

Lab Name: Pace Analytical Services	Facility Address:	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Consultant/Contractor Project No: BPSOU Park Sampling
Lab PM: Julia Fogarty	Lead Regulatory Agency:	Address: 307 E Park Suite 421, Anaconda MT, 59711
Lab Phone: 612-607-1700	California Global ID No.:	Consultant/Contractor PM: Jesse Schwarzrock
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-697-0949 Email: jschwarzrock@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision — — —	Email EDD To: Jesse Schwarzrock
Other Info:	Stage: Activity:	Invoice To: BP — Contractor — X
BP Project Manager (PM): Mike Mc Anulty		
BP PM Phone: 406-723-1822		
BP PM Email: mcanumc@bp.com		

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	No. Containers / Preservative: Total Number of Containers	Ambient (As, Cd, Cu, Pb, Zn)/<6 C Hg	H2SO4	HNO3	HCl	Methanol	Requested Analyses: Air dry&sieve*, 6020 (As, Cd, Cu, Pb, Zn)	7471 Mercury, dry weight	Report Type & QC Level / Comments
	24-RMAP-TypeB-6	01/22/24	1300	X				2	x					X	X	Rush TAT 002
	24-RMAP-TypeB-7	01/22/24	1245	X				2	x					X	X	Rush TAT 004

Standard — x

Full Data Package —

Note: If sample not collected, indicate "No

Sampler's Name: Dana St. John	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Pioneer Technical Services	PTS	01/25/24	1330		1/26/24	850
Shipment Method: FedEx Overnight Ship Date: 01/25/24						
Shipment Tracking No: 6092 7241 3801						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.7 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

DC#_Title: ENV-FRM-MIN4-0149 v08_Sample Condition Upon Receipt (SCUR) - ESI
Effective Date: 4/18/2023

Sample Condition Upon Receipt - ESI Tech Specs

Client Name: BP-Pioneer

Project #: **WO#: 10682249**

PM: JMF **Due Date: 02/02/24**

CLIENT: BP-PIONEER

Courier: ☑ FedEx ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ SpeeDee ☐ Commercial

Tracking Number: 6092 7241 3501 ☐ See Exceptions ENV-FRM-MIN4-0142

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 (0436) ☐ T3 (0459) ☐ T4 (0402) ☐ T5 (0178) ☐ T6 (0235) ☐ T7 (0042) ☐ T8 (0775) ☐ T9 (0727) ☐ 01339252/1710 **Type of Ice:** ☑ Wet ☐ Blue ☐ Dry ☐ None ☐ Melted

Temp should be above freezing to 6 °C **Cooler temp Read w/Temp Blank:** 1.4 °C

Correction Factor: +0.3 **Cooler Temp Corrected w/temp blank:** 1.7 °C

Average Corrected Temp (no temp blank only): ____ °C ☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

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

Date/Initials of Person Examining Contents: DGS 1/26/24

Did samples originate in a quarantine zone within the United States: AL, AR, AZ 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 (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

Location (Check one): ☐ Duluth ☑ Minneapolis ☐ Virginia				**COMMENTS**
Chain of Custody Present and Filled Out?	☑ Yes	☐ No		1.
Chain of Custody Relinquished?	☑ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	3.
Samples Arrived within Hold Time?	☑ Yes	☐ No		4.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E.coli ☐ BOD/cBOD ☐ Hex Chrom ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other
Rush Turn Around Time Requested?	☑ Yes	☐ No		6.
Sufficient Sample Volume?	☑ Yes	☐ No		7.
Triple Volume Provided for MS/MSD (if more than 10 samples)?	☐ Yes	☐ No	☑ N/A	
Correct Containers Used?	☑ Yes	☐ No		8.
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☑ Yes	☐ No		11. **If no, write ID/Date/Time of container below:** ☐ See Exceptions ENV-FRM-MIN4-0142
Matrix: ☐ Water ☑ Soil ☐ Oil ☐ Other				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO3, H2SO4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☑ N/A	☐ NaOH ☐ HNO3 ☐ H2SO4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxins/PFAS (*If adding preservative to a container, it must be added to associated field and equipment blanks--verify with PM first.)	☐ Yes	☐ No	☑ N/A	Positive for Residual Chlorine? ☐ Yes ☐ No ☐ See Exceptions ENV-FRM-MIN4-0142
				pH Paper Lot #
				Residual Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☑ N/A	13. ☐ See Exceptions ENV-FRM-MIN4-0142
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☑ N/A	
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	Pace Trip Blank Lot # (if purchased):

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 930	Temp: 1.4	Corrected Temp: 1.7	
Time: 9:50	put in cooler		
Time:	Temp:	Corrected Temp:	

CLIENT NOTIFICATION/RESOLUTION **Field Date Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: Julia Fogarty **Date:** 1/26/24

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: DGS **Line:** 2

40273584

Internal Transfer Chain of Custody

Pace

☐ Rush Multiplier____X
☒ Samples Pre-Logged into eCOC

State Of Origin: MT
Cert. Needed: ☐ Yes ☒ No

Workorder: 10682249 **Workorder Name:** BPSOU Park Sampling

Owner Received Date: 1/26/2024 **Results Requested By:** 2/2/2024

Report To	Subcontract To
Julia Fogarty Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700	Pace Analytical Green Bay 1241 Bellevue Street Suite 9 Green Bay, WI 54302 Phone (920)469-2436

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	ZPLU Preserved Containers: Unpreserved						Requested Analysis: Air Dry & Sieve												LAB USE ONLY
1	24-RMAP-TypeB-6	PS	1/22/2024 13:00	10682249001	Solid	1						X												001
2	24-RMAP-TypeB-7	PS	1/22/2024 12:45	10682249003	Solid	1						X												002
3																								
4																								
5																								

Transfers	Released By	Date/Time	Received By	Date/Time
1	Fed EX	01/26/2024 1535	Matt Vandamwell Pace	01/26/2024 1535
2				
3				

Comments

IR40-Rush
#60 Sieve
Include soil prep log
Follow QAPP

Cooler Temperature on Receipt 20.0 °C | **Custody Seal** (Y) or N | **Received on Ice** Y or (N) | **Samples Intact** (Y) or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.*

Sample Preservation Receipt Form

Client Name: Pace Minneapolis

Project # V4027358Y

All containers needing preservation have been checked and noted below. ☐Yes ☐No ☑N/A

Lab Lot# of pH paper.

Lab Std #ID of preservation (if pH adjusted):

Initial when completed MW Date/ Time:

Pace Lab #	Glass							Plastic						Vials						Jars				General				VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
	AG1U	BG1U	AG1H	AG4S	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	BP2Z	VG9C	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN 1	GN 2							
001																									1								2.5 / 5
002																									1								2.5 / 5
003																																	2.5 / 5
004																																	2.5 / 5
005																																	2.5 / 5
006																																	2.5 / 5
007																																	2.5 / 5
008																																	2.5 / 5
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015																																	2.5 / 5
016																																	2.5 / 5
017																																	2.5 / 5
018																																	2.5 / 5
019																																	2.5 / 5
020																																	2.5 / 5

MW 8/15/2024

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other:

Headspace in VOA Vials (>6mm) ☐Yes ☐No ☑N/A *If yes look in headspace column

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	VG9C	40 mL clear ascorbic w/ HCl	JGFU	4 oz amber jar unpres
BG1U	1 liter clear glass	BP3U	250 mL plastic unpres	DG9T	40 mL amber Na Thio	JG9U	9 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP3B	250 mL plastic NaOH	VG9U	40 mL clear vial unpres	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9H	40 mL clear vial HCL	WPFU	4 oz plastic jar unpres
AG5U	100 mL amber glass unpres	BP3S	250 mL plastic H2SO4	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH + Zn	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres					GN 1	
						GN 2	

Page 1 of 2

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO#: 40273584

40273584

Client Name: Pace Minneapolis

Courier: ☐ CS Logistics ☑ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco
☐ Client ☐ Pace Other:

Tracking #: 609272385750

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other Paper padding

Thermometer Used SR - 131 **Type of Ice:** Wet Blue Dry (None) ☐ Meltwater Only

Cooler Temperature Uncorr: 20.5 /Corr: 20.0

Temp Blank Present: ☐ yes ☑ no **Biological Tissue is Frozen:** ☐ yes ☐ no

Person examining contents:
Date: 01/26/2024 Initials: MRR

Labeled By Initials: SS

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C if shipped on Dry Ice.

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☐No ☑N/A	4. Pace IRWO MRR 01/26/2024
Samples Arrived within Hold Time:	☑Yes ☐No	5.
- DI VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No	6.
Rush Turn Around Time Requested:	☑Yes ☐No	7.
Sufficient Volume: For Analysis: ☑Yes ☐No MS/MSD: ☐Yes ☑No ☐N/A		8.
Correct Containers Used:	☑Yes ☐No	9.
Correct Type: Pace Green Bay, Pace IR, (Non-Pace)		
Containers Intact:	☑Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: S	☑Yes ☐No ☐N/A	12.
Trip Blank Present:	☐Yes ☐No ☑N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: Date/Time:

Comments/ Resolution: No internal custody seal sealing the bag shut. MRR 01/26/2024

PM Review is documented electronically in LIMs. By releasing the project, the PM acknowledges they have reviewed the sample login

Page 2 of 2

40273584

Internal Transfer Chain of Custody

Pace

☐ Rush Multiplier____X
☒ Samples Pre-Logged into eCOC

State Of Origin: MT
Cert. Needed: ☐ Yes ☒ No

Workorder: 10682249 **Workorder Name:** BPSOU Park Sampling

Owner Received Date: 1/26/2024 Results Requested By: 2/2/2024

Report To	Subcontract To
Julia Fogarty Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700	Pace Analytical Green Bay 1241 Bellevue Street Suite 9 Green Bay, WI 54302 Phone (920)469-2436

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Unpreserved	ZPLU					Requested Analysis: Air Dry & Sieve												LAB USE ONLY
1	24-RMAP-TypeB-6	PS	1/22/2024 13:00	10682249001	Solid	1						X												001
2	24-RMAP-TypeB-7	PS	1/22/2024 12:45	10682249003	Solid	1						X												002
3																								
4																								
5																								

Transfers	Released By	Date/Time	Received By	Date/Time
1	FedEX	01/26/2024 1535	Matt VanSumeek Pace	01/26/2024 1535
2	Matt VanSumeek Pace	01/26/2024 16:00		1-31-24 1454
3				

Comments
IR40-Rush
#60 Sieve
Include soil prep log
Follow QAPP

Cooler Temperature on Receipt 20.0°C **Custody Seal** (Y) or N **Received on Ice** Y or (N) **Samples Intact** (Y) or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.*

Forwarding for Analysis CLL 1/31/24

Sample Condition Upon Receipt

Client Name: Pace Green Bay

Project #: 10682249

Courier: ☐ FedEx ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ SpeeDee ☑ Commercial

Tracking Number: 776030141 ☐ See Exceptions ENV-FRM-MIN4-0142

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 (0436) ☐ T3 (0459) ☑ T4 (0402) ☐ T5 (0178) ☐ T6 (0235) ☐ T7 (0042) ☐ T8 (0775) ☐ T9(0727) ☐ 01339252/1710 **Type of Ice:** ☐ Wet ☐ Blue ☐ Dry ☑ None ☐ Melted

Did Samples Originate in West Virginia? ☐ Yes ☑ No **Were All Container Temps Taken?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6 °C **Cooler temp Read w/Temp Blank:** _____ °C

Correction Factor: +0.2 **Cooler Temp Corrected w/temp blank:** _____ °C

Average Corrected Temp (no temp blank only): 20.5 °C ☑ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

USDA Regulated Soil: ☑ N/A, water sample/other: Solid

Date/Initials of Person Examining Contents: JMW 1-31-24

Did samples originate in a quarantine zone within the United States: AL, AR, AZ 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 (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

Location (Check one): ☐ Duluth ☑ Minneapolis ☐ Virginia

				COMMENTS
Chain of Custody Present and Filled Out?	☑ Yes	☐ No		1.
Chain of Custody Relinquished?	☑ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☐ Yes	☐ No	☑ N/A	3.
Samples Arrived within Hold Time?	☑ Yes	☐ No		4. If fecal: ☐ <8 hrs ☐ >8 hr, <24 ☐ No
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E.coli ☐ BOD/cBOD ☐ Hex Chrom ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other
Rush Turn Around Time Requested?	☐ Yes	☑ No		6.
Sufficient Sample Volume?	☑ Yes	☐ No		7.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	8.
-Pace Containers Used?	☐ Yes	☑ No		
Containers Intact?	☑ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☑ Yes	☐ No		11. **If no, write ID/Date/Time of container below:** ☐ See Exceptions ENV-FRM-MIN4-0142
Matrix: ☐ Water ☐ Soil ☐ Oil ☑ Other Solid				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO3, H2SO4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☑ N/A	☐ NaOH ☐ HNO3 ☐ H2SO4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxins/PFAS (*If adding preservative to a container, it must be added to associated field and equipment blanks--verify with PM first.)	☐ Yes	☐ No	☑ N/A	Positive for Residual Chlorine? ☐ Yes ☐ No ☐ See Exceptions ENV-FRM-MIN4-0142
				pH Paper Lot #
				Residual Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Headspace in Methyl Mercury Container?	☐ Yes	☐ No	☑ N/A	13.
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☑ N/A	14. ☐ See Exceptions ENV-FRM-MIN4-0142
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☑ N/A	
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	Pace Trip Blank Lot # (if purchased): _____

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: Julia Fogarty **Date:** 1/31/24

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: DU **Line:** 3

Pace ANALYTICAL SERVICES	DC#_Title: ENV-FRM-MIN4-0142 v02_Sample Condition Upon Receipt (SCUR) Exception Form
	Effective Date: 09/22/2022

Workorder #: _____

No Temp Blank		
Read Temp	Corrected Temp	Average temp
20.3	20.5	
20.3	20.5	20.5

PM Notified of Out of Temp Cooler? ☐ Yes ☐ No

If yes, indicate who was contacted, date and time.
If no, indicate reason why.

