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### **Butte Priority Soils Operable Unit (BPSOU) Insufficiently Reclaimed Sites - Field Sampling Plan (FSP) BRES No. 154 – Clark Mill Tailings NE.**

Mike McAnulty

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**December 1, 2021**

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**Re: Butte Priority Soils Operable Unit (BPSOU) Insufficiently Reclaimed Sites - Field Sampling Plan (FSP) BRES No. 154 – Clark Mill Tailings NE.**

Dear Agency Representatives:

As described in Appendix D, Attachment C to the 2020 Butte Priority Soils Operable Unit (BPSOU) Consent Decree (CD) (available at <https://www.co.silverbow.mt.us/2161/ButtePriority-Soils-Operable-Unit-Conse>), sites listed as Insufficiently Reclaimed Solid Media Sites within BPSOU were reclaimed prior to the establishment of the Butte Hill Revegetation Specifications (BHRS), which is Appendix B of Appendix E to the U.S. Environmental Protection Agency (EPA) 2006 Record of Decision (ROD) contained in the CD. Since additional reclamation work may be required to bring the sites into compliance with the BHRS, the sites will be evaluated to assess past actions and to identify any site-specific conditions that fail to meet the BHRS.

The site evaluation will include a review of available previous Butte Reclamation Evaluation System (BRES) field evaluations and site construction completion reports along with on-site evaluation and sampling. The site evaluation will include sampling within the existing site boundary performed according to the Atlantic Richfield Company *2021-2022 Final Reclaimed Areas Maintenance and Monitoring (M&M) Quality Assurance Project Plan (QAPP)* (referred to as Reclaimed Areas M&M QAPP), which is a component of the BPSOU Solid Media Management Project Plan. The Reclaimed Areas M&M QAPP is available at the following link:



[https://pioneertechnicalservices.sharepoint.com/:b:/s/submitted/Ebj\\_4MWC5ENErHdG89yMF6QBIVjK5T1dpsi483fuVSAQWg](https://pioneertechnicalservices.sharepoint.com/:b:/s/submitted/Ebj_4MWC5ENErHdG89yMF6QBIVjK5T1dpsi483fuVSAQWg)<sup>1</sup>.

Field sampling within the existing boundary will be performed to determine whether contaminants are present, if growth media is adequate, and if there are previously unidentified sources contributing to site deficiencies.

Additional sampling performed in adjacent areas outside of the existing site boundary to characterize gap zones where site characterization may be unknown or incomplete will be conducted according to the Atlantic Richfield Company *Final Unreclaimed Sites Quality Assurance Project Plan (QAPP)* (referred to as the Unreclaimed Sites QAPP) which also is a component of the BPSOU Solid Media Management Project Plan available at the following link:

<https://pioneertechnicalservices.sharepoint.com/:f:/s/submitted/EjBNYNYtQgpMv3YyC7R1-ZkBvRWHYn7u2JNU41VnChLuEA>.<sup>2</sup>

Sample results in the areas outside of the existing site boundary will be evaluated to determine if contaminants are present beyond the site boundary at concentrations exceeding action levels listed in Table 1 or Table 2 in the Unreclaimed Sites QAPP. Final sampling data will be used to assist in determining the final site declaration.

This Field Sampling and Investigation Plan (FSP) provides details related to the field evaluation of the Insufficiently Reclaimed Site BRES No. 154 – Clark Mill Tailings NE. Proposed soil sampling locations and areas of known deficiencies are shown on Figure 1.

The site evaluation is anticipated to be completed in the fourth quarter of 2021, pending approval and site conditions, or spring of 2022. A site summary and declaration will be prepared to present all available site data and describe which BHRS criteria, if any, are not met. A remedial action work plan (RAWP) describing the actions that will be implemented at the site will be provided for Agency review and approval.

A list of FSPs, provided below, will be updated to record the status and progress of FSP submittals.

<b>Submittal</b>	<b>Site</b>	<b>Submittal Date</b>	<b>Approval Date</b>
1	BRES No. 104 – Colorado Dump Shaft	9/29/2021	11/5/2021
2	BRES No. 154 – Clark Mill Tailings NE	12/1/2021	

The crosswalk list provided below references where pertinent field sample collection and documentation elements are discussed.

<sup>1</sup> Please note the link provided is valid for one year from the date of this submittal.

