

STATE OF MONTANA, NATURAL RESOURCE DAMAGE PROGRAM



January 16, 2025

Ms. Emma Rott
Superfund Remedial Program Manager
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Helena, MT 59626

Mr. William Lindsey
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U.S. EPA Region 8
1595 Wynkoop Street
Denver, CO 80202

RE: NRDP Comments on BP-Atlantic Richfield (BP-AR's) Draft Materials Management Plan and Associated Documents at Butte Priority Soils Operable Unit of the Silver Bow Creek/Butte Area Superfund Site

Dear Ms. Rott and Mr. Lindsey:

As you know, the Natural Resource Damage Program (NRDP) works on behalf of the Governor as natural resource trustee for the State of Montana to coordinate restoration with remedy.

Because restoration settlements were agreed to prior to final remedy decisions and restoration is the residual of remedy, NRDP is charged with assuring that restoration funds are not spent on remedy.

NRDP has a responsibility to safeguard the State's significant BPSOU investments in connection with decisions pertaining to contaminated groundwater and its impacts to Blacktail or Silver Bow Creeks. Specifically, the Trustee expended over \$33.0M to protect Blacktail and Silver Bow Creeks from contaminated groundwater discharge with the Parrot Tailings Waste Removal Project alone.

As required by the NCP, NRDP coordinates with EPA, as the lead agency, at every stage of enforcement and response actions. This includes ensuring that any restoration actions implemented by the State do not interfere with the remedy and are not otherwise inconsistent

with the remedy. NRDP also shares data that can be used for response. In turn, EPA is required by the NCP to coordinate all assessments, evaluations, investigations, and planning with NRDP. NRDP has a shared responsibility with DEQ to ensure that the BPSOU CD is being implemented as executed and that the State's interests, and liabilities are protected and adequately addressed.

On November 21, 2024, NRDP received the current version of "*Draft Final Materials Management Plan – Silver Bow Creek Conservation Area (SBCCA)*" (Draft MMP) for review and comment. NRDP requests written responses to the following comments.

General Comment 1:

It is difficult to review this document without other documents that have not yet been received by NRDP.

As with previous versions of this Draft MMP document, this Draft MMP is dependent on and incorporates analysis, methods, and determinations from numerous other documents that have not been received or approved. These missing documents all must be received and reviewed before a determination can be made as to the draft MMP and CD compliance and potential impact to restoration projects.

At a minimum, the documents NRDP needs to be able to review contemporaneously with this Draft MMP are:

- "*Technical Specifications. Atlantic Richfield Company, 2024.*" It appears that this document needed revision, and this revision has not been provided to the CD parties.
- "*Construction Quality Assurance Plan. Atlantic Richfield Company, 2024.*" It appears that this document has not been provided to the CD parties.
- "*Construction Monitoring Quality Assurance Project Plan. Atlantic Richfield Company, 2024.*" It appears that this document has not been provided to the CD parties.
- "*Construction Drawings*" in Attachment B of each design. Some version (30%, 60%, etc.) of these designs are available.

In NRDP's view, this document, and all the others that are necessary to review to understand it, and this process for making obvious decisions such as what Waste to remove, is unnecessarily complex and confusing. The net effect of this current process of dozens of documents, including information for making decisions that are defined in the BPSOU CD, is that critical information and CD compliance decisions are extremely difficult to find and/or not available.

General Comment 2:

BP-AR is submitting documents where the proposed remedial actions do not comply with the location/spatial requirements in Attachment C Tables.

The required remedial actions are primarily defined in the BPSOU CD Appendix D, Attachment C. Three Tables from Attachment C (attached) outline requirements for the remedial actions:

- Table 1 identifies the numeric criteria for Waste;

- Table 2 outlines the numeric criteria for backfill (“Backfill”); and
- Table 3 outlines the numeric criteria for caps/engineered covers (“Caps”).

The footnotes in Tables 2 and 3 define where Backfill or Cap materials can be used (i.e. “location/spatial controls”).

The Draft MMP Section 3.0, BACKFILL MATERIAL CHARACTERIZATION AND REUSE PLAN, describes the numeric criteria for Tables 2 and 3 use but does not describe the location/spatial requirements that also apply to the categories of materials. Table 2 and Table 3 have specific location/spatial requirements that should be fully detailed in this section.