_____

Multiple Cooler Project? ☐ Yes ☐ No

If anything is OVER 6.0° C, you MUST document containers in this section HERE

Tracking Number	Temperature

Out of Temp Sample ID	Container Type	# of Containers

pH Adjustment Log for Preserved Samples

Sample ID	Type Of Preserve	pH Upon Receipt	Date Adjusted	Time Adjusted	Amount Added (mL)	Lot # Added	pH After	In Compliance After Addition?		Initials
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	

Comments:

_____

_____

_____

ATTACHMENT C
DATA VALIDATION INFORMATION

STAGE 4 QUALITY ASSURANCE REVIEW

SILVER BOW CREEK/BUTTE AREA NATIONAL PRIORITIES LIST SITE, BUTTE PRIORITY SOILS OPERABLE UNIT, RESIDENTIAL METALS ABATEMENT PROGRAM PROJECT

BORROW SOIL SAMPLES COLLECTED ON

JANUARY 22, 2024

SAMPLE DELIVERY GROUP: 10682249

FEBRUARY 13, 2024

Prepared for:

ATLANTIC RICHFIELD COMPANY
317 Anaconda Road
Butte, MT 59701

Prepared by:

ENVIRONMENTAL STANDARDS, INC.
1140 Valley Forge Road
P.O. Box 810
Valley Forge, PA 19482-0810

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INTRODUCTION

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the samples collected on January 22, 2024, as part of the Silver Bow Creek/Butte Area National Priorities List (NPL) Site, Butte Priority Soils Operable Unit, Residential Metals Abatement Program (RMAP) sampling event. The samples that have undergone a rigorous QA review are listed on Table 1. Table 1 also presents the laboratory sample number, collection date, parameter(s) examined and the review level for each sample. Stage 2B review includes an evaluation of data package completeness and review of the summary forms provided (raw data are not reviewed). In addition to all the elements included in a Stage 2B review, a Stage 4 review includes the evaluation of raw data and the verification of calculated results.

This review was performed with guidance from the RMAP Quality Assurance Project Plan (QAPP; June 2023); Clark Fork River Superfund Site Investigation (CFRSSI) Data Management/Data Validation Plan (CFRSSI DM/DV Plan) (ARCO 1992a); the "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use," (US EPA, January 2009); and the "National Functional Guidelines for Inorganic Superfund Methods Data Review," (US EPA, November 2020). The National Functional Guidelines validation guidance documents specifically address analyses performed in accordance with the Contract Laboratory Program (CLP) analytical methods and are not completely applicable to the type of analyses and analytical protocols performed for the SW-846 methods utilized by the laboratory for these samples. Environmental Standards, Inc. (Environmental Standards) used professional judgment to determine the usability of the analytical results and compliance relative to the methods utilized by the laboratory.

The reported analytical results are presented as qualified electronic data deliverables (EDDs). Any required data validation qualifications have been annotated on the associated EDDs. Data were examined to determine the usability of the analytical results and compliance relative to the method requirements specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846" (SW-846) Methods 6020B and 7471B. This report was prepared to provide a critical review of the laboratory analyses and reported analytical results. Rigorous QA reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories. The data qualifications allow the data end-user to best understand the usability of the analytical results. Data not qualified in this report should be considered valid based on the quality control (QC) criteria that have been reviewed as detailed in the QAPP (June 2023). Details of this QA review are presented in Section 1 of this report.

TABLE 1

BORROW SAMPLES INCLUDED IN THIS QUALITY ASSURANCE REVIEW

Field Sample Name	Laboratory Sample Numbers	Sample Delivery Group	Collection Date	Parameters Examined	Stage Validation (2B or 4)
24-RMAP-TypeB-6	10682249001 10682249002	10682249	1/22/24	Hg M	4
24-RMAP-TypeB-7	10682249003 10682249004	10682249	1/22/24	Hg M	4

NOTES:

M - Total Arsenic, Cadmium, Copper, Lead, and Zinc by SW-846 Method 6020B.
Hg - Total Mercury by SW-846 Method 7471B.
2B - Data Verification in accordance with Section 5.2 of QAPP (June 2023)
4 - Data Validation in accordance with Section 5.2 of QAPP (June 2023)

SECTION 1 QUALITY ASSURANCE REVIEW

The soil samples were collected on January 22, 2024, as part of the Silver Bow Creek/Butte Area NPL Site, Butte Priority Soils Operable Unit, RMAP sampling event. The samples for the analysis of arsenic, cadmium, copper, lead, and zinc by inductively coupled plasma/mass spectrometry (ICP/MS) were first dried and sieved by Pace Analytical Services, LLC (Pace) of Green Bay, Wisconsin, prior to transfer to Pace of Minneapolis, Minnesota, for digestion and analysis by SW-846 Method 6020B. The soil samples collected for the analysis of mercury by Cold Vapor Atomic Absorption (CVAA) were shipped in separate iced coolers to Pace of Minneapolis, Minnesota, for wet digestion and analysis by SW-846 Method 7471B and reported on a dry-weight basis. The specific samples and analyses reviewed are identified on Table 1.

The findings in this QA review are based upon a review of sample holding times, condition of samples upon laboratory receipt, blank analysis results, laboratory matrix spike sample (LMS) results, laboratory control sample (LCS) results, laboratory duplicate results, initial and continuing calibrations, sample preparation, reporting limit (RL) standard results, interference check sample results, serial dilution results, internal standard performance, instrument sensitivity, analytical sequence, the quantitation of positive results, and a critical evaluation of instrumental raw data. Any required data validation qualifications are annotated in the qualified EDD as defined in Section 3.

Issues are typically presented in two categories – deliverable issues and procedural issues. Deliverable issues are data issues that can easily be corrected and that may or may not impact the usability of the reported results. Procedural issues are issues that cannot be corrected and address method compliance issues; these issues may or may not impact the usability of the reported results. Comments address issues for which the data reviewer has provided information in order to clarify issues relating to the data; comments do not typically impact the usability of the reported results. The data reviewer has edited the laboratory-reported data and QC summary forms based on the issues and comments in this QA review. Furthermore, the data reviewer has included copies of all relevant raw data, QC forms, and other documentation needed to support these edits in the Inorganic Data Support Documentation (Section 4) of this report.

Deliverable Review

- Deliverable issues that affect data quality were not observed for the data in this QA review.

Procedural Review

- Procedural issues that affect data quality were not observed for the data in this QA review.

Comments

- Due to a Laboratory Information Management System (LIMS) limitation, the results reported for arsenic, cadmium, copper, lead, and zinc were described as being reported

on a “wet-weight basis” in the data package. As described in the Case Narrative (see Project Case Narrative and Chain-Of-Custody Record [Section 5]), the samples for arsenic, cadmium, copper, lead, and zinc were dried and sieved prior to preparation and analysis; therefore, the distinction of being reported on a “wet-weight basis” for these results does not indicate that the percent moisture associated with the sample can be applied to the arsenic, cadmium, copper, lead, and zinc results. Qualification of data due to this issue was not warranted.

- The qualified EDD reports the arsenic, cadmium, copper, lead, and zinc results with a basis of “WET” based upon the reporting requirements of bp America, Inc. (bp) and DDMS, Inc. (DDMS). The basis of “WET” is misleading as wetness is the ability of a liquid to adhere to the surface of a solid and the samples for arsenic, cadmium, copper, lead, and zinc were dried and sieved prior to preparation and analysis as described in the Case Narrative (see Section 5). The distinction of “WET” does not indicate that the percent moisture associated with the sample can be applied to the arsenic, cadmium, copper, lead, and zinc results. Qualification of data due to this issue was not warranted.

With regard to data usability, the principal areas of concern are results reported below the sample-specific RL. Based upon a complete review of the data package provided, the following qualifiers are offered. The following data usability issues represent an interpretation of the QC results obtained for the project samples. Quite often, data qualifications address issues relating to sample matrix problems. Similarly, the data validation guidelines routinely specify areas of the data that require qualification, yet the methods used for analysis may not require corrective action by the laboratory. Accordingly, the following data usability issues should <u>not</u> be construed as an indication of laboratory performance.

SECTION 2 DATA VALIDATION CHECKLIST FOR METALS SAMPLE ANALYSIS

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times*	Collection Date	Batch	Analysis Date	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Lead and Arsenic	Pace – Minneapolis, MN	Soil	SW-846 Method 6020B	6 months from sample collection	1/22/24	930271	2/2/24	Y	N/A
Mercury	Pace – Minneapolis, MN	Soil	SW-846 Method 7471B	28 days from sample collection	1/22/24	930745	2/6/24	Y	N/A

*Reference for Holding Times – Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition” (SW-846) Methods 6020B and 7471B and Chapter 3

Were any data flagged because of holding time? Yes ☐ No ☒
Were any data flagged because of preservation problems? Yes ☐ No ☒

<u>Describe Any Actions Taken:</u>

No actions were required.

Comments:

Qualification of data was not warranted.

2. Instrument Calibration

Was the Tune analysis performed? Yes ☒ No ☐
Were the peak widths and resolution of the masses within the required control limits? Yes ☒ No ☐
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions? Yes ☒ No ☐
Was the Instrument successfully calibrated at the correct frequency? Yes ☒ No ☐
Was the Instrument calibrated with appropriate standards and blanks? Yes ☒ No ☐
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed? Yes ☒ No ☐
Were ICV and CCV results within the control window? Yes ☒ No ☐
Were any data flagged because of calibration problems? Yes ☐ No ☒

Describe Any Actions Taken:

No actions were required.

Comments:

Qualification of data was not warranted. Calibrations were within method acceptance criteria of 90% - 110% for metals and 85% - 115% for mercury.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed? Yes ☒ No ☐
Were ICBs and CCBs within the control window? Yes ☒ No ☐
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch? Yes ☒ No ☐
Were MBs within the control window? Yes ☐ No ☒
Were any data flagged because of blank problems? Yes ☐ No ☒

Describe Any Actions Taken:

No actions were required.

Comments:

The MB analyzed on 2/2/24, at 9:48 contained a detection for lead of 0.86 mg/kg. As stated in the “National Functional Guidelines for Inorganic Superfund Methods Data Review,” (US EPA, November 2020), when an MB is ≥ the quantitation limit (QL), sample results may be flagged “J+” or “R.” Based on Environmental Standards’ professional judgment, when these

circumstances occur, data are flagged “J+” only when the analyte is < 10× the detected MB result. The MB detection was ≥ QL and all samples were ≥ 10× the detected MB result; therefore, qualification of data was not warranted.

The quantitation limit (QL) referenced in “National Functional Guidelines for Inorganic Superfund Methods Data Review,” (US EPA, November 2020) is equivalent to the RL in the QAPP (June 2023).

4. Interference Check Samples

Were ICP/MS Interference Check Samples (ICS) within the control limits? Yes ☒ No ☐
Were any data flagged because of ICS problems? Yes ☐ No ☒

Describe Any Actions Taken:

No actions were required.

Comments:

Information provided in the data package(s) was insufficient to permit assessment of the potential for molecular or other interferences or the adequacy of corrections for such interferences. The fact that the analysis was performed with an instrument that includes collision cell technology reduces the likelihood of significant interference if one or more of the potentially interfering elements were present. The data user should consider this information when determining the ultimate use of the reported results.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?
Yes ☒ No ☐
What was the LCS prepared from a second source? Yes ☒ No ☐
Were LCS results within the control window (80-120%)? Yes ☒ No ☐
Were any data flagged because of LCS problems? Yes ☐ No ☒

Describe Any Actions Taken:

No actions were required.

Comments:

Qualification of data was not warranted.

6. Laboratory Reporting Limit Standards

Were RL standards analyzed at the beginning and end of each analytical batch?

Yes ☒ No ☐
Were RL standard results within the control window (70-130%)? Yes ☒ No ☐
Were any data flagged because of RL standard results problems? Yes ☐ No ☒

Describe Any Actions Taken:

No actions were required.

Comments:

Qualification of data was not warranted.

7. Laboratory Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?
Yes ☒ No ☐
Were LDS results within the control window (relative percent difference [RPD] < 20%)?
Yes ☒ No ☐
Were any data flagged because of LDS problems? Yes ☐ No ☒

Describe Any Actions Taken:

No actions were required.

Comments:

Qualification of data was not warranted.

8. Matrix Spike/Matrix Spike Duplicate/Post Digestion Spike Sample Results

Were LMS analyzed at the frequency of 1 per batch? Yes ☒ No ☐
Were LMS percent recovery (%R) results within the control window (75-125%)? Yes ☒ No ☐
Were any data flagged because of LMS problems? Yes ☐ No ☒
Was a Post Digestion Spike (PDS) performed? Yes ☐ No ☒
Were PDS percent recovery (%R) results within the control window (75-125%)? Yes ☐ No ☐ N/A ☒
Were any data flagged because of PDS problems? Yes ☐ No ☐ N/A ☒

Describe Any Actions Taken:

No actions were required.

Comments:

The laboratory did not perform PDS analysis for preparation batch 930077. As stated in SW-846

Method 6020B, Section 9.13, the PDS is only required if less than acceptable bias and precision data are generated for the LMS/LMSD. Qualification of data was not warranted.

9. ICP/MS Serial Dilutions

Were ICP/MS Serial Dilutions (SD) analyzed at the frequency of 1 per batch? Yes ☒ No ☐
Were SD percent differences (%D) results within the control window? Yes ☒ No ☐
Were any data flagged because of SD problems? Yes ☐ No ☒

Describe Any Actions Taken:

No actions were required.

Comments:

The SD analysis was within the method acceptance criteria; the percent difference was ≤ 25% when the original undiluted concentration was greater than 50× the MDL. The SD analysis was not evaluated when the original undiluted concentrations were less than or equal to 50× the MDL. Qualification of data was not warranted.

10. Internal Standards

Were internal standards added to each sample in the analytical batch? Yes ☒ No ☐
Were the percent relative recoveries (%RI) within the control window (60-125%)? Yes ☒ No ☐
Were any data flagged because of internal standard problems? Yes ☐ No ☒

Describe Any Actions Taken:

No actions were required.

Comments:

Qualification of data was not warranted.

11. Field Duplicates

Were field duplicates submitted as specified in the Field Sampling Plan (FSP)?
Yes ☐ No ☐ N/A ☒
Were the field duplicates within the control window (RPD > 35%)? Yes ☐ No ☐ N/A ☒
Were any data qualified because of field duplicate problems? Yes ☐ No ☐ N/A ☒

Describe Any Actions Taken:

No actions were required.

Comments:

Qualification of data was not warranted.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Yes ☐ No ☒

Comments:

- Reported positive results between the MDL and the RL should be considered estimated and have been flagged “J” in the qualified EDD. It is appropriate to note that sample results qualified as estimated “J” by the laboratory because the reported result is between the MDL and RL, values are considered enforcement-quality data if no other qualifiers were required during validation.

Complete support documentation for this inorganic QA review is presented in Section 4 of this report. The cover sheet for this section is a checklist of all QA procedures required by the protocol and examined in this data review.

The analytical data completeness (defined as the percentage of usable data) for the samples included in this QA review is 100%.