<sup>2</sup> Please note that this link is active until June 2022.

Element	Reference Location		
	FSP	Reclaimed Areas M&M QAPP	Unreclaimed Sites QAPP
Title page and approval authority.		Page i	Page i
Introduction and appropriate Agency-approved QAPP reference.	X		
Goals and objectives of sampling.		Section 2.6	Section 2.4, Section 3.2
Proposed schedule for field work.	X	Section 2.5.1	
Site figure including sampling locations, number, and depth of samples to be collected, and sample field identification.	X		Section 3.2.1
Field activity methods and procedures, standard operating procedures.		Section 3.3	Section 3.2, Table 4
Sample labeling and shipping.		Section 3.4.2	Section 3.2.5, Appendix C
Sample analysis specifying X-ray fluorescence (XRF) vs. laboratory analysis and laboratory name.		Section 2.7	Section 3.3
Figure showing the site and/or area represented by a sample, sample ID, and aliquot locations for composite samples.	X		

**Background**

The BRES No 154 – Clark Mill Tailings NE site is approximately 1.41 acres and is located east of the Copper Mountain Recreation Complex in Butte, Montana, 59701. Detailed information regarding site-specific reclamation is not available. It is assumed that the site is not reclaimed to BHRS; therefore, it is being evaluated to identify reclamation deficiencies and requirements to adhere to BHRS and ensure remedial effectiveness.

**Previous Evaluation Findings**

The site evaluation will incorporate a review of previous site evaluations, sampling, and anticipated remedial action. The site was evaluated in 2019 during the recurring BRES site evaluation process. Preliminary review of the evaluation indicates issues with weeds, exposed waste, site edges, and barren areas illustrated on Figure 1. The site appears to be dominated by undesirable weedy species, plant litter, and bare ground, which may be contributing to the lack of desirable species. A steep, east-facing slope on the northern part of the site is also comprised of bare ground and weedy species.

## Previous Sampling Efforts

Data obtained from the Geocortex web-based database at <https://eis2.woodardcurran.com/Html5Viewer/index.html?viewer=BPButte.BPSOU> contains the records for previous soil samples collected near BRES No 154 – Clark Mill Tailings NE. The approximate sample locations are included on Figure 1 with results provided in Table 1, Table 2, and Table 3. Sample results highlighted yellow in the tables exceed ROD Solid Media soil screening criteria. The BPSOU action levels are listed in Table 3 of the Reclaimed Areas M&M QAPP, Section 2.6.1.

**Table 1: Previous Sampling Results from BPSOU Soil Sampling**

COC	Sample ID: MS-036	Sample ID: MS-038	Sample ID: MS-039	Sample ID: MTW010-40	Sample ID: MTW010-50	Sample ID: MTW010-60
Arsenic	200 mg/kg	142 mg/kg	79 mg/kg	250 mg/kg	154 mg/kg	188 mg/kg
Cadmium	4 mg/kg	11 mg/kg	4 mg/kg	9 mg/kg	5 mg/kg	4 mg/kg
Copper	761 mg/kg	1,360 mg/kg	137 mg/kg	1,710 mg/kg	359 mg/kg	314 mg/kg
Lead	545 mg/kg	360 mg/kg	157 mg/kg	551 mg/kg	318 mg/kg	304 mg/kg
Zinc	1,210 mg/kg	1,640 mg/kg	626 mg/kg	2,660 mg/kg	1,660 mg/kg	1,030 mg/kg
pH	5.62 S.U.	7.53 S.U.	6.35 S.U.	-	-	-

**Yellow** highlight: results exceed Record of Decision Solid Media soil screening criteria.

COC: Contaminant of concern. mg/kg: milligrams per kilogram. S.U.: standard unit.

**Table 2: Previous Sampling Results from BPSOU Soil Sampling**

COC	Sample ID: RRRNB013 0.5FT	Sample ID: RRRNB013 0.08FT	Sample ID: RRRNB013 1.5FT	Sample ID: RRRNB013 2FT	Sample ID: RRRNB013 1FT
Arsenic	77 mg/kg	208 mg/kg	8 mg/kg	26 mg/kg	14 mg/kg
Cadmium	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg
Copper	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg
Lead	168 mg/kg	462 mg/kg	15 mg/kg	51 mg/kg	23 mg/kg
Zinc	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg
pH	-	-	-	-	-

**Yellow** highlight: results exceed Record of Decision Solid Media soil screening criteria.

COC: Contaminant of concern. mg/kg: milligrams per kilogram. S.U.: standard unit.