In NRDP’s June 26, 2024, comments to EPA on BP-ARs “*Diggings East 60% Remedial Design Package*,” we identified a number of instances where BP-AR’s design did not meet the location/spatial specific requirements for Table 2 Backfill or Table 3 Caps (NRDP, 2024b, see Comments on applicable DE 60% Design Figures section).

Another example where these location/spatial requirements are not being followed was detailed in NRDPs May 30, 2024, “*100% Grove Gulch Final Submittal*.” We identified where BP-AR had actually changed the location/spatial specific footnote requirements of the BPSOU CD Table 2 and Table 3. BP-AR made the changes in their document’s Table 3.

Based on BP-AR’s “*Diggings East 60% Remedial Design Package*” and “*100% Grove Gulch Final Submittal*,” it appears that they may be requesting to modify parts of these Tables’ location/spatial specific requirements. If BP-AR or EPA is looking to modify any part of the requirements in these Tables, please let NRDP know as soon as possible so we can work through the requested changes.

General Comment 3:

BP-AR’s continued reliance on using numeric modeling and/or visual identification does not meet the numeric requirements of BPSOU CD Table 1-Waste.

NRDP believes that BP-AR’s reliance solely on numeric modeling or visual identification to determine where Waste, Backfill or Cap materials, all CD regulated materials with numeric standards, are located for compliance purposes is not sufficient.¹ It appears that BP-AR agrees with that conclusion as it relates to Backfill or Cap materials as they are proposing to sample and analyze these materials prior to any reuse. Sampling and analysis will demonstrate that the materials meet the Table’s numeric requirements. NRDP believes that the proposed sampling

¹ “EPA does not agree with the waste volumes defined by the EVS model described in Attachment F (Grove Gulch Earth Volumetric Studio Model Inputs Technical Memorandum) of Appendix A (Predesign Investigation Report) of the Final Remedial Design Report (dated March 2024). However, EPA agrees that, as stated in EVS model described in this technical memorandum will also be removed from the project and taken to an approved repository”. Therefore, material defined as waste by the EVS model and excavated material not defined as waste by the EVS model will be moved to a repository. That is, all excavated material will be removed to a repository.” (page 5 of EPAs May 29, 2024, GG comments to BP-AR).

methods and frequency are currently inadequate and not technically supported but we do agree sampling is necessary (see Comments 7-9 below).

While utilizing a numeric model based in limited data to estimate material quantities for bidding purposes is standard practice in CERCLA remedial projects, NRDP believes confirmation sampling is necessary here. The proposed numeric modeling cannot be used alone to determine the extent and location of contamination.

BP-AR's own consultant who developed the Diggings East (DE), Butte Reduction Works and the Northside Tailings numeric models states in the DE report's conclusions: "*Therefore, this tool (i.e. the numeric model) should be viewed as a guide to assist in design and not as a real-world view of the concentrations within the Site.*" (ARC, 2024). NRDP fully agrees with this statement on the applicability and usefulness of the numeric models. These models do not predict "real-world" conditions when it comes to identifying Waste or any other BPSOU CD defined materials.

General Comment 4:

Use of the term "Silver Bow Creek Conservation Area" (SBCCA)

The title of this document and use throughout of the term "The Silver Bow Creek Conservation Area (SBCCA)" is not a requirement of the BPSOU CD or its required remedial actions and does not have any legal or programmatic meaning under CERCLA. These documents and the actions described within them are requirements under the BPSOU CD. EPA and the State have no legal oversight or involvement with the SBCCA.

In order to provide clarity to the public and the reader, we think it would be helpful to explain how the MMP, and other future documents, applies to the BPSOU CD remedial requirements. These sections could also explain how the "SBCCA" overlaps geographically with the BPSOU CD requirements but is not a part of the BPSOU CD process.

General Comment 5:

Proper citation of location/spatial specific controls

The location/spatial specific controls, i.e. the footnotes that define where the Backfill and Cap materials can be used, and numeric requirements of Table 2 and Table 3 must be accurately described and met in all BPSOU CD design documents. These requirements apply regardless of the source of the materials (i.e. onsite or offsite). NRDP requests that EPA ensure all BP-AR submittals meet the letter and intent of Attachment C.

Specific Comments:

Comment 1:

Section 1.3.3 Excavation Depths:

Excavation depths are established in the FRESOW and are specific to each SBCCA project area, as follows: BRW – The excavation depth at the BRW project area is defined by the depth to which

materials exceed the Waste Identification Criteria, included in Table 1 of the FRESOW (see Table 1), within the removal corridor as defined within the FRESOW.”