13. Authorization of Data Validation

Report prepared by: Laken A. Delaney, Quality Assurance Chemist
Report reviewed by: Joelle D. Manners, Project Quality Assurance Chemist
Report approved by: Lester J. Dupes, CEAC, Associate Chemist
Report approved by: Rock J. Vitale, CEAC, Technical Director of Chemistry/Senior Principal
Date: 2/13/24

SECTION 3 DATA VALIDATION QUALIFIER DEFINITIONS

U	The result is qualified as non-detect due to the detection of the analyte in an associated QC blank.
J	The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample. This will also include results reported between the MDL and RL.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was not detected above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
No Flag	Result accepted without qualification.

RMAP REASON CODES

1	Holding time violation
2	Method blank contamination
3	Surrogate recovery
4	Matrix spike/matrix spike duplicate recovery
5	Matrix spike/matrix spike duplicate precision outside limits
6	Laboratory control sample recovery
7	Field blank contamination
8	Field duplicate precision outside limits
9	Other deficiencies (including cooler temperature)
A	Absence of supporting QC
S	ICV, CCV, or column performance check problem
Y	Initial and continuing calibration blank problem
M	Interference check samples problem
O	Post-digestion spike outside of 75-125%
F	MSA correlation coefficient < 0.995, or MSA not done
G	Serial dilution problem
K	DFTPP or BFB tuning problem
Q	Initial calibration problem
X	Internal standard recovery problem
V	Second-source standard calibration verification problem
L	Low bias
Z	Retention time problem
N	Counting time error (radionuclide chemistry)
W	Detector instability (radionuclide chemistry)
C	Co-elution of compounds
E	Value exceeds linear calibration range
I	Interferences present during analysis
T	Trace-level compound, poor quantitation
P	1C/2C precision outside of limits
B	LCS/LCSD precision outside limits
D	Lab Dup/Rep precision outside limits
H	High Bias

SECTION 4

INORGANIC DATA SUPPORT DOCUMENTATION

ENVIRONMENTAL® STANDARDS
Montrose Environmental Group

INORGANIC ANALYSIS SUPPORT DOCUMENTATION

Client Name:	Atlantic Richfield	EnvStd Project Manager:	Lester Dupes
Site/Project Name:	2023 Parks and Playgrounds Quality Assurance	Reviewed by:	Laken Delaney
Project Number/Task:	Stage 4	Approved by:	Joelle D. Manners
Laboratory/Location:	Pace Minneapolis	Completion Date:	2/13/24
SDG:	10682249	Validation Level:	4
Sample Collection Dates:	1/22/24		

The following table indicates criteria that were examined, the identified problems, and support documentation attachments.

	Criteria Examined in Detail							**Problems Identified**						
	Note: All items examined have been included in the Support Document unless otherwise noted.													
	Check (√) if Yes or Footnote Letter for Comments Below													
Parameter/ Method	Metals	Mercury						Metals	Mercury					
Condition upon Receipt	√	√												
Sample Preservation	√	√												
Holding Times	√	√												
Blank Analysis Results	√	√												
Laboratory Control Sample	√	√												
Matrix Spike (Pre-Digestion Spike)	√	√												
Laboratory Duplicate	√	√												
Field Duplicate														
Total *vs.* Dissolved Results Comparison														
Sample Preparation	√	√												
Mass Tuning	√													
Initial Calibrations	√	√												
Continuing Calibrations	√	√												
Detection Limit/Reporting Limit Standards	√	√												
Negative Bias	√	√												
Interference Checks	√													
Post-Digestion Spike														
Serial Dilution	√													
Analytical Sequence	√	√												
Linear Range Analysis														
Interelement Correction Factors														
Detection Limit/Sensitivity	√	√												
Dilutions	√	√												
Internal Standard Performance	√													
Quantitation of Results	√	√												
Multiple Exposures %RSD	√	√												
Percent Solids		√												
Deliverable was Complete	√	√												
Other:														

Comments: Quantitation of Results and Multiple Exposures are not included in the Support Documentation unless a problem was identified.

ENVIRONMENTAL® STANDARDS
Montrose Environmental Group

BLANK ANALYSIS RESULTS

Fraction[1]	Matrix[2]	Blank Type[3]	Blank Sample Number	Contaminant	Concentration	Units[4]	Qualification limit (5×)	Qualification limit (10×)
M	S	MB	4879783	Lead	0.86	mg/kg	4.3	8.6

1 - M = Metal; G = General Chemistry; V = Volatile; S = Semivolatile; P = Pesticide/PCB; O = Other:
2 - Aq = Aqueous; S = Solid
3 - MB = Method Blank; TB = Trip Blank; EB = Equipment Blank; FB = Field Blank;
IB = Instrument Blank; CCB = Continuing Calibration Blank; ICB = Initial Calibration Blank
4 - µg/L, mg/L, µg/kg, mg/kg

Notes: _____

SAMPLE NO.

24-RMAP-TypeB-6

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Lab Sample ID: 10682249001 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7440-38-2	Arsenic	13.1		mg/kg	1	02/02/2024 10:44
7440-43-9	Cadmium	0.47		mg/kg	1	02/02/2024 10:44
7440-50-8	Copper	22.0		mg/kg	1	02/02/2024 10:44
7439-92-1	Lead	10		mg/kg	1	02/02/2024 10:44
7440-66-6	Zinc	178		mg/kg	1	02/02/2024 10:44

SAMPLE NO.

24-RMAP-TypeB-7

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Lab Sample ID: 10682249003 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7440-38-2	Arsenic	12.9		mg/kg	1	02/02/2024 12:04
7440-43-9	Cadmium	0.31		mg/kg	1	02/02/2024 12:04
7440-50-8	Copper	21.9		mg/kg	1	02/02/2024 12:04
7439-92-1	Lead	9.9		mg/kg	1	02/02/2024 12:04
7440-66-6	Zinc	173		mg/kg	1	02/02/2024 12:04

FORM II INORGANIC-1

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Initial Calibration Verification Source: 453205

Continuing Calibration Verification Source: 453205

Concentration Units: ug/L Instrument ID: 10ICMD

	Initial Calibration Verification				Continuing Calibration Verification						
	02/02/2024 09:00				02/02/2024 09:23			02/02/2024 10:11			
Analyte	True	Found	%R	Control Limit	True	Found	%R	True	Found	%R	Control Limit
Arsenic	80	80.1	100.1	90-110	80	80.2	100.3	80	80.0	99.9	90-110
Cadmium	80	81.2	101.5	90-110	80	80.8	101.1	80	80.7	100.9	90-110
Copper	80	81.3	101.6	90-110	80	81.4	101.8	80	80.7	100.9	90-110
Lead	80	81.4	101.8	90-110	80	80.9	101.1	80	79.4	99.2	90-110
Zinc	80	81.4	101.7	90-110	80	81.6	102.0	80	81.2	101.5	90-110

Not bracketing samples; no eval

FORM II INORGANIC-2

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Initial Calibration Verification Source:

Continuing Calibration Verification Source: 453205

Concentration Units: ug/L Instrument ID: 10ICMD

	Continuing Calibration Verification									
	02/02/2024 10:56			02/02/2024 11:45			02/02/2024 12:17			Control Limit
Analyte	True	Found	%R	True	Found	%R	True	Found	%R	
Arsenic	80	81.4	101.7	80	81.2	101.5	80	82.3	102.9	90-110
Cadmium	80	82.5	103.2	80	82.0	102.5	80	84.7	105.9	90-110
Copper	80	81.9	102.3	80	82.6	103.2	80	84.0	105.0	90-110
Lead	80	80.4	100.5	80	80.1	100.1	80	81.8	102.2	90-110
Zinc	80	81.7	102.1	80	83.3	104.1	80	84.5	105.7	90-110

FORM II INORGANIC-3

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Initial Calibration Verification Source:

Continuing Calibration Verification Source: 453205

Concentration Units: ug/L Instrument ID: 10ICMD

	Continuing Calibration Verification			
	02/02/2024 12:43			Control Limit
Analyte	True	Found	%R	
Arsenic	80	76.6	95.8	90-110
Cadmium	80	74.9	93.6	90-110
Copper	80	77.1	96.4	90-110
Lead	80	73.9	92.4	90-110
Zinc	80	76.4	95.5	90-110

Not bracketing samples; no eval

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

CRDL Check Standard Source: 453681 Analysis Date/Time: 02/02/2024 09:33

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Arsenic	0.5	0.52	104.6	80-120
Cadmium	0.08	0.079	98.8	80-120
Copper	1.0	1.0	100.8	80-120
Lead	0.5	0.48	96.4	80-120
Zinc	5.0	5.3	106.1	80-120
				70-130

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

CRDL Check Standard Source: 453681 Analysis Date/Time: 02/02/2024 11:03

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Arsenic	0.5	0.54	108.6	80-120
Cadmium	0.08	0.083	103.8	80-120
Copper	1.0	1.0	103.2	80-120
Lead	0.5	0.49	97.8	80-120
Zinc	5.0	5.5	110.7	80-120

70-130

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

CRDL Check Standard Source: 453681 Analysis Date/Time: 02/02/2024 12:24

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Arsenic	0.5	0.49	98.4	80-120
Cadmium	0.08	0.085	106.2	80-120
Copper	1.0	0.95	95.3	80-120
Lead	0.5	0.46	91.6	80-120
Zinc	5.0	5.4	108.2	80-120
				70-130

FORM III INORGANIC-1

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract : BPSOU Park Sampling

Method Blank Matrix: Solid Instrument ID: 10ICMD

Method Blank Concentration Units: mg/kg

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Method Blank	
	02/02/2024 09:06	C	02/02/2024 09:26	C	02/02/2024 10:14	C	02/02/2024 11:00	C	4879783	C
Arsenic	0.12	U	0.12	U	0.12	U	0.12	U	<0.14	U
Cadmium	0.030	U	0.030	U	0.030	U	0.030	U	<0.029	U
Copper	0.35	U	0.35	U	0.35	U	0.35	U	<0.30	U
Lead	0.18	U	0.18	U	0.18	U	0.18	U	0.86	
Zinc	2.0	U	2.0	U	2.0	U	2.0	U	<1.4	U

Not bracketing samples; no eval

MB>QL
Both >10xQL; no qual

FORM III INORGANIC-2

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract : BPSOU Park Sampling

Method Blank Matrix: Instrument ID: 10ICMD

Method Blank Concentration Units:

Analyte	Initial Calibration Blank		Continuing Calibration Blank (ug/L)					
		C	02/02/2024 11:48	C	02/02/2024 12:20	C	02/02/2024 12:46	C
Arsenic			0.12	U	0.12	U	0.12	U
Cadmium			0.030	U	0.030	U	0.030	U
Copper			0.35	U	0.35	U	0.35	U
Lead			0.18	U	0.18	U	0.18	U
Zinc			2.0	U	2.0	U	2.0	U

Not bracketing samples; no eval

FORM IV INORGANIC-1
INTERFERENCE CHECK SAMPLE

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Instrument ID: 10ICMD Solution A Run Date: 02/02/2024 09:09

ICS Source: 452915,451438 Solution AB Run Date: 02/02/2024 09:13

Concentration Units: ug/L

Analyte	True		Found				
	Sol. A	Sol. AB	Sol. A	%R	Sol. AB	%R	Limits
Aluminum	25000	27500	25619.921	102.5	29138.43	106	80-120
Arsenic		100	0.016		105.554	105.6	80-120
Cadmium		100	-0.011		104.531	104.5	80-120
Calcium	25000	27500	24825.83	99.3	28627.531	104.1	80-120
Copper		100	0.046		106.818	106.8	80-120
Iron	25000	26250	25571.07	102.3	27730.963	105.6	80-120
Lead		100	0.015		105.968	106	80-120
Magnesium	25000	27500	25521.068	102.1	29306.233	106.6	80-120
Molybdenum	500	600	504.631	100.9	630.965	105.2	80-120
Potassium	25000	27500	25377.48	101.5	28959.662	105.3	80-120
Sodium	25000	27500	25623.499	102.5	29004.189	105.5	80-120
Titanium	500	600	475.368	95.1	605.893	101	80-120
Zinc		100	0.665		106.062	106.1	80-120

85-115

SAMPLE NO.

4879785MS

FORM V INORGANIC-1

MATRIX SPIKE SAMPLE RECOVERY

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid Basis: Wet Parent Sample ID: 24-RMAP-TypeB-6

Percent Moisture:

Analyte	Units	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R
Arsenic	mg/kg	75-125	64.2	13.1	48.6	105
Cadmium	mg/kg	75-125	53.4	0.47	48.6	109
Copper	mg/kg	75-125	74.8	22.0	48.6	109
Lead	mg/kg	75-125	60.5	10	48.6	104
Zinc	mg/kg	75-125	231	178	48.6	109

SAMPLE NO.

4879786MSD

FORM V INORGANIC-2

MATRIX SPIKE SAMPLE RECOVERY

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid Basis: Wet Parent Sample ID: 24-RMAP-TypeB-6

Percent Moisture:

Analyte	Units	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R
Arsenic	mg/kg	75-125	65.5	13.1	50.0	105
Cadmium	mg/kg	75-125	54.9	0.47	50.0	109
Copper	mg/kg	75-125	75.6	22.0	50.0	107
Lead	mg/kg	75-125	62.2	10	50.0	105
Zinc	mg/kg	75-125	235	178	50.0	114

SAMPLE NO.

4879786MSD

FORM VI INORGANIC-1
DUPLICATES

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid Concentration Units: mg/kg

Percent Moisture: _____ Basis: Wet

Analyte	RPD Control Limit	Sample	Duplicate	RPD
Arsenic	20	64.2	65.5	2
Cadmium	20	53.4	54.9	3
Copper	20	74.8	75.6	1
Lead	20	60.5	62.2	3
Zinc	20	231	235	2

SAMPLE NO.

4879787DUP

FORM VI INORGANIC-2
DUPLICATES

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid Concentration Units: mg/kg

Percent Moisture: Basis: Wet

Analyte	RPD Control Limit	Sample	Duplicate	RPD
Arsenic	20	13.1	13.3	1
Cadmium	20	0.47	0.41	14
Copper	20	22.0	22.3	2
Lead	20	10	10.1	1
Zinc	20	178	181	2

SAMPLE NO.

4879784LCS

FORM VII INORGANIC-1
LABORATORY CONTROL SAMPLE

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid

Analyte	Units	True	Found	%R	Limits	
Arsenic	mg/kg	49.8	50.4	101	80	120
Cadmium	mg/kg	49.8	51.2	103	80	120
Copper	mg/kg	49.8	54.2	109	80	120
Lead	mg/kg	49.8	51.7	104	80	120
Zinc	mg/kg	49.8	53.6	108	80	120

SAMPLE NO.