**Table 3: Previous Sampling Results from BPSOU Soil Sampling**

COC	Sample ID: SO-GG-C	Sample ID: SO-GG-C	Sample ID: RRRNB015	Sample ID: RRRNB014	Sample ID: RRRNB012	Sample ID: RRRNB011
Arsenic	348 mg/kg	331 mg/kg	12 mg/kg	149 mg/kg	16 mg/kg	47 mg/kg
Cadmium	6 mg/kg	4 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg
Copper	1,620 mg/kg	1,440 mg/kg	28 mg/kg	380 mg/kg	27 mg/kg	0 mg/kg
Lead	458 mg/kg	452 mg/kg	21 mg/kg	50 mg/kg	27 mg/kg	71 mg/kg
Zinc	2,190 mg/kg	1,940 mg/kg	98 mg/kg	140 mg/kg	100 mg/kg	0 mg/kg
pH	-	-	-	-	-	-

**Yellow** highlight: results exceed Record of Decision Solid Media soil screening criteria.

COC: Contaminant of concern. mg/kg: milligrams per kilogram. S.U.: standard unit.

During recent sampling activities on Unreclaimed Site UR-40, which is adjacent to BRES No. 154 – Clark Mill Tailings NE, an opportunistic sample was obtained from within the BRES No. 154 – Clark

Mill Tailings NE site boundary. Final results from this sampling effort will be included with the Unreclaimed Sites Data Summary Report and will also be included in the site summary report and declaration described below.

## **Preliminary Site Evaluation**

A preliminary site visit was conducted to better qualify existing site conditions and identify areas of focus for additional evaluation. Site photographs were taken during the preliminary site evaluation to capture site conditions. The photographs are included in this section for reference. Multiple areas of erosion, bare areas, and undesirable weeds were identified in addition to run-on/runoff issues associated with storm water along the eastern slope. Areas of potential mine waste were also identified along the eastern boundary as shown on the site photographs below.

As seen in Photograph 1 and Photograph 2, steep, east-facing slopes have multiple areas of rill erosion that appear to be developing through high storm water events. Material is being conveyed east and depositing near the site boundary, as shown in Photograph 3.



**Photograph 1. Possible Mining Waste Erosion**



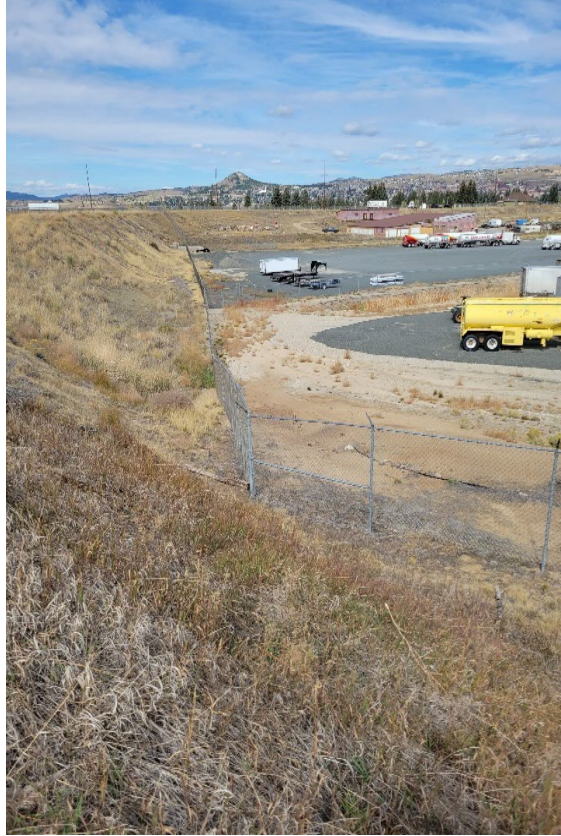
**Photograph 2. Erosion Rills on Possible Mining Waste Bare Area**



**Photograph 3. Possible Mining Waste Deposit Near Site Boundary**

The site lacks vegetation diversity, however, some species included in the 2018 BHRS General Seed Mixture No. 3 (included in Appendix B of the Atlantic Richfield *2021 Revised Draft Final Butte Reclaimed Areas M&M Plan*) are present.