This is an example of the confusing nature with terminology. The BRW is a remedial FRESOW of the CD not a “SBCCA.” NRDP agrees with this statement and would like to point out that contaminant concentrations define depth of removal at the BRW and BTC, not a suspect approximation determined by a numerical model that has been “correlated” (see Specific Comment 4).

Comment 2:

Section 1.5.2 Computer Generated Models:

“The 3D models were used to define waste extents, ultimately establishing the design excavation surface that would achieve RAOs for waste removal with a high degree of confidence. This surface is shown on the Construction Drawings in Attachment B of the RAWP for each project area.”

NRDP believes that EPA should not permit BP-AR to rely solely on numeric modeling to demonstrate BPSOU CD compliance for Waste removal or use of Table 2 or Table 3 materials. These numeric models do not achieve the RAOs for Waste removal “with a high degree of confidence”. In fact, for some site contaminants there is an absence of confidence. This statement should be corrected (see NRDP, 2024a and NRDP, 2024b comments).

In addition, the Construction Drawings provided in Attachment B show the waste areas horizontal extent and not the vertical extent. Excavation surfaces are usually provided in two dimensions and not one.

BP-AR should be required to develop an acceptable BPSOU CD compliance sampling and analysis Work Plan (WP), Sampling and Analysis Plan (SAP), and Quality Assurance Project Plan (QAPP) to ensure compliance with the BPSOU CD numeric criteria detailed in Tables 1-3, as is the accepted CERCLA practice. EPA has guidance on the components of each document.

Although NST, DE, and BG require removal of Waste to a predetermined elevation (it is expected that any materials being left above this elevation are adequately sampled), 3-year high groundwater, which is simpler to verify, the Butte Reduction Works Smelter Site (BRW) and the Blacktail Creek Remediation and Groundwater Control (BTC) BPSOU CD requires “all” Waste within its boundaries to be removed from these locations. This requirement for BTC and BRW was intentional. The BTC and BRW sites sit in the floodplains of Blacktail and Silver Bow Creeks whose surface water exceeds State of Montana DEQ-7 standards and have highly-contaminated instream sediments that impact state surface water and the remedial action in the Streamside Tailings Operable Unit (SSTOU). The BRW and parts of BTC Wastes also produce highly-contaminated groundwater that currently discharges to Silver Bow Creek causing surface water exceedances and contaminating instream sediments that are then transported downstream to the SSTOU.

The goal for all BPSOU CD materials characterization (WP/SAP/QAPP) should be to document CD compliance with numeric requirements included in the BPSOU CD. -Characterization is necessary to demonstrate compliance with Attachment C: Table 1-Waste identification; Table 2-Backfill Suitability Criteria; and Table 3-Engineered Caps/Cover Systems Material Suitability Criteria.

As stated previously, NRDP recommends including sampling with an X-ray fluorescence (XRF) meter with laboratory correlation. This approach is inexpensive and does not reduce construction efficiency. In implementing the Parrot Tailings Waste Removal Project, the State moved almost 2,000,000 cubic yards (cy) using XRF/laboratory sampling in real time for all materials. XRFs have been utilized in CERCLA waste cleanups for over 20 years with great success. Our experience was that using real-time onsite XRF sampling:

1. ensured project numerical contaminant requirements were met,
2. expedited the construction progress, and
3. substantially reduced project costs.

NRDP documented the bases and methods in a 2021 Technical Memorandum (NRDP, 2021). We would be happy to share this again; just let us know.

Comment 3:

Section 1.6 Backfill and Engineered Caps/Cover Systems:

Backfill materials are required to reestablish final grades for the SBCCA project area remedies and final landscaping. Engineered caps/cover systems are required to provide cover and support revegetation of the project areas. Backfill and engineered caps/cover system materials meeting specific material suitability requirements will be obtained using a combination of imported materials from off-site sources and reuse materials generated from on-site excavation.”

Section 1.6 should describe and reference the location/spatial controls of the Table 2 and Table 3 footnotes.

Comment 4:

Section 2.1.2 Tailings, Waste, and Contaminated Soils Delineation:

“Tailings, waste, and contaminated soils were characterized and delineated according to waste identification criteria provided in Table 1 of the FRESOW and sample data collected under the project PDIWPs. The delineation process included data correlation and modeling identified in Section 1.5 and review of past land uses of each site from historical maps, aerial photographs, and site visits. The resulting waste extents and excavation limits are detailed on the Construction Drawings in Attachment B of the individual SBCCA project area RAWPs and shown on the following figures of this MMP for each applicable project area:

- BRW – Figure 4a.
- BG – Figure 5a.
- DE – Figure 6a.