4880572SD

FORM VIII INORGANIC-1
SERIAL DILUTIONS

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid Parent Sample ID: 24-RMAP-TypeB-6

Analyte	Units	Initial Sample Result	Serial Dilution Result	% Difference	Control Limit %D
Arsenic	ug/L	13.4	14.3U		10
Cadmium	ug/L	0.59U	2.9U		10
Copper	ug/L	22.6	30.6U		10
Lead	ug/L	10.3	17.4U		10
Zinc	ug/L	183	191J	4.7	10

25

* Indicates that the % Difference exceeds the control limit.
No difference is calculated if either result is a non-detect.

02/08/2024 11:29

FORM IX INORGANIC-1
INSTRUMENT DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Preparation Method: None Instrument ID: 10ICMD

Concentration Units: ug/L

Analyte	PQL	IDL	IDL Date
Arsenic	0.50	0.12	12/12/2023
Cadmium	0.080	0.030	12/12/2023
Copper	1.0	0.35	12/12/2023
Lead	0.50	0.18	12/12/2023
Zinc	5.0	2.0	12/12/2023

FORM IX INORGANIC-2
METHOD DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Preparation Method: EPA 3050B Instrument ID: 10ICMD

Concentration Units: mg/kg

Analyte	PQL	MDL	MDL Date
Arsenic	0.50	0.14	08/28/2023
Cadmium	0.080	0.029	08/28/2023
Copper	1.0	0.31	08/28/2023
Lead	0.50	0.17	08/28/2023
Zinc	5.0	1.4	08/28/2023

FORM XI - INORGANIC-1
LINEAR DYNAMIC RANGES

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract : BPSOU Park Sampling

Instrument ID: 10ICMD Effective Date: 05/25/2023

Analyte	Concentration (ug/L)
Arsenic	450
Cadmium	450
Copper	450
Lead	450
Zinc	450

FORM XII INORGANIC-1
PREPARATION LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Preparation Method: EPA 3050B Batch: MPRP 141697

Lab Sample ID	Sample Name	Preparation Date	Initial Weight (g)	Final Volume (mL)
4879783	4879783	02/01/2024	1.005	50
4879784	4879784	02/01/2024	1.005	50
4879785	4879785	02/01/2024	1.029	50
4879786	4879786	02/01/2024	1.001	50
4879787	4879787	02/01/2024	1.028	50
10682249001	24-RMAP-TypeB-6	02/01/2024	1.028	50
10682249003	24-RMAP-TypeB-7	02/01/2024	1.004	50

FORM XIII INORGANIC-1
ANALYSIS RUN LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Instrument ID: 10ICMD Analysis Method: EPA 6020B

Start Date: 02/02/2024 08:21 End Date: 02/02/2024 12:46

Sample Name	Lab Sample ID	D/F	Date	Time	As	Cd	Cu	Pb	Zn
34438082CAL0	34438082CAL0	1	02/02/2024	08:21	X	X	X	X	X
34436935CAL2	34436935CAL2	1	02/02/2024	08:28	X	X	X	X	X
34436936CAL3	34436936CAL3	1	02/02/2024	08:31	X	X	X	X	X
34438085CAL1	34438085CAL1	1	02/02/2024	08:38	X	X	X	X	X
34436938CAL4	34436938CAL4	1	02/02/2024	08:41	X	X	X	X	X
34436939CAL5	34436939CAL5	1	02/02/2024	08:45	X	X	X	X	X
34436940CAL6	34436940CAL6	1	02/02/2024	08:48	X	X	X	X	X
34436941CAL7	34436941CAL7	1	02/02/2024	08:51	X	X	X	X	X
34410332ICV	34410332ICV	1	02/02/2024	09:00	X	X	X	X	X
34410333ICB	34410333ICB	1	02/02/2024	09:06	X	X	X	X	X
34410334ICSA	34410334ICSA	1	02/02/2024	09:09	X	X	X	X	X
34410335ICSAB	34410335ICSAB	1	02/02/2024	09:13	X	X	X	X	X
34410336CCV	34410336CCV	1	02/02/2024	09:23	X	X	X	X	X
34410337CCB	34410337CCB	1	02/02/2024	09:26	X	X	X	X	X
34410338CRDL	34410338CRDL	1	02/02/2024	09:33	X	X	X	X	X
4879783BLANK	4879783	1	02/02/2024	09:48	X	X	X	X	X
4879784LCS	4879784	1	02/02/2024	09:51	X	X	X	X	X
34410340CCV	34410340CCV	1	02/02/2024	10:11	X	X	X	X	X
34410341CCB	34410341CCB	1	02/02/2024	10:14	X	X	X	X	X
24-RMAP-TypeB-6	10682249001	1	02/02/2024	10:44	X	X	X	X	X
34410345CCV	34410345CCV	1	02/02/2024	10:56	X	X	X	X	X
34410346CCB	34410346CCB	1	02/02/2024	11:00	X	X	X	X	X
34410347CRDL	34410347CRDL	1	02/02/2024	11:03	X	X	X	X	X
4880572SD	4880572	5	02/02/2024	11:13	X	X	X	X	X
4879787DUP	4879787	1	02/02/2024	11:19	X	X	X	X	X
4879785MS	4879785	1	02/02/2024	11:26	X	X	X	X	X
4879786MSD	4879786	1	02/02/2024	11:32	X	X	X	X	X
34410356CCV	34410356CCV	1	02/02/2024	11:45	X	X	X	X	X
34410357CCB	34410357CCB	1	02/02/2024	11:48	X	X	X	X	X
24-RMAP-TypeB-7	10682249003	1	02/02/2024	12:04	X	X	X	X	X
34410372CCV	34410372CCV	1	02/02/2024	12:17	X	X	X	X	X
34410373CCB	34410373CCB	1	02/02/2024	12:20	X	X	X	X	X
34410374CRDL	34410374CRDL	1	02/02/2024	12:24	X	X	X	X	X
34410375CCV	34410375CCV	1	02/02/2024	12:43	X	X	X	X	X
34410376CCB	34410376CCB	1	02/02/2024	12:46	X	X	X	X	X

US EPA 200.8/6020 Tune Check Report

Acq/Data Batch	D:\Agilent\ICPMH\1\DATA\020224.b
Report Comment	ICMD IMB
Instrument Name	G8403A SG19374593

[He]

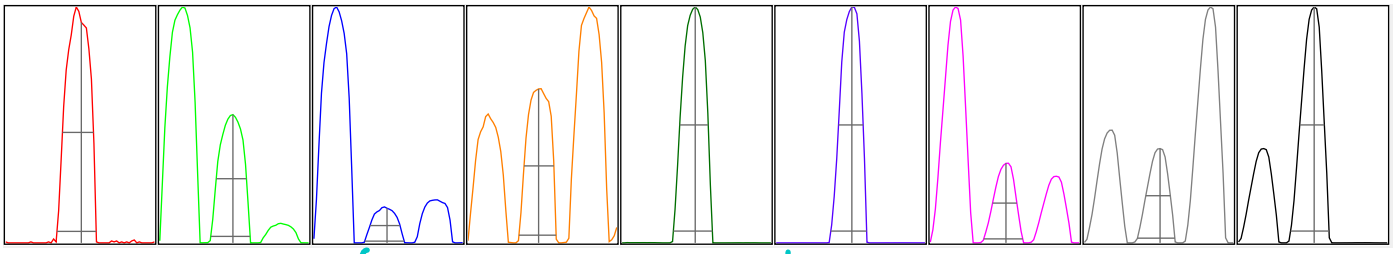
Sensitivity

Mass	Count	RSD%	RSD%(Rqd)	RSD%(Flag)
9	28	4.131	5.000	
24	312	1.133	5.000	
25	46	2.138	5.000	
26	57	1.566	5.000	
59	5258	0.700	5.000	
115	7364	0.587	5.000	
206	3919	0.637	5.000	
207	3282	0.616	5.000	
208	8254	0.373	5.000	

Rep#1 Count	Rep#2 Count	Rep#3 Count	Rep#4 Count	Rep#5 Count
27	28	26	28	29
314	313	314	311	306
46	46	48	45	46
56	58	57	57	57
5288	5230	5296	5265	5210
7404	7357	7405	7300	7354
3890	3913	3950	3940	3903
3269	3266	3316	3285	3273
8206	8259	8282	8278	8244

Integration Time [sec] 0.1

Resolution/Axis



Mass	Peak Height	Axis	Axis (Required)	Axis (Flag)	W-5%	W-5% (Required)	W-5% (Flag)
9	45.70	9.05	8.90 - 9.10		0.778	0.900	
24	547.61	24.00	23.90 - 24.10		0.782	0.900	
25	80.35	25.00	24.90 - 25.10		0.784	0.900	
26	99.71	25.95	25.90 - 26.10		0.738	0.900	
59	9642.49	59.00	58.90 - 59.10		0.774	0.900	
115	15164.69	115.05	114.90 - 115.10		0.711	0.900	
206	8098.56	206.05	205.90 - 206.10		0.774	0.900	
207	6781.97	207.05	206.90 - 207.10		0.741	0.900	
208	16966.00	208.05	207.90 - 208.10		0.763	0.900	

Integration Time [sec] 0.1 Acquisition Time [sec] 212.5 Y Axis Linear

Tune Parameters

Plasma Parameters

Plasma Mode	---	Nebulizer Gas	0.78 L/min	Dilution Gas	0.15 L/min
RF Power	1600 W	Option Gas	---	Auxiliary Gas	0.90 L/min
RF Matching	1.20 V	Nebulizer Pump	0.10 rps	Plasma Gas	15.0 L/min
Sample Depth	7.0 mm	S/C Temp	2 °C		

Lens Parameters

Extract 1	0.0 V	Omega Lens	9.5 V	Deflect	0.2 V
Extract 2	-160.0 V	Cell Entrance	-40 V	Plate Bias	-60 V
Omega Bias	-70 V	Cell Exit	-70 V		

Cell Parameters

Use Gas	Yes	3rd Gas Flow	---	Energy Discrimination	3.0 V
He Flow	4.5 mL/min	OctP Bias	-18.0 V		
H2 Flow	0.0 mL/min	OctP RF	200 V		

US EPA 200.8/6020 Tune Check Report

Acq/Data Batch	D:\Agilent\ICPMH\1\DATA\020224.b
Report Comment	ICMD IMB
Instrument Name	G8403A SG19374593

[H2]

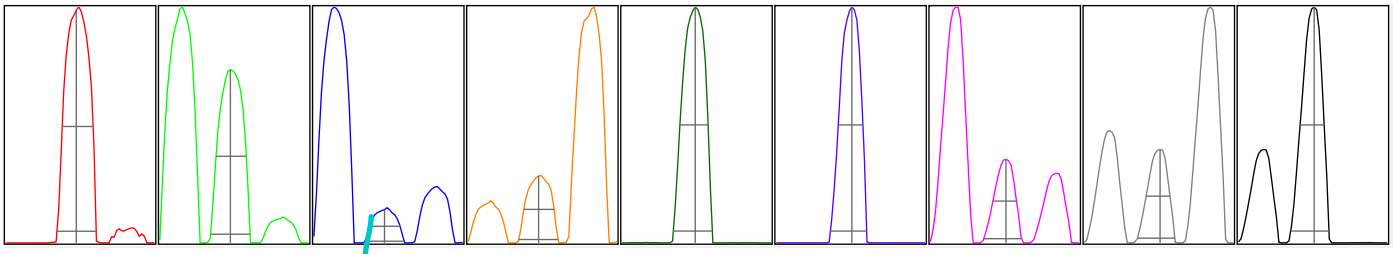
Sensitivity

Mass	Count	RSD%	RSD%(Rqd)	RSD%(Flag)
9	53	1.479	5.000	
24	272	0.692	5.000	
25	39	2.628	5.000	
26	64	3.325	5.000	
59	653	0.402	5.000	
115	1438	0.586	5.000	
206	831	0.433	5.000	
207	699	0.918	5.000	
208	1772	0.842	5.000	

Rep#1 Count	Rep#2 Count	Rep#3 Count	Rep#4 Count	Rep#5 Count
52	53	53	54	54
271	273	270	275	273
40	38	38	39	39
63	61	65	65	66
650	652	657	655	651
1438	1423	1444	1441	1443
830	831	830	828	837
697	702	689	702	706
1774	1750	1788	1782	1765

Integration Time [sec] 0.1

Resolution/Axis



Mass	Peak Height	Axis	Axis (Required)	Axis (Flag)	W-5%	W-5% (Required)	W-5% (Flag)
9	90.90	8.95	8.90 - 9.10		0.778	0.900	
24	475.79	23.95	23.90 - 24.10		0.786	0.900	
25	66.95	24.95	24.90 - 25.10		0.782	0.900	
26	112.66	25.95	25.90 - 26.10		0.782	0.900	
59	1209.24	59.00	58.90 - 59.10		0.774	0.900	
115	2969.15	115.05	114.90 - 115.10		0.719	0.900	
206	1760.77	206.05	205.90 - 206.10		0.753	0.900	
207	1465.70	207.05	206.90 - 207.10		0.740	0.900	
208	3700.98	208.05	207.90 - 208.10		0.760	0.900	

Integration Time [sec] 0.1 Acquisition Time [sec] 212.5 Y Axis Linear

Tune Parameters

Plasma Parameters

Plasma Mode	---	Nebulizer Gas	0.78 L/min	Dilution Gas	0.15 L/min
RF Power	1600 W	Option Gas	---	Auxiliary Gas	0.90 L/min
RF Matching	1.20 V	Nebulizer Pump	0.10 rps	Plasma Gas	15.0 L/min
Sample Depth	7.0 mm	S/C Temp	2 °C		

Lens Parameters

Extract 1	0.0 V	Omega Lens	9.5 V	Deflect	-0.2 V
Extract 2	-160.0 V	Cell Entrance	-40 V	Plate Bias	-60 V
Omega Bias	-70 V	Cell Exit	-70 V		

Cell Parameters

Use Gas	Yes	3rd Gas Flow	---	Energy Discrimination	3.0 V
He Flow	0.0 mL/min	OctP Bias	-18.0 V		
H2 Flow	3.5 mL/min	OctP RF	200 V		

FORM XV INORGANIC-1

INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Instrument ID: 10ICMD Start Date: 02/02/2024 08:21 End Date: 02/02/2024 12:46