Slopes, shown in Photograph 4, will be evaluated to mitigate erosion. Evaluations will consider regrading, vegetation, or armoring requirements. A local biology/plant ecologist, or suitable Subject Matter Expert (SME), will be consulted to determine if site-specific seed mix may be developed with remedial erosion controls to establish vegetation or if riprap armoring provides a more suitable long-term remedy.



**Photograph 4. East-Facing Slope, Material Conveying into Site Boundary**

Existing storm water controls (SWCs) include grass ditches located on the south, western, and eastern boundaries of the site (Photograph 5 and Photograph 6). These will be evaluated to determine effectiveness and identify additional Best Management Practices or potential maintenance items. The ditch on the western boundary is well vegetated and discharges into the Grove Gulch inlet structure GG-O-1 (see Figure 1). Multiple concrete culverts are also located on site (Photograph 7, Photograph 8, and Photograph 9) and will be evaluated to determine effectiveness and to identify maintenance requirements.

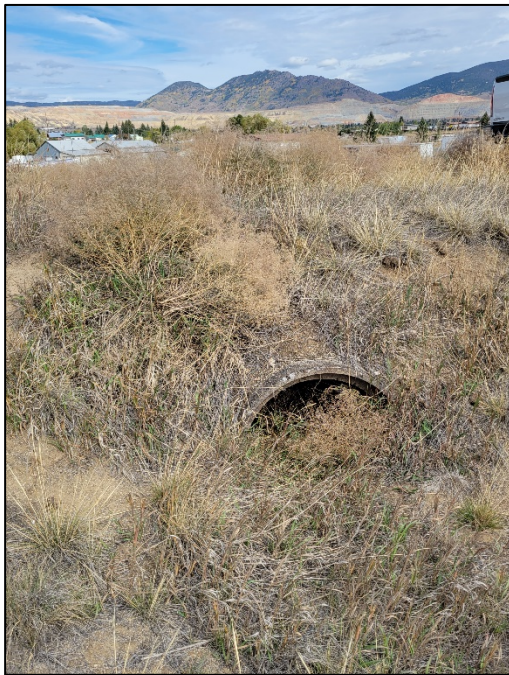




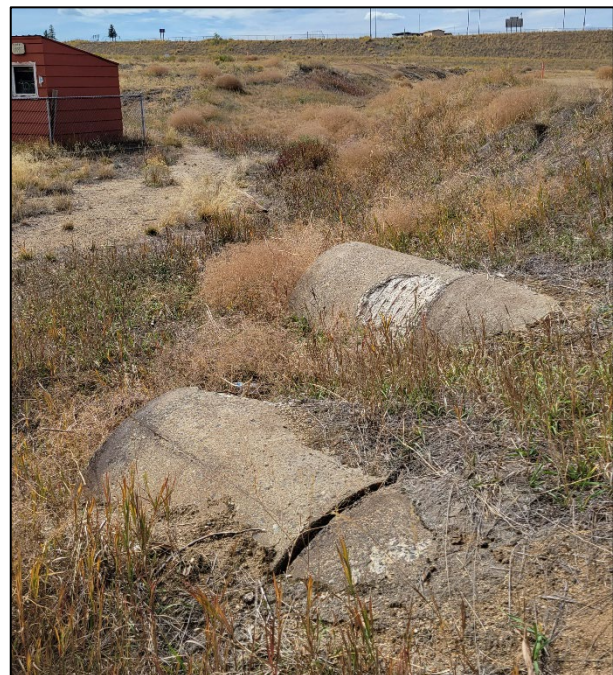
**Photograph 5. South Storm Water Sediment Ditch**



**Photograph 6. Southwest Ditch Runs to Grove Gulch Inlet**



**Photograph 7. South Storm Water Culvert Under Access Road**



**Photograph 8. Storm Water Culvert East of Site, Inlet for South Sediment Ditch**



**Photograph 9. East Culvert Sediment Deposition from South Storm Water Ditch**

## **Site Characterization Plan**

Per the Reclaimed Areas M&M QAPP, the site will be sampled at 2 depth intervals [(1) 0 to 6 inches and (2) 6 to 18 inches] to determine the presence of waste and/or confirm the depth of previous reclamation efforts. Additional samples obtained outside of the existing site boundary will be obtained from 3 depth intervals [(3) 0 to 2 inches, (4) 2 to 6 inches, and (5) 6 to 12 inches] per the Unreclaimed Sites QAPP sampling protocol. Figure 1 illustrates the proposed sample locations. Opportunistic samples may be obtained in the field at the discretion of field sampling personnel or Agency oversight representative(s). The field team leader will be responsible for determining the appropriate sampling protocol as dictated by the location of the opportunistic sample(s).