- NST – Figure 7.

The Construction Drawings show the waste to be excavated and removed in plan and cross-sectional views, as defined by data correlation and modeling addressed in Section 1.5.”

See General Comments 2 and 3 above. This section is inconsistent with statements in Section 1.5.2 of the Draft MMP that *“The 3D models were used to define waste extents, ultimately establishing the design excavation surface that would achieve RAOs for waste removal with a high degree of confidence. This surface is shown on the Construction Drawings in Attachment B of the RAWP for each project area.”*

It appears that BP-AR did not just use its “modeling,” as described in Section 1.5.2, to identify Waste, and therefore non-waste materials, but also used other methods such as “*past land uses,*” “*historical maps,*” “*aerial photographs,*” “*data correlation,*” and “*site visits.*” What exactly is “*data correlation*”? It should be defined and described. Although these methods are helpful in identifying Waste, contaminant concentrations cannot be seen and the BPSOU CD definition for Waste is based on contaminant concentrations and not visual identification or numeric model predictions based on limited site data with very low statistical correlation.

Comment 5:

Section 2.2 Slag Management:

Please see above General Comments 2 and 4 about using in situ sampling/analysis results to identify Waste. Slag is not a defined material in BPSOU CD or Attachment C. Similar to other Waste, unless the plan is to remove all slag as Waste, please clarify that the slag will be identified based on sampling results demonstrating whether it fails the Table 1 Waste criteria. All Wastes exceeding the criteria must be removed in the BPSOU CD defined areas.

Comment 6:

Section 3.0 BACKFILL MATERIAL CHARACTERIZATION AND REUSE PLAN:

This section excludes the location/spatial specific requirements for Backfill and Cap uses found in the footnotes of Tables 2 and 3 respectively (see General Comment #2). Table 2 and Table 3 location/spatial specific requirements are:

Table 2 - Backfill Material Suitability Criteria

Criteria A - RIPARIAN, WETLAND AND SUB-IRRIGATED GROWTH MEDIA, applies to all replacement soils in:

- a. All areas of Blacktail Creek and Butte Reduction Works; and,
- b. Buffalo Gulch, Grove Gulch, Northside Tailings and Diggings East materials for the stormwater basin inlet and outlet channels, vegetated swales and bypass areas, and above the stormwater liner systems.

Criteria B - GENERAL FILL, applies to structural fill below Diggings East and Buffalo Gulch stormwater basins (including associated inlet and outlet structures), Grove Gulch and

Northside Tailings sedimentation basins (including inlet and outlet structures as appropriate).
Not for use in-stream or in floodplains.

Criteria C - IN-STREAM SEDIMENT REPLACEMENT MEDIA, applies to all materials placed in Blacktail, Silver Bow Creek below the confluence with Blacktail Creek and Confluence Area channel

Table 3 - Engineered Caps/Cover Systems Material Suitability Criteria

Criteria D - RIPARIAN OR SUB-IRRIGATED ENGINEERED CAP/COVER SYSTEMS applies to Engineered Caps at Northside Tailings, Grove Gulch and Buffalo Gulch.

Criteria E - UPLAND ENGINEERED CAP/COVER SYSTEMS, applies to Engineered Caps in upland areas of Diggings East and Northside Tailings. Criteria E does not apply to any sub-irrigated, wetland or riparian areas of Northside Tailings and Diggings East.

The BPSOU CD location/spatial specific requirements need to be represented by BP-AR in all BPSOU CD documents and on all design sheets.

Comment 7:

Section 3.3: On-Site Reuse Materials:

NRDP does not believe that stockpiling materials from identified and defined waste areas prior to sampling meets the requirements. Stockpiling in off-site/ “clean” areas with previous acceptable data and away from known waste sources may be an accepted practice.

In known waste areas, stockpiling prior to sampling is a form of “blending,” which is prohibited in the BPSOU CD. Attachment C, Sections: 1.1.3, 1.4 #4, 2.3.1, 2.4 #5, 3.1.3, 3.4 #5, 4.3 #4, “Blending of waste material and clean material will not be allowed.” Onsite materials should be sampled in-situ prior to blending and mixing into a stockpile. NRDP requests that EPA require a WP/SAP/QAPP that includes sampling of potential onsite “expected non-wastes” in-situ prior to blending it into a stockpile.