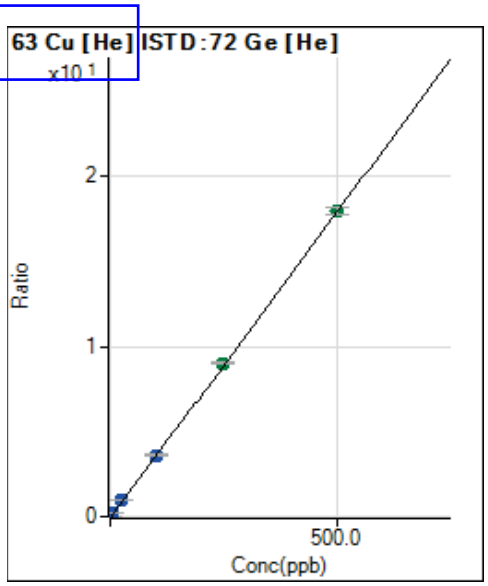
Sample Name	Time	GE-72	Ge-72-IS1	In-115	Ir-193-IS	Sc-45-IS	Sc-45-IS1	Tb-159
								60-125
34438082CAL0	08:21	100.0	100.0	100.0	100.0	100.0	100.0	100.0
34436935CAL2	08:28	104.2	103.5	102.5	101.3	103.4	101.9	101.9
34436936CAL3	08:31	105.7	106.8	104.7	100.2	104.4	105.5	103.9
34438085CAL1	08:38	103.5	103.1	101.9	96.9	102.7	101.8	99.7
34436938CAL4	08:41	108.0	111.6	104.9	102.5	105.9	108.5	104.5
34436939CAL5	08:45	106.5	117.0	104.4	102.2	105.6	111.0	105.5
34436940CAL6	08:48	106.1	125.9	102.7	101.9	105.7	116.4	105.2
34436941CAL7	08:51	106.1	140.7	103.3	99.3	106.7	124.1	106.0
34410332ICV	09:00	106.8	116.8	106.1	105.7	103.9	112.9	107.4
34410333ICB	09:06	99.4	107.1	100.3	102.5	98.2	106.2	103.6
34410334ICSA	09:09	104.9	153.1	105.6	104.4	104.7	121.6	107.7
34410335ICSAB	09:13	107.1	154.4	107.3	106.7	106.7	125.8	109.2
34410336CCV	09:23	104.8	121.9	105.6	106.3	101.6	118.3	107.7
34410337CCB	09:26	97.8	111.3	99.8	102.9	95.7	109.8	103.2
34410338CRDL	09:33	96.1	113.9	99.1	100.5	93.5	110.9	101.3
4879783	09:48	96.6	111.5	100.2	101.3	94.5	110.9	101.6
4879784	09:51	101.2	121.7	101.7	101.9	98.8	118.7	104.2
34410340CCV	10:11	109.6	132.9	109.5	111.2	105.8	127.5	111.5
34410341CCB	10:14	102.3	120.3	104.7	106.8	99.6	118.2	107.4
24-RMAP-TypeB-6	10:44	91.2	130.5	93.2	101.1	87.2	112.8	98.7
34410345CCV	10:56	94.3	120.1	91.3	94.1	88.2	113.2	93.8
34410346CCB	11:00	88.4	110.4	87.4	89.0	83.6	106.3	89.2
34410347CRDL	11:03	86.7	109.6	85.9	87.8	81.5	105.3	87.4
4880572	11:13	92.5	119.3	93.5	99.6	88.0	113.4	97.8
4879787	11:19	87.3	126.4	88.9	95.2	83.6	111.5	95.2
4879785	11:26	86.5	127.6	87.1	94.6	82.7	110.8	93.6
4879786	11:32	85.1	126.2	86.4	94.0	81.2	109.9	92.3
34410356CCV	11:45	88.1	112.9	90.7	95.6	82.8	108.8	94.5
34410357CCB	11:48	83.9	104.1	87.9	93.7	79.4	101.5	91.9
24-RMAP-TypeB-7	12:04	83.4	122.3	85.2	93.4	79.4	108.7	91.5
34410372CCV	12:17	90.8	114.7	92.3	97.9	84.0	109.4	96.3
34410373CCB	12:20	85.8	107.7	88.3	96.0	80.6	104.7	93.4
34410374CRDL	12:24	87.3	110.2	92.4	97.8	82.9	107.0	95.9
34410375CCV	12:43	91.0	111.5	91.7	94.2	88.3	109.0	94.6
34410376CCB	12:46	87.3	105.1	88.2	92.2	84.4	104.9	91.9

Calibration for 018_ICV.d

Batch Folder: D:\Agilent\ICPMH\1\DATA\020224.b\
Analysis File: 020224.batch.bin
DA Date-Time: 2/2/2024 13:59:30
Calibration Title:
Calibration Method: External Calibration
VIS Interpolation Fit:

Level	Standard Data File	Sample Name	Acq. Date-Time
1	008CALB.d	CAL0	2/2/2024 08:21:28
2	012CALS.d	CAL1	2/2/2024 08:38:21
3	010CALS.d	CAL2	2/2/2024 08:28:29
4	011CALS.d	CAL3	2/2/2024 08:31:59
5	013CALS.d	CAL4	2/2/2024 08:41:50
6	014CALS.d	CAL5	2/2/2024 08:45:13
7	015CALS.d	CAL6	2/2/2024 08:48:26
8	016CALS.d	CAL7	2/2/2024 08:51:38

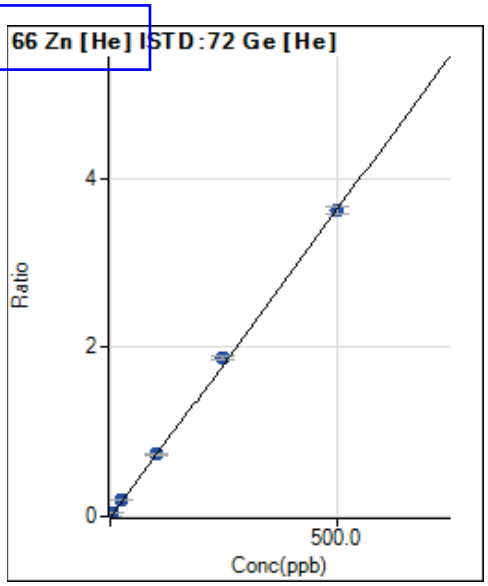
Calibration for 018_ICV.d



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	1504.750	0.0090	P	2.0	
2	☐	1.000	1.015	7852.857	0.0455	P	2.7	1.5
3	☐	5.000	5.074	33237.517	0.1913	P	1.0	1.5
4	☐	25.000	25.910	165655.850	0.9396	P	1.2	3.6
5	☐	100.000	100.247	650173.980	3.6096	P	2.1	0.2
6	☐	250.000	250.875	1602578.877	9.0198	A	1.5	0.3
7	☐	500.000	499.467	3174527.000	17.9485	A	1.9	-0.1
8	☐			4975.553	0.0281	P	1.0	

y = 0.0359 * x + 0.0090
R = 1.0000
DL = 0.01532 ppb
BEC = 0.2512 ppb

Weight: <None>
Min Conc: <None>

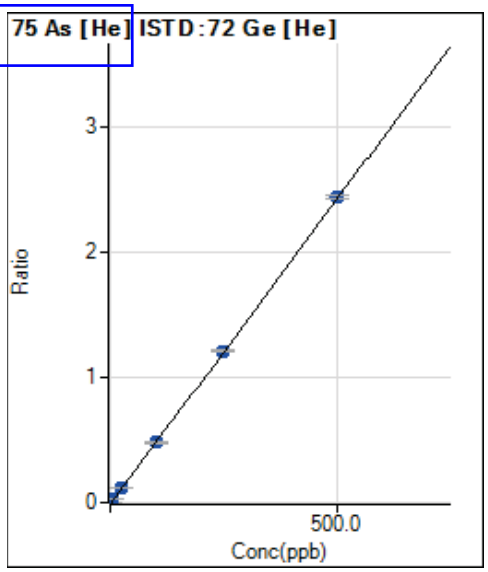


	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	420.010	0.0025	P	5.1	
2	☐	5.000	5.219	7001.087	0.0406	P	2.0	4.4
3	☐	5.000	5.287	7133.147	0.0411	P	0.6	5.7
4	☐	25.000	25.758	33538.987	0.1902	P	1.9	3.0
5	☐	100.000	100.765	132718.850	0.7369	P	1.8	0.8
6	☐	250.000	256.926	333134.960	1.8749	P	1.3	2.8
7	☐	500.000	496.341	640197.813	3.6197	P	1.9	-0.7
8	☐			1924.137	0.0109	P	3.6	

y = 0.0073 * x + 0.0025
R = 0.9999
DL = 0.05242 ppb
BEC = 0.3456 ppb

Weight: <None>
Min Conc: <None>

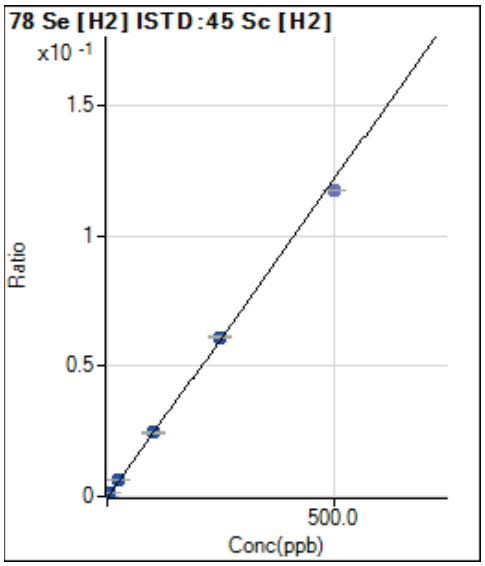
Calibration for 018_ICV.d



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	39.333	0.0002	P	12.6	
2	☐	0.500	0.506	466.010	0.0027	P	4.1	1.1
3	☐	5.000	5.006	4278.483	0.0246	P	1.5	0.1
4	☐	25.000	25.244	21721.703	0.1232	P	1.0	1.0
5	☐	100.000	98.874	86798.643	0.4819	P	2.0	-1.1
6	☐	250.000	248.319	214975.727	1.2099	P	1.5	-0.7
7	☐	500.000	501.053	431745.780	2.4411	P	1.6	0.2
8	☐			281.167	0.0016	P	11.8	

y = 0.0049 * x + 2.3595E-004
R = 1.0000
DL = 0.01833 ppb
BEC = 0.04844 ppb

Weight: <None>
Min Conc: <None>

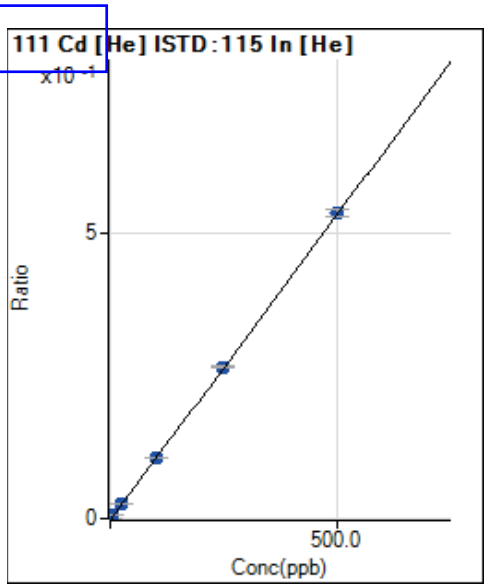


	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	1.000	0.0000	P	100.	
2	☐	0.500	0.614	23.333	0.0002	P	17.4	22.8
3	☐	5.000	5.172	189.333	0.0013	P	7.0	3.4
4	☐	25.000	25.195	950.697	0.0062	P	0.7	0.8
5	☐	100.000	100.151	3882.540	0.0245	P	3.0	0.2
6	☐	250.000	249.917	9910.170	0.0610	P	1.1	0.0
7	☑	500.000		19974.847	0.1174	P	0.3	
8	☐			69.667	0.0004	P	5.7	

y = 2.4425E-004 * x + 6.8321E-006
R = 1.0000
DL = 0.08412 ppb
BEC = 0.02797 ppb

Weight: <None>
Min Conc: <None>

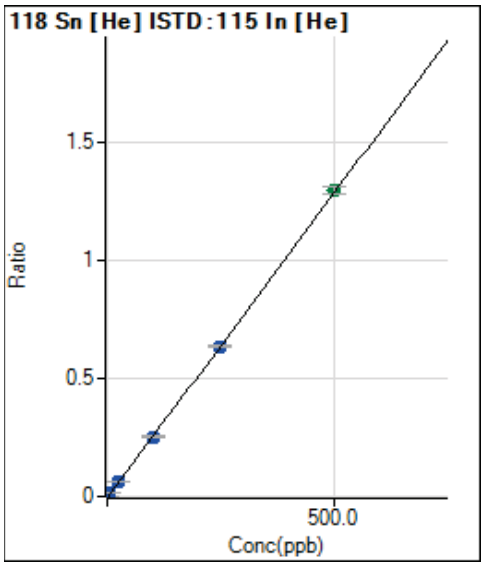
Calibration for 018_ICV.d



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	6.660	0.0000	P	86.7	
2	☐	0.080	0.082	166.493	0.0001	P	43.5	2.1
3	☐	5.000	5.136	10118.963	0.0055	P	2.1	2.7
4	☐	25.000	24.714	49685.357	0.0265	P	2.0	-1.1
5	☐	100.000	99.927	201228.257	0.1070	P	2.0	-0.1
6	☐	250.000	248.708	498570.220	0.2662	P	1.4	-0.5
7	☐	500.000	500.673	986600.393	0.5360	P	2.2	0.1
8	☐			119.750	0.0001	P	22.2	

y = 0.0011 * x + 3.7030E-006
R = 1.0000
DL = 0.009002 ppb
BEC = 0.003459 ppb

Weight: <None>
Min Conc: <None>

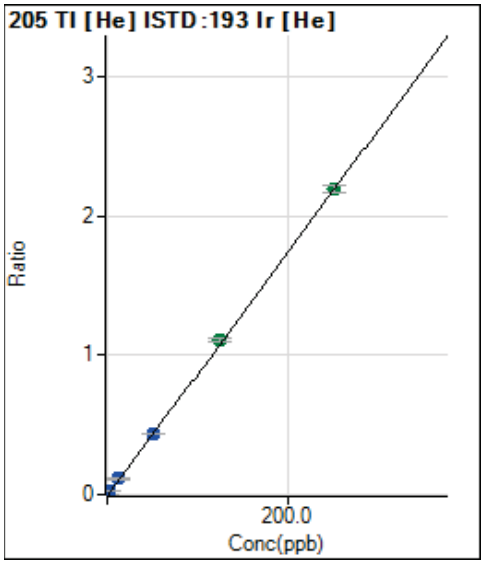


	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	840.043	0.0005	P	36.9	
2	☐	0.500	0.547	3432.130	0.0019	P	5.5	9.3
3	☐	5.000	4.712	23228.167	0.0126	P	2.5	-5.8
4	☐	25.000	24.524	119737.470	0.0638	P	2.4	-1.9
5	☐	100.000	97.746	475464.877	0.2528	P	2.6	-2.3
6	☐	250.000	246.442	1192011.727	0.6365	P	1.6	-1.4
7	☐	500.000	502.257	2387416.633	1.2968	A	1.9	0.5
8	☐			1966.867	0.0011	P	20.8	