Results will be used to prepare the site declaration and prescribe site remedial improvements. The overall site will be sampled following procedures in the Reclaimed Areas M&M QAPP using a systematic procedure to determine spatial characterization of waste, parameters of previous reclamation, and extent of transient material. Sampling performed outside of the existing boundary will be used to determine if waste extends beyond the existing boundary at concentrations which exceed levels listed in Table 1 or Table 2 of the Unreclaimed Sites QAPP and will be applied to the determination of the final site declaration.

Existing site grading and drainages will be evaluated to determine storm water flow patterns and identify whether additional storm water controls will prevent off-site migration of impacted sediment. The location and condition of existing storm water features will be field-verified and

recorded to implement appropriate corrective actions. The contributing sources of storm water upgradient and adjacent to the site will also be investigated as appropriate.

Items identified below will be evaluated to determine whether they are adequate and to identify additional remedial measures. The following provides the minimum site characterization items that will be considered. Additional items may be identified during the remedial design process.

- Evaluate plant species cover to BHRS seed mix specifications.
  - Coordinate and confirm plant species with biology/plant ecologist or related SME.
- Evaluate steep slopes for regrading and eroding of possible mining waste.
- Evaluate existing storm water controls designed for a 25-year, 24-hour, Soil Conservation Service Type I storm event.
- Evaluate site storm water controls to mitigate run-on/runoff.
- Identify remedial improvements to mitigate site erosion and improve vegetative areas to meet BHRS.
- Identify maintenance items for successful long-term operation.

## Sampling Procedure

All soil sampling and characterization activities and procedures within the existing site boundary will follow the Reclaimed Areas M&M QAPP. The Reclaimed Areas M&M QAPP also describes the quality assurance/quality control policies and procedures that will be used during sample collection and analysis. Samples will be obtained from the sample stations listed below following the Reclaimed Areas M&M QAPP.

<b>Sample Station</b>	<b>2 Depth Intervals (inches)</b>
IR-154-SS01	(1) 0-6, (2) 6-18
IR-154-SS02	(1) 0-6, (2) 6-18
IR-154-SS03	(1) 0-6, (2) 6-18
IR-154-SS04	(1) 0-6, (2) 6-18
IR-154-SS05	(1) 0-6, (2) 6-18
IR-154-SS06	(1) 0-6, (2) 6-18
IR-154-SS07	(1) 0-6, (2) 6-18

All soil sampling and characterization activities beyond the existing site boundary at sample stations listed below will follow the Unreclaimed Sites QAPP.

<b>Sample Station</b>	<b>3 Depth Intervals (inches)</b>
IR-154-SS08	(3) 0-2, (4) 2-6, and (5) 6-12
IR-154-SS09	(3) 0-2, (4) 2-6, and (5) 6-12
IR-154-SS10	(3) 0-2, (4) 2-6, and (5) 6-12
IR-154-SS11	(3) 0-2, (4) 2-6, and (5) 6-12
IR-154-SS12	(3) 0-2, (4) 2-6, and (5) 6-12
IR-154-SS13	(3) 0-2, (4) 2-6, and (5) 6-12

This field work is anticipated to begin in December of 2021 or spring of 2022, depending on site conditions and Agency approval.

## Site Summary Report and Declaration

After the site evaluation and data collection activities have been completed, a data summary report will be prepared and submitted to Agencies for review and approval. The report will include a summary of all available site sampling data and a site declaration specifying any deficient BHRS criteria.

If you have questions or comments, please do not hesitate to call me at (907) 355-3914.