In addition, all final excavation surfaces should be sampled to show CD criteria are met and to document final conditions. This will primarily apply to BRW, BTC, and Grove Gulch.

Comment 8:

Section 3.3.1.4 Potential On-Site Reuse Material Sampling and Analysis:

“Potential on-site material must meet the requirements described in Tables 2 and 3 of the FRESOW to be eligible for reuse. No on-site material will be reused if it exceeds any single metal analyte of the Table 2 or Table 3 suitability criteria, as applicable for the materials intended use (see Table 2 and Table 3). To make this determination, composite soil samples will be collected at a frequency of 1 sample per every 5,000 cy of materials excavated and stockpiled. Samples will be analyzed for FRESOW Tables 2 and 3 criteria parameters per the SBCCA Construction Monitoring QAPP (Atlantic Richfield Company, 2024c). Materials that meet

FRESOW Tables 2 or 3 requirements will be classified into material types A through E according to the suitability criteria they meet. Some materials may meet requirements for multiple material types and will be identified accordingly. Materials that do not meet these criteria will be hauled to an approved disposal location under the condition that they meet the applicable acceptance criteria. The extents and locations where suitable materials can be placed are shown on the Construction Drawings in Attachment B of the BG and DE RAWPs.”

In this instance BP-AR will use the numerical model/visual identifications to identify Table 2 and Table 3 materials initially. The materials will then be sampled to show compliance with the BPSOU CD by providing numeric results, which are part of the requirements of Tables 1-3 of Appendix D, Attachment C. NRDP supports a sampling-based framework for all numerical BPSOU CD materials requirements.

Comment 9:

Section 3.3.1.4 Potential On-Site Reuse Material Sampling and Analysis:

NRDP does not believe that one 5-point composite sample from every 5,000 cy of onsite, i.e. in the contaminated area, materials has any technical or statistical basis and is an entirely inadequate sampling frequency for a contaminated area. 5,000 cy is about 500 over-the-road side dump trucks typically used in these projects.

MT DEQ State Superfund Unit’s guidance document “**How do I demonstrate that borrow material is clean?**” States, “*It is important to demonstrate that the imported material does not contain contaminants at concentrations greater than applicable screening levels or cleanup levels*” (DEQ, June 5, 2023). “*Generally, at least one 5-point composite sample needs to be collected for every 400 cubic yards of borrow material. If large volumes of borrow material are needed from the same source, you may propose an alternative sample frequency for DEQ approval. Samples collected for metals should be sieved according to SSU’s soil sieving FAQ, which can be found on the SSU Website under “Frequently Asked Questions” in the dropdown tab for “Soil.” Generally, samples for metals should be sieved to a No. 100 (<150 um) particle size. If other contaminant analyses are required, the soil for those samples should not be sieved.*” (page 3, DEQ 2023)

It should be noted that DEQs requirements are for “clean materials” outside the contaminated project area. Please use DEQ’s above approach.

Comment 10:

Section 3.3.1.6 Placed On-Site Material Quality Assurance:

“On-site reuse materials will be placed in accordance with the SBCCA Technical Specifications (Atlantic Richfield Company, 2024b) and monitored in accordance with the SBCCA Construction Monitoring QAPP (Atlantic Richfield Company, 2024c).”

Please ensure that the Technical Specifications and Construction Monitoring QAPP are consistent with footnotes of Table 2 (location/spatial restrictions for use of the Backfill), or Table

3 (locations for the caps). Again, it is difficult to review the Draft MMP without these documents.

Comment 11:

Figure 8:

This Figure lists “*GROWTH MEDIA AND COVER SOIL REMOVAL EXTENTS (6.9 ACRES)*” This is not a cover system defined in Table 3, nor is there any description of which Fill material(s) will be used, as defined in Table 2. It might help expedite the remedial process if the Table 2 and 3 category terminology was used by all parties.

Thank you for considering our comments.