y = 0.0026 * x + 4.6838E-004
R = 1.0000
DL = 0.2007 ppb
BEC = 0.1815 ppb

Weight: <None>
Min Conc: <None>

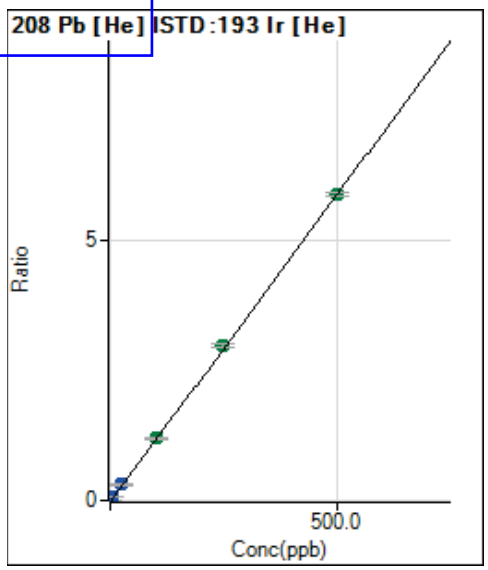
Calibration for 018_ICV.d



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	473.347	0.0002	P	5.8	
2	☐	0.100	0.099	2745.317	0.0011	P	5.6	-0.5
3	☐	2.500	2.411	58448.270	0.0214	P	0.9	-3.6
4	☐	12.500	12.765	304063.530	0.1126	P	2.0	2.1
5	☐	50.000	49.706	1209940.400	0.4380	P	2.1	-0.6
6	☐	125.000	126.461	3067957.873	1.1142	A	2.6	1.2
7	☐	250.000	249.316	6029501.370	2.1964	A	2.0	-0.3
8	☐			1130.060	0.0004	P	7.9	

y = 0.0088 * x + 1.7560E-004
R = 1.0000
DL = 0.003461 ppb
BEC = 0.01993 ppb

Weight: <None>
Min Conc: <None>



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	3261.857	0.0012	P	5.1	
2	☐	0.500	0.479	17906.703	0.0069	P	2.8	-4.3
3	☐	5.000	4.882	160630.837	0.0588	P	1.4	-2.4
4	☐	25.000	25.496	815921.177	0.3022	P	1.1	2.0
5	☐	100.000	100.801	3290369.430	1.1913	A	1.3	0.8
6	☐	250.000	253.043	8230042.220	2.9887	A	2.0	1.2
7	☐	500.000	498.295	16154376.003	5.8842	A	1.4	-0.3
8	☐			12946.000	0.0048	P	1.4	

y = 0.0118 * x + 0.0012
R = 1.0000
DL = 0.01572 ppb
BEC = 0.1025 ppb

Weight: <None>
Min Conc: <None>

Prep Log Report

Batch Information: MPRP 930077 6020BS_P

3050B | ICP_ICPMS Soil

Prep Method	EPA 3050B	Analysis Method	EPA 6020B	Prepared By	SMB	Instrument	10BL04
Block ID	10MET55	Thermometer ID	221739845	Correction Factor (C)	-0.2	Block Temp (C)	93.5
Corrected Temp. (C)	93.30	Digestion Start Date/Time	02/01/2024 13:53:59:608	Digestion End Date/Time	02/01/2024 15:56:54:475	Block End Temp (C)	90.4
Corrected End Temp. (C)	90.20	Digestion Vessel	451062	Resin Pellets Solid Matrix	417697	Metals Pipette 1	Q896
Metals Pipette 2		Dispenser ID 1	Q943	Dispenser ID 2	Q452	Dispenser ID 3	Q897
Reviewed By	MT2	Reviewed By Date	02/02/2024 08:45	Batch Notes	WEIGH BY NJ1		

Sample Information:

QC Rule	Sample Type	Lab Sample ID	Matrix	Initial Weight (g)	Conc. HNO3 (L)	H2O2 (L)	Conc. HCL (L)	Final Volume (mL)	Sample Notes	Hg-SPK (mL)	METALS-STK1 (mL)	METALS-STK2 (mL)
6020BS_P	BLANK	**4879783**	Solid	1.005	444571 (7.5)	432974 (2.5)	448106 (5)	50				
6020BS_P	LCS	**4879784**	Solid	1.005	444571 (7.5)	432974 (2.5)	448106 (5)	50		447060 (0.5)	441002 (.5)	428419 (.5)
6020BS_P	PS	**10682249001**	Solid	1.028	444571 (7.5)	432974 (2.5)	448106 (5)	50				
6020BS_P	DUP	**4879787**	Solid	1.028	444571 (7.5)	432974 (2.5)	448106 (5)	50				
6020BS_P	MS	**4879785**	Solid	1.029	444571 (7.5)	432974 (2.5)	448106 (5)	50		447060 (0.5)	441002 (.5)	428419 (.5)
6020BS_P	MSD	**4879786**	Solid	1.001	444571 (7.5)	432974 (2.5)	448106 (5)	50		447060 (0.5)	441002 (.5)	428419 (.5)
6020BS_P	PS	**10682249003**	Solid	1.004	444571 (7.5)	432974 (2.5)	448106 (5)	50				

Standard Notes:

428419: ZPACEMN-106

441002: ZPACEMN-116 (MIX 1)

447060: Intermediate Spike for ICPMS Soil

SAMPLE NO.

24-RMAP-TypeB-6

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Lab Sample ID: 10682249002 Percent Moisture: 4.4

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7439-97-6	Mercury	0.015	J	mg/kg	1	02/06/2024 14:39

SAMPLE NO.

24-RMAP-TypeB-7

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Lab Sample ID: 10682249004 Percent Moisture: 4.8

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7439-97-6	Mercury	0.013	J	mg/kg	1	02/06/2024 14:46

FORM II INORGANIC-1

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Initial Calibration Verification Source: 453947

Continuing Calibration Verification Source: 453947

Concentration Units: ug/L Instrument ID: 10HG09

	Initial Calibration Verification				Continuing Calibration Verification						
	02/06/2024 11:02				02/06/2024 11:33			02/06/2024 14:21			
Analyte	True	Found	%R	Control Limit	True	Found	%R	True	Found	%R	Control Limit
Mercury	5.0	J 5.2	103.4	~~90-110~~ 80-120	5.0	5.1	102.6	5.0	5.1	102.0	~~90-110~~ Not bracketing samples; no eval

FORM II INORGANIC-2

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Initial Calibration Verification Source:

Continuing Calibration Verification Source: 453947

Concentration Units: ug/L Instrument ID: 10HG09

	Continuing Calibration Verification						
	02/06/2024 14:32			02/06/2024 14:49			Control Limit
Analyte	True	Found	%R	True	Found	%R	
Mercury	5.0	5.1	102.6	5.0	5.1	102.4	~~90-110~~ 80-120

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

CRDL Check Standard Source: 453942,454254 Analysis Date/Time: 02/06/2024 11:05

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Mercury	0.2	0.19	95.0	70-130

Not bracketing samples; no eval

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

CRDL Check Standard Source: 453942,454254 Analysis Date/Time: 02/06/2024 14:31

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Mercury	0.2	0.18	90.0	70-130

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

CRDL Check Standard Source: 453942,454254 Analysis Date/Time: 02/06/2024 14:47

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Mercury	0.2	0.19	95.0	70-130

FORM III INORGANIC-1

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract : BPSOU Park Sampling

Method Blank Matrix: Solid Instrument ID: 10HG09

Method Blank Concentration Units: mg/kg

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Method Blank	
	02/06/2024 11:03	C	02/06/2024 11:34	C	02/06/2024 14:23	C	02/06/2024 14:34	C	4877925	C
Mercury	0.087	U	0.087	U	0.087	U	0.087	U	<0.0078	U

Not bracketing samples; no eval

FORM III INORGANIC-2

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract : BPSOU Park Sampling

Method Blank Matrix: Instrument ID: 10HG09

Method Blank Concentration Units:

Analyte	Initial Calibration Blank		Continuing Calibration Blank (ug/L)					
		C	02/06/2024 14:50	C		C		C
Mercury			0.087	U				

SAMPLE NO.

4877928MS

FORM V INORGANIC-1

MATRIX SPIKE SAMPLE RECOVERY

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid Basis: Dry Parent Sample ID: 24-RMAP-TypeB-6

Percent Moisture: 4.4

Analyte	Units	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R
Mercury	mg/kg	~~80-120~~ 75-125	0.56	0.015J	0.51	106

SAMPLE NO.

4877929MSD

FORM V INORGANIC-2

MATRIX SPIKE SAMPLE RECOVERY

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid Basis: Dry Parent Sample ID: 24-RMAP-TypeB-6

Percent Moisture: 4.4

Analyte	Units	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R
Mercury	mg/kg	~~80-120~~ 75-125	0.51	0.015J	0.49	102

SAMPLE NO.

4877927DUP

FORM VI INORGANIC-1
DUPLICATES

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid Concentration Units: mg/kg

Percent Moisture: 4.4 Basis: Dry

Analyte	RPD Control Limit	Sample	Duplicate	RPD
Mercury	20	0.015J	0.014J	

7

SAMPLE NO.

4877929MSD

FORM VI INORGANIC-2
DUPLICATES

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid Concentration Units: mg/kg

Percent Moisture: 4.4 Basis: Dry

Analyte	RPD Control Limit	Sample	Duplicate	RPD
Mercury	20	0.56	0.51	9

J

SAMPLE NO.

4877926LCS

FORM VII INORGANIC-1
LABORATORY CONTROL SAMPLE

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid

Analyte	Units	True	Found	%R	Limits	
Mercury	mg/kg	0.47	0.47	99	80	120

FORM IX INORGANIC-1
INSTRUMENT DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Preparation Method: None Instrument ID: 10HG09

Concentration Units: ug/L

Analyte	PQL	IDL	IDL Date
Mercury	0.20	0.087	03/30/2021

FORM IX INORGANIC-2
METHOD DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Preparation Method: EPA 7471B Instrument ID: 10HG09

Concentration Units: mg/kg

Analyte	PQL	MDL	MDL Date
Mercury	0.020	0.0087	03/30/2021

FORM XII INORGANIC-1
PREPARATION LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Preparation Method: EPA 7471B Batch: MERP 43060

Lab Sample ID	Sample Name	Preparation Date	Initial Weight (g)	Final Volume (mL)
4877925	4877925	02/06/2024	0.332	30
4877926	4877926	02/06/2024	0.318	30
4877927	4877927	02/06/2024	0.332	30
4877928	4877928	02/06/2024	0.306	30
4877929	4877929	02/06/2024	0.321	30
10682249002	24-RMAP-TypeB-6	02/06/2024	0.332	30
10682249004	24-RMAP-TypeB-7	02/06/2024	0.336	30

FORM XIII INORGANIC-1

ANALYSIS RUN LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Instrument ID: 10HG09 Analysis Method: EPA 7471B

Start Date: 02/06/2024 10:51 End Date: 02/06/2024 14:50

Sample Name	Lab Sample ID	D/F	Date	Time	Hg
34425530CAL0	34425530CAL0	1	02/06/2024	10:51	X
34425531CAL1	34425531CAL1	1	02/06/2024	10:52	X
34425532CAL2	34425532CAL2	1	02/06/2024	10:54	X
34425533CAL3	34425533CAL3	1	02/06/2024	10:56	X
34425534CAL4	34425534CAL4	1	02/06/2024	10:57	X
34425535CAL5	34425535CAL5	1	02/06/2024	10:59	X
34425536ICV	34425536ICV	1	02/06/2024	11:02	X
34425537ICB	34425537ICB	1	02/06/2024	11:03	X
34425538CRDL	34425538CRDL	1	02/06/2024	11:05	X
34425540CCV	34425540CCV	1	02/06/2024	11:33	X
34425541CCB	34425541CCB	1	02/06/2024	11:34	X
34425559CCV	34425559CCV	1	02/06/2024	14:21	X
34425560CCB	34425560CCB	1	02/06/2024	14:23	X
34425561CRDL	34425561CRDL	1	02/06/2024	14:31	X
34425562CCV	34425562CCV	1	02/06/2024	14:32	X
34425563CCB	34425563CCB	1	02/06/2024	14:34	X
4877925BLANK	4877925	1	02/06/2024	14:36	X
4877926LCS	4877926	1	02/06/2024	14:37	X
24-RMAP-TypeB-6	10682249002	1	02/06/2024	14:39	X
4877927DUP	4877927	1	02/06/2024	14:41	X
4877928MS	4877928	1	02/06/2024	14:42	X
4877929MSD	4877929	1	02/06/2024	14:44	X
24-RMAP-TypeB-7	10682249004	1	02/06/2024	14:46	X
34425564CRDL	34425564CRDL	1	02/06/2024	14:47	X
34425565CCV	34425565CCV	1	02/06/2024	14:49	X
34425566CCB	34425566CCB	1	02/06/2024	14:50	X

Pace Analytical, LLC

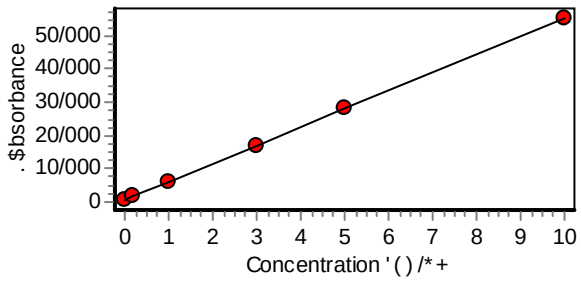
Report Generated By Teledyne Leeman QuickTrace
Analyst: 10metalsuser,HM
Worksheet file: S:\METALS\10HG09\06FEB24SOLIDS10HG09. s!"
Creation Date: 2#6#2024$9:06:06$AM
Comment: E%A&4&1B

Results

Sample Name	Type	Date/Time	Conc (ug/L)	µAbs	%RSD	Residual	Flags	DF	% Reco e!y
Calibration Blank	! "	02/06/24 10:51:11 am	0.00	411	2.27			1.0000	#/$
Replicates 398.5 417.8 410.8 418.8									
tan%ar%&1 '0.2 ( ) /* +	! "	02/06/24 10:52:48 am	0.20	1546	1.17	,7.10-		1.0000	#/$
Replicates 1530.7 1568.3 1553.5 1532.3									
tan%ar%&2 '1 ( ) /* +	! "	02/06/24 10:54:25 am	1.00	6068	0.36	0.99-		1.0000	#/$
Replicates 6049.4 6050.9 6076.4 6095.4									
tan%ar%&3 '3 ( ) /* +	! "	02/06/24 10:56:02 am	3.00	16968	0.37	,0.13-		1.0000	#/$
Replicates 16985.5 16968.5 16882.7 17034.0									
tan%ar%&4 '5 ( ) /* +	! "	02/06/24 10:57:40 am	5.00	28278	0.14	1.15-		1.0000	#/$
Replicates 28230.1 28326.6 28285.9 28269.6									
tan%ar%&5 '10 ( ) /* +	! "	02/06/24 10:59:18 am	10.00	55244	0.95	,0.28-		1.0000	#/$
Replicates 55876.9 55453.5 54925.5 54720.5									