Sincerely,



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

### Attachments:

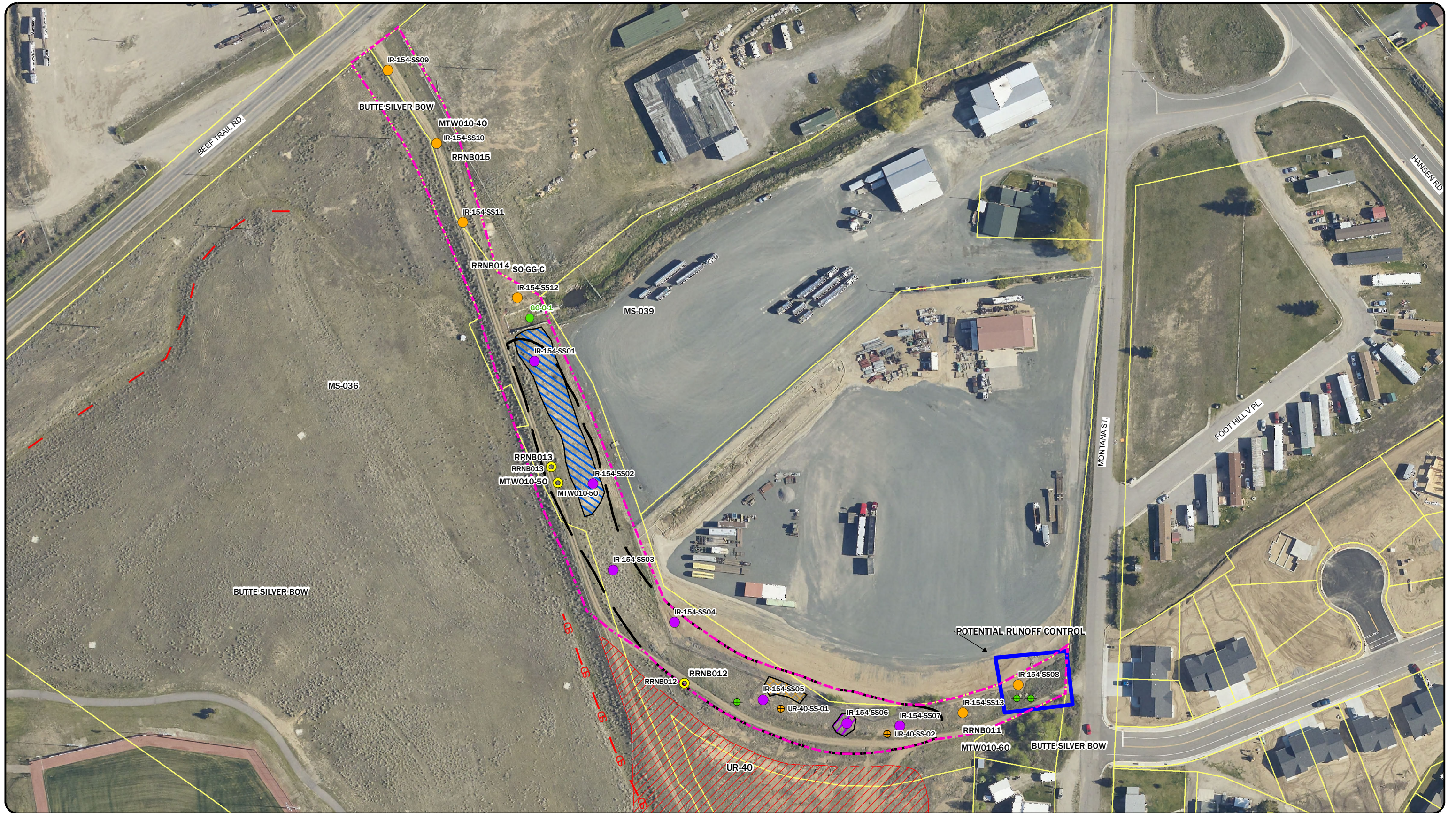
Figure 1 – Insufficiently Reclaimed Sites BRES-154 Clark Mill Tailings NE Proposed Sample Locations

Cc: Patricia Gallery / Atlantic Richfield - email  
Chris Greco / Atlantic Richfield – email  
Josh Bryson / Atlantic Richfield - email  
Mike Mc Anulty / Atlantic Richfield - email  
Loren Burmeister / Atlantic Richfield – email  
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John Davis / PRR - email  
Joe Vranka / EPA - email  
David Shanight / CDM - email  
Curt Coover / CDM - email  
James Freeman / DOJ - email  
John Sither / DOJ - email  
Jenny Chambers / DEQ - email  
Dave Bowers / DEQ - email