Sincerely,



Jim Ford

cc:

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Amy Steinmetz / DEQ
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Katie Garcin-Forba / DEQ
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Mark Thompson / MR

Becky Summerville / MR
John DeJong / UP
Robert Bylsma / UP
John Gilmour / Kelley Drye
Leo Berry / BNSF
Robert Lowry / BNSF
Brooke Kuhl / BNSF
Lauren Knickrehm / BNSF
Doug Brannan / Kennedy Jenks
Matthew Mavrincac / RARUS
Harrison Roughton / RARUS
Brad Gordon / RARUS
Mark Neary / BSB
Eric Hassler / BSB
Brandon Warner / BSB
Abigail Peltomaa / BSB
Aaron Rains / BSB
Sean Peterson / BSB
Josh Vincent / WET
Kevin Bethke / W&C
Scott Bradshaw / W&C
Emily Evans / W&C
Paddy Stoy / W&C
Joe McElroy / Pioneer
Troy Colvin / Pioneer
Mark Meyer / Pioneer
Pat Sampson / Pioneer
Karen Helfrich / Pioneer
Brad Hollamon / Pioneer
Randa Colling / Pioneer
Rich Keeland / Aspect
Andy White / Aspect
Elizabeth Erickson, BNRC



ARC, 2017. Draft 3-Year Maximum Observed Potentiometric Surface (2014-2016) Technical Memorandum. Prepared by Pioneer Technical Services, Inc., April 26, 2017.

ARC, 2024. Draft Final Diggings East Stormwater Basin Area Leapfrog Model Report, 2024

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EPA, 2020. Consent Decree for the Butte Priority Soils Operable Unit. U.S. Environmental Protection Agency. February 13, 2020.

https://www.co.silverbow.mt.us/DocumentCenter/View/17494/BPSOU-Consent-Decree_-_FINAL-to-BSB-County_02_10_2020

NRDP, 2020. Draft Final – Butte Area One Parrot Performance Monitoring Program Conceptual Site Model, May 2020

<https://dojmt.gov/wp-content/uploads/DRAFT-FINAL-Butte-Area-One-Parrot-CSM-compressed.pdf>

NRDP, 2021. “Parrot Tailings Waste Removal Project, Waste Identification Criteria Development, and Implementation” September 22, 2021

<https://dojmt.gov/wp-content/uploads/Parrot-Project-Materials-Screening-Methods-rs.pdf>

NRDP, 2023. Comments on BPSOU “Comments on BPSOU Grove Gulch Submittals Received from British Petroleum-Atlantic Richfield (BP-AR) on 9/25/2023” October 11, 2023

<https://dojmt.gov/wp-content/uploads/2023.10.11-NRDP-95-GG-Comments-rs.pdf>

NRDP, 2024a. Comments on BPSOU “100% Grove Gulch Final Submittal” Received from Atlantic Richfield Company (BP-AR) on 3/22/2024, May 30, 2024

<https://dojmt.gov/wp-content/uploads/NRDP-GG-100-Design-Comments.pdf>

NRDP, 2024b. Comments on BPSOU “Diggings East 60% Design Package” Received from Atlantic Richfield Company (BP-AR) on 4/23/2024, June 26, 2024

https://dojmt.gov/wp-content/uploads/2024/12/Draft-DE-60_-_Design-Comments-1.pdf

Attachments:

A – BPSOU CD Table 1. Waste Identification Criteria

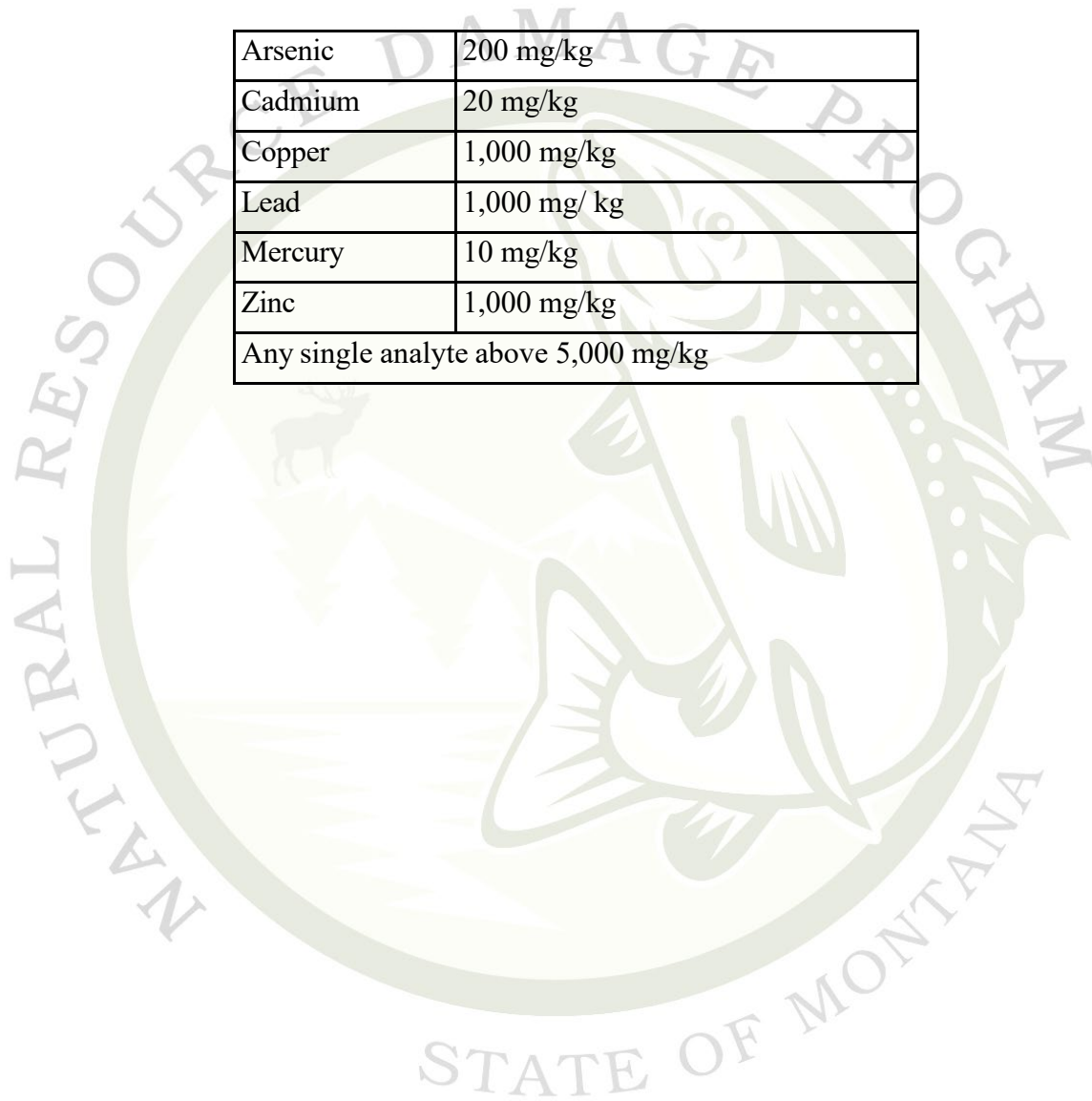
B – BPSOU CD Table 2. Backfill Suitability Criteria

C – BPSOU CD Table 3. Engineered Caps/Cover Systems Material Suitability Criteria

Table 1. Waste Identification Criteria

If three of the six contaminant criteria listed are exceeded or any one contaminant is above 5,000 mg/kg then, the material is considered tailings, waste, or contaminated soil.

Arsenic	200 mg/kg
Cadmium	20 mg/kg
Copper	1,000 mg/kg
Lead	1,000 mg/ kg
Mercury	10 mg/kg
Zinc	1,000 mg/kg
Any single analyte above 5,000 mg/kg	



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 Partial Remedial Design/Remedial Action and Operation and Maintenance

Table 2: Backfill Material Suitability Criteria

PARAMETER	CRITERIA A ¹ RIPARIAN, WETLAND AND SUB-IRRIGATED GROWTH MEDIA	CRITERIA B ^{2,3} GENERAL FILL	CRITERIA C ⁴ IN-STREAM SEDIMENT REPLACEMENT MEDIA
Soil Texture			
USDA Texture	Not Sa, LoSa or Cl	Not clay soils	TBD during design phase
Sand	20-70%		
Silt	10-60%		
Clay	5-30%		
Coarse Fraction (%>2mm)	<35%, Maximum fragment size = 3 inches	<60%, Maximum fragment size = 18 inches	
pH		5.5 to 8.5 S.U.	
EC/Salinity	<4.0 mmho/cm	<6.0 mmho/cm	TBD during design phase
SAR	<12		
Soil Saturation Percentage	Between 25% and 85%		
Metals			
Arsenic	<30 mg/kg	<200 mg/kg	<30 mg/kg
Cadmium	<4 mg/kg	<20 mg/kg	<4 mg/kg
Copper	<100 mg/kg	<1,000 mg/kg	<100 mg/kg
Lead	<100 mg/kg	<1,000 mg/kg	<100 mg/kg
Mercury	<5 mg/kg	<10 mg/kg	<5 mg/kg
Zinc	<250 mg/kg	<1,000 mg/kg	<250 mg/kg
Nutrients			
Phosphorous (P)	P, K, and NO ₃ will be used to verify fertilizer rates	Not Applicable (NA)	NA
Potassium (K)			
Nitrate + Nitrite (NO ₃)			
Organic Matter	3% minimum organic matter on a dry weight basis in the upper 6 inches of cover soil		
Vegetation	Vegetation shall consist of native species appropriate to the riparian, wetland, or sub-irrigated setting to the extent practicable. Final revegetation shall be determined as part of remedial design activities.	Not for use in Engineered Caps. This material can only be placed >18 inches below ground surface for structural needs.	NA