Calibration
01(ation: $bs 3 5487.2564 5 526.705
R2: 0.99993 R 0: 4.20-
00: 191.0815
2la) s:

Curve Validated



6C7	6C7	02/06/24 11:02:18 am	5.17	28887	0.10			1.0000	103.37
Replicates 28876.2 28920.9 28896.2 28853.4									
6CB	6CB	02/06/24 11:03:57 am	,0.02	403	4.02			1.0000	#/$
Replicates 401.9 401.0 410.8 400.0									
CR" *	CR" *	02/06/24 11:05:34 am	0.19	1561	0.75			1.0000	94.21
Replicates 1551.1 1564.7 1568.7 1558.0									
4881302850451	9#:	02/06/24 11:18:30 am	0.00	544	64.51			1.0000	#/$
Replicates 547.5 545.3 553.3 528.1									
4881303850451	9#:	02/06/24 11:20:06 am	5.21	29089	0.15			1.0000	#/$
Replicates 29100.9 29144.0 29055.0 29056.5									
10682793001850451	9#:	02/06/24 11:21:43 am	0.06	874	3.31			1.0000	#/$
Replicates 863.2 865.1 882.8 885.1									

Prep Log Report

Batch Information: MERP 929593 7471B S_P

7471 | CVAA_HG Solid

Prep Method	EPA 7471B	Analysis Method	EPA 7471B	Prepared By	MT2	Instrument	10BL03
Block ID	10MET54	Thermometer ID	221739706	Correction Factor (C)	-0.1	Block Temp (C)	95
Corrected Temp. (C)	94.90	Digestion Start Date/Time	02/06/2024 09:36:02:159	Digestion End Date/Time	02/06/2024 10:19:38:367	Block End Temp (C)	96
Corrected End Temp. (C)	95.90	Digestion Vessel	451062	Resin Pellets Solid Matrix	437553	Metals Pipette 1	Q765
Metals Pipette 2	Q930	Dispenser ID 1	Q945	Dispenser ID 2	Q943	Dispenser ID 3	Q452
Dispenser ID 4	Q671	Dispenser ID 5		Reviewed By	IMB	Reviewed By Date	02/06/2024 10:28
Batch Notes	WEIGH BY NJ1						

Sample Information:

QC Rule	Sample Type	Lab Sample ID	Matrix	Initial Weight (g)	Aqua Regia (mL)	5% KMnO4 (mL)	12% NH2OH*HCL (mL)	Final Volume (mL)	Sample Notes	MERCURY-SPK (mL)
7471B S_P	BLANK	**4877925**	Solid	0.332	454177 (3)	453953 (9)	453115 (3.6)	30		
7471B S_P	LCS	**4877926**	Solid	0.318	454177 (3)	453953 (9)	453115 (3.6)	30		451662 (.15)
7471B S_P	PS	**10682249002**	Solid	0.332	454177 (3)	453953 (9)	453115 (3.6)	30		
7471B S_P	DUP	**4877927**	Solid	0.332	454177 (3)	453953 (9)	453115 (3.6)	30		
7471B S_P	MS	**4877928**	Solid	0.306	454177 (3)	453953 (9)	453115 (3.6)	30		451662 (.15)
7471B S_P	MSD	**4877929**	Solid	0.321	454177 (3)	453953 (9)	453115 (3.6)	30		451662 (.15)
7471B S_P	PS	**10682249004**	Solid	0.336	454177 (3)	453953 (9)	453115 (3.6)	30		

Standard Notes:

451662: LCS, MS, MSD Spike Solution

SAMPLE NO.

24-RMAP-TypeB-6

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Lab Sample ID: 10682249002 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
	Percent Moisture	4.4		%	1	01/29/2024 11:15

SAMPLE NO.

24-RMAP-TypeB-7

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Lab Sample ID: 10682249004 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
	Percent Moisture	4.8		%	1	01/29/2024 11:15

SAMPLE NO.

4877478DUP

FORM VI INORGANIC-1
DUPLICATES

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid Concentration Units: %

Percent Moisture: Basis: Wet

Analyte	RPD Control Limit	Sample	Duplicate	RPD
Percent Moisture	30	5.2	5.0	4

SAMPLE NO.

4877479DUP

FORM VI INORGANIC-2
DUPLICATES

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Matrix: Solid Concentration Units: %

Percent Moisture: Basis: Wet

Analyte	RPD Control Limit	Sample	Duplicate	RPD
Percent Moisture	30	20.4	19.5	5

FORM IX INORGANIC-1
METHOD DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Preparation Method: ASTM D2974 Instrument ID: 10BALP

Concentration Units: %

Analyte	PQL	MDL	MDL Date
Percent Moisture	0.10	0.10	01/01/2003

FORM XII INORGANIC-1
PREPARATION LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Preparation Method: ASTM D2974 Batch: MPRP 141621

Lab Sample ID	Sample Name	Preparation Date	Initial Volume (mL)	Final Volume (mL)
4877478	4877478	01/29/2024	1	1
4877479	4877479	01/29/2024	1	1
10682249002	24-RMAP-TypeB-6	01/29/2024	1	1
10682249004	24-RMAP-TypeB-7	01/29/2024	1	1

FORM XIII INORGANIC-1

ANALYSIS RUN LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10682249 Contract: BPSOU Park Sampling

Instrument ID: 10BALP Analysis Method: ASTM D2974

Start Date: 01/29/2024 11:14 End Date: 01/29/2024 11:17

Sample Name	Lab Sample ID	D/F	Date	Time	MOIST
10682390001	10682390001	1	01/29/2024	11:14	X
4877478DUP	4877478	1	01/29/2024	11:14	X
24-RMAP-TypeB-6	10682249002	1	01/29/2024	11:15	X
24-RMAP-TypeB-7	10682249004	1	01/29/2024	11:15	X
10682291004	10682291004	1	01/29/2024	11:16	X
4877479DUP	4877479	1	01/29/2024	11:17	X

Prep Log Report

Batch Information: 929445 141621 DW

ASTM D2974 | % Moisture / % Total Solids / Saturation %

Analysis Method	ASTM D2974	Analyzed By	JDL	Instrument	10BALP	Oven ID	10WET49
Acceptance Range	100-110 C	Thermometer ID	559926	Oven Correction Factor (C)	0	Oven Temp In1 (C) | Corr | Date/Time | Init	105.0 | 105.0 | 01/29/2024 11:36 | JDL
Oven Temp Out1 (C) | Corr | Date/Time | Init	105.0 | 105.0 | 01/30/2024 08:00 | JDL	Desic. In 1 ID | Date/Time | Init	10MET41 | 01/30/2024 08:00 | JDL	Desic. Out 1 Date/Time | Init	01/30/2024 08:30 | JDL	Reviewed By	WBS
Reviewed By Date	01/30/2024 12:51	Batch Notes					

Sample Information:

QC Rule	Sample Type	Lab Sample ID	Select	ID	TS Posted (%)	Percent Moisture	Run Date/Time	Posted Dry Weight /w Dish (g)	Dish Weight (g)	Wet Weight /w Dish (g)	Dry Weight 1 (g)	Dry Wt Use 1	Sample Notes
DRY WEIGHT	PS	**10682390001**	Y		94.81	5.192	01/29/2024 11:14:40	9.4432	1.2772	9.8904	9.4432	M	
DRY WEIGHT	DUP	**4877478**	Y		95.02	4.978	01/29/2024 11:14:52	9.4728	1.2678	9.9026	9.4728	M	
DRY WEIGHT	PS	**10682390002**	Y		95.64	4.365	01/29/2024 11:15:02	9.0122	1.2636	9.3659	9.0122	M	
DRY WEIGHT	PS	**10682249002**	Y		95.61	4.392	01/29/2024 11:15:13	8.7564	1.2658	9.1005	8.7564	M	
DRY WEIGHT	PS	**10682249004**	Y		95.24	4.761	01/29/2024 11:15:25	8.9456	1.2795	9.3288	8.9456	M	
DRY WEIGHT	PS	**10682285001**	Y		78.00	22.00	01/29/2024 11:15:36	7.4132	1.2674	9.1465	7.4132	M	
DRY WEIGHT	PS	**10682285002**	Y		79.28	20.72	01/29/2024 11:15:48	8.1698	1.2686	9.9732	8.1698	M	
DRY WEIGHT	PS	**10682285003**	Y		88.01	11.99	01/29/2024 11:15:59	8.5883	1.2663	9.5862	8.5883	M	
DRY WEIGHT	PS	**10682285004**	Y		80.08	19.92	01/29/2024 11:16:10	7.9248	1.2803	9.5778	7.9248	M	
DRY WEIGHT	PS	**10682291001**	Y		82.16	17.84	01/29/2024 11:16:22	8.3906	1.2688	9.9369	8.3906	M	
DRY WEIGHT	PS	**10682291002**	Y		72.09	27.91	01/29/2024 11:16:35	7.3865	1.2632	9.7576	7.3865	M	
DRY WEIGHT	PS	**10682291003**	Y		85.58	14.42	01/29/2024 11:16:48	8.0536	1.2717	9.1961	8.0536	M	
DRY WEIGHT	PS	**10682291004**	Y		79.60	20.40	01/29/2024 11:16:59	8.1486	1.2697	9.9114	8.1486	M	
DRY WEIGHT	DUP	**4877479**	Y		80.51	19.49	01/29/2024 11:17:10	8.2285	1.2735	9.9118	8.2285	M	
DRY WEIGHT	PS	**10682333001**	Y		99.27	0.7283	01/29/2024 11:17:22	9.4163	1.2647	9.4761	9.4163	M	
DRY WEIGHT	PS	**10682334001**	Y		99.22	0.7808	01/29/2024 11:17:34	9.7613	1.2729	9.8281	9.7613	M	

Prep Log Report

QC Rule	Sample Type	Lab Sample ID	Select	ID	TS Posted (%)	Percent Moisture	Run Date/Time	Posted Dry Weight /w Dish (g)	Dish Weight (g)	Wet Weight /w Dish (g)	Dry Weight 1 (g)	Dry Wt Use 1	Sample Notes
DRY WEIGHT	PS	**10682334002**	Y		99.31	0.6925	01/29/2024 11:17:45	9.6081	1.2765	9.6662	9.6081	M	
DRY WEIGHT	PS	**10682346001**	Y		45.74	54.26	01/29/2024 11:17:56	4.8889	1.2688	9.1825	4.8889	M	

Prep Log Report

Batch Information: Soil Sieve 53130 WET Log | Sieve

Analysis Method	Dry Sieve	Prepared By	AXH	Date/Time In	01/29/2024 08:51:08:648
Date/Time Out	01/30/2024 08:40:00:000	Instrument	40BALW	Sieve Size	#60
Drying Space	40DRY01	Humidistat ID	I204797	Thermometer ID	I204797
Correction Factor (C)	0	Temp In | Corr. (C)	15.60 | 15.60	Temp Out | Corr. (C)	15.90 | 15.90
Humidity In (%)	29	Humidity Out (%)	30	Reviewed By	
Reviewed By Date		Batch Notes	archive & coarse retained; #10 sieve also used; Pace ZPLC used to tare; ZPLC lab lot #409819, freezer paper lab lot #408996 (boats) / #409087 (loose paper); dried, disaggregated, and sorted by AXH; primary review by AXH		

Sample Information:

QC Rule	Sample Type	Lab Sample ID	Select	Client ID	Sample Weight (g)	Archive Sample Wt (g)	Shaker ID	Shaker Start Date/Time
SIEVE	PS	**10682249001**	Y	PACE - MN		822.05	40SKR4	01/30/2024 08:59:41
SIEVE	PS	**10682249003**	Y	PACE - MN		958.25	40SKR4	01/30/2024 08:59:41

QC Rule	Sample Type	Lab Sample ID	Shaker End Date/Time	Sample Weight Greater Than (g)	Sample Weight Less Than (g)	Sample Notes
SIEVE	PS	**10682249001**	01/30/2024 09:09:41	284.7	24.77	1*
SIEVE	PS	**10682249003**	01/30/2024 09:09:41	288.99	20.18	1*

Sample Notes:

1*: somewhat moist, loose, rocks

SECTION 5

PROJECT CASE NARRATIVE AND

CHAIN-OF-CUSTODY RECORD

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10682249001	**24-RMAP-TypeB-6**	Solid	01/22/24 13:00	01/26/24 08:50
10682249002	**24-RMAP-TypeB-6**	Solid	01/22/24 13:00	01/26/24 08:50
10682249003	**24-RMAP-TypeB-7**	Solid	01/22/24 12:45	01/26/24 08:50
10682249004	**24-RMAP-TypeB-7**	Solid	01/22/24 12:45	01/26/24 08:50

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Date: February 06, 2024

Samples analyzed for method 6020 arsenic and lead were analyzed after they were dried and sieved using a number 60 sieve.

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Method: **EPA 6020B**
Description: 6020B MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 06, 2024

General Information:
2 samples were analyzed for EPA 6020B 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.

Internal Standards:
All internal standards were within QC limits 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.