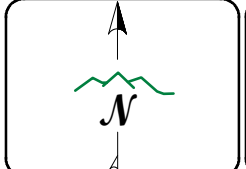
Carolina Balliew / DEQ - email  
Matthew Dorrington / DEQ - email  
Jim Ford / NRDP - email  
Ray Vinkey / NRDP - email  
Harley Harris / NRDP - email  
Katherine Hausrath / NRDP - email  
Meranda Flugge / NRDP - email  
Ted Duaine / MBMG - email  
Gary Icopini / MBMG - email  
Becky Summerville / MR - email  
Kristen Stevens / UP - email  
Robert Bylsma / UP - email  
John Gilmour / Kelley Drye - email  
Leo Berry / BNSF - email  
Robert Lowry / BNSF - email  
Brooke Kuhl / BNSF – email  
Mark Engdahl / BNSF - email  
Jeremie Maehr / Kennedy Jenks - email  
Annika Silverman / Kennedy Jenks - email  
Matthew Mavrinac / RARUS - email  
Harrison Roughton / RARUS - email  
Brad Gordon / RARUS - email  
Mark Neary / BSB - email  
Eric Hassler / BSB - email  
Julia Crain / BSB - email  
Chad Anderson / BSB - email  
Brandon Warner / BSB – email  
Abigail Peltomaa / BSB - email  
Eileen Joyce / BSB – email  
Sean Peterson/BSB – email  
Gordon Hart / BSB – email  
Jeremy Grotbo / BSB – email  
Josh Vincent / WET - email  
Craig Deeney / TREC - email  
Scott Bradshaw / TREC - email  
Brad Archibald / Pioneer - email  
Pat Sampson / Pioneer - email  
Mike Borduin / Pioneer - email  
Joe McElroy / Pioneer – email  
Andy Dare / Pioneer – email  
Karen Helfrich / Pioneer - email  
Leesla Jonart / Pioneer - email  
Connie Logan/ Pioneer – email  
Ian Magruder/ CTEC- email  
CTEC of Butte – email  
Scott Juskiewicz / Montana Tech – email

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

**Figure 1**  
**Proposed Sample Locations**



LEGEND	
<b>Proposed Sample Locations QAPP Program</b>	
<span style="color: purple;">●</span> Sample Under IR QAPP	<span style="color: green;">+</span> UNNAMED STORM OUTLET LOCATION
<span style="color: orange;">●</span> Sample Under UR QAPP	<span style="color: orange;">⊕</span> UR-40 SAMPLE LOCATION
<span style="color: yellow;">○</span> Historic Sample Location	<span style="color: red;">-S-</span> STORM WATER SWALE
<span style="border: 1px dashed pink; display: inline-block; width: 10px; height: 10px;"></span> PROPOSED IR SAMPLING BOUNDARY	<span style="border: 1px dashed black; display: inline-block; width: 10px; height: 10px;"></span> INSUFFICIENTLY RECLAIMED AREA
<span style="border: 1px dashed yellow; display: inline-block; width: 10px; height: 10px;"></span> PROPERTY OWNERSHIP	<span style="border: 1px dashed blue; display: inline-block; width: 10px; height: 10px;"></span> BRES EVALUATION VEGETATIVE IMPROVEMENT
<span style="border: 1px dashed orange; display: inline-block; width: 10px; height: 10px;"></span> BRES EVALUATION EXPOSED WASTE	<span style="border: 1px dashed purple; display: inline-block; width: 10px; height: 10px;"></span> BRES EVALUATION BARREN AREA
<span style="color: green;">●</span> STORM WATER OUTLET	



DISPLAYED AS:	MSP
PROJECTION / ZONE:	NA
DATUM:	INTL FT
UNITS:	PIONEER/QSI2020
SOURCE:	
Feet	

**FIGURE 1**

**PIONEER**  
TECHNICAL SERVICES, INC.

**INSUFFICIENTLY RECLAIMED SITES BRES-154 CLARK MILL TAILINGS NE PROPOSED SAMPLE LOCATIONS**

DATE: 12/1/2021