1 - Criteria A, from the SSTOU soil suitability requirements, applies to all replacement soils in:

a. All areas of BTC and BRW; and

b. BG, GG, NST and DE materials for the stormwater basin inlet and outlet channels, vegetated swales and bypass areas, and above the stormwater liner systems.

2 - Criteria B applies to structural fill below DE and BG stormwater basins (including associated inlet and outlet structures), GG and NST sedimentation basins (including inlet and outlet structures as appropriate). Not for use in-stream or in floodplains.

3 - Inert solid wastes and construction debris includes only unpainted masonry brick, dirt, rock, and concrete, and shall meet metals criteria in Table 2. Concrete size shall not exceed 3 feet by 3 feet.

4 - Criteria C applies to all materials placed in Blacktail, Silver Bow Creek below the confluence with Blacktail Creek and Confluence Area channel and riparian areas including the Blacktail Creek wetlands.

Consent Decree for the Butte Priority Soils Operable Unit
Partial Remedial Design/Remedial Action and Operation and Maintenance

Table 3: Engineered Caps/Cover Systems Material Suitability Criteria

PARAMETER	CRITERIA D ⁵ RIPARIAN OR SUB-IRRIGATED ENGINEERED CAP/COVER SYSTEMS		CRITERIA E ⁶ UPLAND ENGINEERED CAP/COVER SYSTEMS	
	(0 to 6-inches)	(6 to 18 inches)	(0 to 6-inches)	(6 to 18 inches)
Soil Texture				
USDA Texture	Not Sa, LoSa or Cl		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.	
Sand	20-70%			
Silt	10-60%			
Clay	5-30%			
Coarse Fraction (%>2mm)	<35%, Maximum fragment size = 3 inches	<45%, Maximum fragment size = 6 inches	<45%, Maximum fragment size = 3 inches	<45%, Maximum fragment size = 6 inches
pH	5.5 to 8.5 S.U.			
EC/Salinity	<4.0 mmho/cm			
SAR	<12			
Soil Saturation Percentage	Between 25% and 85%			
Metals				
Arsenic	<30 mg/kg		<97 mg/kg	
Cadmium	<4 mg/kg		<4 mg/kg	
Copper	<100 mg/kg		<250 mg/kg	
Lead	<100 mg/kg		<100 mg/kg	
Mercury	<5 mg/kg		<5 mg/kg	
Zinc	<250 mg/kg		<250 mg/kg	
Nutrients				
Phosphorous (P)	P, K, and NO ₃ will be used to verify fertilizer rates		P, K, and NO ₃ will be used to verify fertilizer rates	
Potassium (K)			Not applicable	
Nitrate + Nitrite (NO ₃)				
Organic Matter	3% minimum organic matter on a dry weight basis in the upper 6 inches of cover soil		3% minimum organic matter on a dry weight basis in the upper 6 inches of cover soil	
Cap and Cover Thickness and Vegetation	Engineered Cap minimum depth is 18 inches. Vegetation shall consist of native species appropriate to the riparian setting to the extent practicable. Final revegetation and capillary break design (if necessary) shall be determined as part of remedial design activities.		Engineered Cap minimum depth is 18 inches. Vegetation shall consist of native species appropriate to the upland setting to the extent practicable. Final revegetation and capillary break design (if necessary) shall be determined as part of remedial design activities.	

⁵ - Criteria D applies to Engineered Caps at NST, GG and BG set forth in the following figures: Figures NST-1, GG-1, and BG-1.

⁶ - Criteria E applies to Engineered Caps in upland areas of DE and NST set forth in the following figures: Figures DE-1 and NST-1. Criteria E does not apply to any sub-irrigated, wetland or riparian areas of NST and DE set forth in the following figures: Figures NST-1 and DE-1.