QC Batch: 930077

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 4879783)
  - Lead

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.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Method: **EPA 6020B**
Description: 6020B MET ICPMS
Client: BPAR-PIONEER-MT
Date: February 06, 2024

Analyte Comments:

QC Batch: 930077

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 4879783)
  - Lead

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: BPSOU Park Sampling
Pace Project No.: 10682249

Method: **EPA 7471B**
Description: 7471B Mercury
Client: BPAR-PIONEER-MT
Date: February 06, 2024

General Information:
2 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.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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

WO# : 10682249

10682249

ry Management Program LaMP Chain of Custody Record

Page 1 of 1

lode Path: _____ Req Due Date (mm/dd/yy): _____ Rush TAT: x No ____

acility No: _____ Lab Work Order Number: _____

Lab Name: Pace Analytical Services	Facility Address:	Consultant/Contractor: Pioneer Technical Services
Lab Address: 1700 Elm Street Minneapolis, MN 55414	City, State, ZIP Code:	Consultant/Contractor Project No: BPSOU Park Sampling
Lab PM: Julia Fogarty	Lead Regulatory Agency:	Address: 307 E Park Suite 421, Anaconda MT, 59711
Lab Phone: 612-607-1700	California Global ID No.:	Consultant/Contractor PM: Jesse Schwarzrock
Lab Shipping Accnt:	Enfos Proposal No:	Phone: 406-697-0949 Email: jschwarzrock@pioneer-technical.com
Lab Bottle Order No:	Accounting Mode: Provision — — —	Email EDD To: Jesse Schwarzrock
Other Info:	Stage: Activity:	Invoice To: BP — Contractor — X
BP Project Manager (PM): Mike Mc Anulty		
BP PM Phone: 406-723-1822		
BP PM Email: mcanumc@bp.com		

Lab No.	Sample Description	Date	Time	Soil / Solid	Water / Liquid	Air / Vapor	Is this location a well?	Total Number of Containers	Ambient (As, Cd, Cu, Pb, Zn)/<6 C Hg	H2SO4	HNO3	HCl	Methanol	Air dry&sieve*, 6020 (As, Cd, Cu, Pb, Zn)	7471 Mercury, dry weight	Report Type & QC Level / Comments
	24-RMAP-TypeB-6	01/22/24	1300	X				2	x					X	X	Rush TAT 002
	24-RMAP-TypeB-7	01/22/24	1245	X				2	x					X	X	Rush TAT 004

Matrix | No. Containers / Preservative | Requested Analyses

Report Type & QC Level: Standard — x; Full Data Package —

Note: If sample not collected, indicate "No

Comments

Sampler's Name: Dana St. John	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation / Date / Time
Sampler's Company: Pioneer Technical Services	PTS	01/25/24	1330	1/26/24 650
Shipment Method: FedEx Overnight Ship Date: 01/25/24				
Shipment Tracking No: 6092 7241 3801				

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 1.7 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP Remediation Management COC - Effective Date: starting August 16, 2011.

BP LaMP COC Rev. 8, 24 June 2012

DC#_Title: ENV-FRM-MIN4-0149 v08_Sample Condition Upon Receipt (SCUR) - ESI
Effective Date: 4/18/2023

Sample Condition Upon Receipt - ESI Tech Specs

Client Name: BP-Pioneer

Project #: **WO#: 10682249**

PM: JMF **Due Date: 02/02/24**

CLIENT: BP-PIONEER

Courier: ☑ FedEx ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ SpeeDee ☐ Commercial

Tracking Number: 6092 7241 3501 ☐ See Exceptions ENV-FRM-MIN4-0142

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 (0436) ☐ T3 (0459) ☐ T4 (0402) ☐ T5 (0178) ☐ T6 (0235) ☐ T7 (0042) ☐ T8 (0775) ☐ T9 (0727) ☐ 01339252/1710 **Type of Ice:** ☑ Wet ☐ Blue ☐ Dry ☐ None ☐ Melted

Temp should be above freezing to 6 °C **Cooler temp Read w/Temp Blank:** 1.4 °C

Correction Factor: +0.3 **Cooler Temp Corrected w/temp blank:** 1.7 °C

Average Corrected Temp (no temp blank only): ____ °C ☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

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

Date/Initials of Person Examining Contents: DGS 1/26/24

Did samples originate in a quarantine zone within the United States: AL, AR, AZ 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 (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

Location (Check one): ☐ Duluth ☑ Minneapolis ☐ Virginia				**COMMENTS**
Chain of Custody Present and Filled Out?	☑ Yes	☐ No		1.
Chain of Custody Relinquished?	☑ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	3.
Samples Arrived within Hold Time?	☑ Yes	☐ No		4.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E.coli ☐ BOD/cBOD ☐ Hex Chrom ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other
Rush Turn Around Time Requested?	☑ Yes	☐ No		6.
Sufficient Sample Volume?	☑ Yes	☐ No		7.
Triple Volume Provided for MS/MSD (if more than 10 samples)?	☐ Yes	☐ No	☑ N/A	
Correct Containers Used?	☑ Yes	☐ No		8.
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☑ Yes	☐ No		11. **If no, write ID/Date/Time of container below:** ☐ See Exceptions ENV-FRM-MIN4-0142
Matrix: ☐ Water ☑ Soil ☐ Oil ☐ Other				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO3, H2SO4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☑ N/A	☐ NaOH ☐ HNO3 ☐ H2SO4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxins/PFAS (*If adding preservative to a container, it must be added to associated field and equipment blanks--verify with PM first.)	☐ Yes	☐ No	☑ N/A	Positive for Residual Chlorine? ☐ Yes ☐ No ☐ See Exceptions ENV-FRM-MIN4-0142
				pH Paper Lot #
				Residual Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☑ N/A	13. ☐ See Exceptions ENV-FRM-MIN4-0142
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☑ N/A	
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	Pace Trip Blank Lot # (if purchased):

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 930	Temp: 1.4	Corrected Temp: 1.7	
Time: 9:50	put in cooler		
Time:	Temp:	Corrected Temp:	

CLIENT NOTIFICATION/RESOLUTION **Field Date Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: Julia Fogarty **Date:** 1/26/24

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: DGS **Line:** 2

40273584

Internal Transfer Chain of Custody

Pace

☐ Rush Multiplier____X
☒ Samples Pre-Logged into eCOC

State Of Origin: MT
Cert. Needed: ☐ Yes ☒ No

Workorder: 10682249 **Workorder Name:** BPSOU Park Sampling

Owner Received Date: 1/26/2024 **Results Requested By:** 2/2/2024

Report To	Subcontract To
Julia Fogarty Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700	Pace Analytical Green Bay 1241 Bellevue Street Suite 9 Green Bay, WI 54302 Phone (920)469-2436

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	ZPLU Preserved Containers: Unpreserved						Air Dry & Sieve											LAB USE ONLY
1	24-RMAP-TypeB-6	PS	1/22/2024 13:00	10682249001	Solid	1						X											001
2	24-RMAP-TypeB-7	PS	1/22/2024 12:45	10682249003	Solid	1						X											002
3																							
4																							
5																							

Transfers	Released By	Date/Time	Received By	Date/Time
1	FedEX	01/26/2024 1535	Matt Vandamwell Pace	01/26/2024 1535
2				
3				

Comments

IR40-Rush
#60 Sieve
Include soil prep log
Follow QAPP

Cooler Temperature on Receipt 20.0 °C | **Custody Seal** (Y) or N | **Received on Ice** Y or (N) | **Samples Intact** (Y) or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

Client Name: Pace Minneapolis

Sample Preservation Receipt Form

Project # V4027358Y

All containers needing preservation have been checked and noted below. ☐Yes ☐No ☑N/A

Lab Lot# of pH paper.

Lab Std #ID of preservation (if pH adjusted):

Initial when completed MW Date/ Time:

Pace Lab #	Glass							Plastic						Vials						Jars				General				VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
	AG1U	BG1U	AG1H	AG4S	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	BP2Z	VG9C	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN 1	GN 2							
001																									1								2.5 / 5
002																									1								2.5 / 5
003																																	2.5 / 5
004																																	2.5 / 5
005																																	2.5 / 5
006																																	2.5 / 5
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019																																	2.5 / 5
020																																	2.5 / 5

MW 01/26/2024

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other:

Headspace in VOA Vials (>6mm) ☐Yes ☐No ☑N/A ***If yes look in headspace column**

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	VG9C	40 mL clear ascorbic w/ HCl	JGFU	4 oz amber jar unpres
BG1U	1 liter clear glass	BP3U	250 mL plastic unpres	DG9T	40 mL amber Na Thio	JG9U	9 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP3B	250 mL plastic NaOH	VG9U	40 mL clear vial unpres	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9H	40 mL clear vial HCL	WPFU	4 oz plastic jar unpres
AG5U	100 mL amber glass unpres	BP3S	250 mL plastic H2SO4	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH + Zn	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres					GN 1	
						GN 2	

Page 1 of 2

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40273584

40273584

Client Name: Pace Minneapolis

Courier: ☐ CS Logistics ☑ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco
☐ Client ☐ Pace Other:

Tracking #: 609272385750

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other Paper padding

Thermometer Used SR - 131 **Type of Ice:** Wet Blue Dry (None) ☐ Meltwater Only

Cooler Temperature Uncorr: 20.5 /Corr: 20.0

Temp Blank Present: ☐ yes ☑ no **Biological Tissue is Frozen:** ☐ yes ☐ no

Person examining contents:
Date: 01/26/2024 Initials: MRR

Labeled By Initials: SS

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C if shipped on Dry Ice.

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☐No ☑N/A	4. Pace IRWO MRR 01/26/2024
Samples Arrived within Hold Time:	☑Yes ☐No	5.
- DI VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No	6.
Rush Turn Around Time Requested:	☑Yes ☐No	7.
Sufficient Volume: For Analysis: ☑Yes ☐No MS/MSD: ☐Yes ☑No ☐N/A		8.
Correct Containers Used:	☑Yes ☐No	9.
Correct Type: Pace Green Bay, Pace IR, (Non-Pace)		
Containers Intact:	☑Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: S	☑Yes ☐No ☐N/A	12.
Trip Blank Present:	☐Yes ☐No ☑N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: Date/Time:

Comments/ Resolution: No internal custody seal sealing the bag shut. MRR 01/26/2024

Custody seals only required on cooler. Not on each bag.

PM Review is documented electronically in LIMs. By releasing the project, the PM acknowledges they have reviewed the sample logi

Page 2 of 2

40273584

Internal Transfer Chain of Custody

Pace

☐ Rush Multiplier____X
☒ Samples Pre-Logged into eCOC

State Of Origin: MT
Cert. Needed: ☐ Yes ☒ No

Workorder: 10682249 **Workorder Name:** BPSOU Park Sampling

Owner Received Date: 1/26/2024 Results Requested By: 2/2/2024

Report To	Subcontract To
Julia Fogarty Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700	Pace Analytical Green Bay 1241 Bellevue Street Suite 9 Green Bay, WI 54302 Phone (920)469-2436

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Unpreserved	ZPLU					Requested Analysis: Air Dry & Sieve												LAB USE ONLY
1	24-RMAP-TypeB-6	PS	1/22/2024 13:00	10682249001	Solid	1						X												001
2	24-RMAP-TypeB-7	PS	1/22/2024 12:45	10682249003	Solid	1						X												002
3																								
4																								
5																								

Transfers	Released By	Date/Time	Received By	Date/Time
1	FedEX	01/26/2024 1535	Matt VanSumeren Pace	01/26/2024 1535
2	Matt VanSumeren Pace	01/26/2024 16:00		1-31-24 1454
3				

Comments

IR40-Rush
#60 Sieve
Include soil prep log
Follow QAPP

Cooler Temperature on Receipt 20.0°C **Custody Seal** (Y) or N **Received on Ice** Y or (N) **Samples Intact** (Y) or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.*

Forwarding for Analysis ctr 1/31/24

Sample Condition Upon Receipt

Client Name: Pace Green Bay

Project #: 10682249

Courier: ☐ FedEx ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ SpeeDee ☑ Commercial

Tracking Number: 776030141 ☐ See Exceptions ENV-FRM-MIN4-0142

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 (0436) ☐ T3 (0459) ☑ T4 (0402) ☐ T5 (0178) ☐ T6 (0235) ☐ T7 (0042) ☐ T8 (0775) ☐ T9(0727) ☐ 01339252/1710 **Type of Ice:** ☐ Wet ☐ Blue ☐ Dry ☑ None ☐ Melted

Did Samples Originate in West Virginia? ☐ Yes ☑ No **Were All Container Temps Taken?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6 °C **Cooler temp Read w/Temp Blank:** _____ °C

Correction Factor: +0.2 **Cooler Temp Corrected w/temp blank:** _____ °C

Average Corrected Temp (no temp blank only): 20.5 °C ☑ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

USDA Regulated Soil: ☑ N/A, water sample/other: Solid

Date/Initials of Person Examining Contents: JMW 1-31-24

Did samples originate in a quarantine zone within the United States: AL, AR, AZ 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 (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

Location (Check one): ☐ Duluth ☑ Minneapolis ☐ Virginia

				COMMENTS
Chain of Custody Present and Filled Out?	☑ Yes	☐ No		1.
Chain of Custody Relinquished?	☑ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☑ N/A	3.
Samples Arrived within Hold Time?	☑ Yes	☐ No		4. If fecal: ☐ <8 hrs ☐ >8 hr, <24 ☐ No
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E.coli ☐ BOD/cBOD ☐ Hex Chrom ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other
Rush Turn Around Time Requested?	☐ Yes	☑ No		6.
Sufficient Sample Volume?	☑ Yes	☐ No		7.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	8.
-Pace Containers Used?	☐ Yes	☑ No		
Containers Intact?	☑ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☑ Yes	☐ No		11. **If no, write ID/Date/Time of container below:** ☐ See Exceptions ENV-FRM-MIN4-0142
Matrix: ☐ Water ☐ Soil ☐ Oil ☑ Other Solid				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO3, H2SO4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☑ N/A	☐ NaOH ☐ HNO3 ☐ H2SO4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxins/PFAS (*If adding preservative to a container, it must be added to associated field and equipment blanks--verify with PM first.)	☐ Yes	☐ No	☑ N/A	Positive for Residual Chlorine? ☐ Yes ☐ No ☐ See Exceptions ENV-FRM-MIN4-0142
				pH Paper Lot #
				Residual Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Headspace in Methyl Mercury Container?	☐ Yes	☐ No	☑ N/A	13.
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☑ N/A	14. ☐ See Exceptions ENV-FRM-MIN4-0142
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☑ N/A	
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	Pace Trip Blank Lot # (if purchased): _____

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: Julia Fogarty **Date:** 1/31/24

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: DU **Line:** 3

Pace ANALYTICAL SERVICES	DC#_Title: ENV-FRM-MIN4-0142 v02_Sample Condition Upon Receipt (SCUR) Exception Form
	Effective Date: 09/22/2022

Workorder #: _____

No Temp Blank		
Read Temp	Corrected Temp	Average temp
20.3	20.5	
20.3	20.5	20.5

PM Notified of Out of Temp Cooler? ☐ Yes ☐ No

If yes, indicate who was contacted, date and time.
If no, indicate reason why.

_____

Multiple Cooler Project? ☐ Yes ☐ No

If anything is OVER 6.0° C, you MUST document containers in this section HERE

Tracking Number	Temperature

Out of Temp Sample ID	Container Type	# of Containers

pH Adjustment Log for Preserved Samples

Sample ID	Type Of Preserve	pH Upon Receipt	Date Adjusted	Time Adjusted	Amount Added (mL)	Lot # Added	pH After	In Compliance After Addition?		Initials
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	
								☐ Yes	☐ No	

Comments:

_____

_____

_____

Qualtrax ID: 52763

Page 1 of 1

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: BPSOU Park Sampling
Pace Project No.: 10682249

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.

ANALYTE QUALIFIERS

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.
P8	Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.