Spring 5-10-2023

Butte Reduction Works (BRW) Phase III Quality Assurance Project Plan (QAPP) Request for Change BRW-2023-01

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May 10, 2023

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RE: Butte Reduction Works (BRW) Phase III Quality Assurance Project Plan (QAPP) Request for Change BRW-2023-01

Agency Representatives:

I am writing you on behalf of Atlantic Richfield Company to submit the BRW Phase III QAPP Request for Change (RFC) BRW-2023-01 for your review and approval. This RFC provides the details necessary to install up to four additional geotechnical boreholes and collect additional geotechnical data. The data will be used to support the design and construction of the proposed bridge replacement that will span the Silver Bow Creek channel on the north side of the BRW Site.

The RFC may be downloaded at the following link:

https://pioneertechnicalservices.sharepoint.com/:f:/s/submitted/ElJjK5GmcNtAo7ISRT8uYF0B_Gfz8cAFBCVAdAWIvBlAaA.

If you have any questions or comments, please call me at (406) 723-1834.

Sincerely,

Josh Bryson, PE, PMP
Liability Manager
Remediation Management Services Company
An affiliate of **Atlantic Richfield Company**

Atlantic Richfield Company

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BPSOU SharePoint - upload

ATLANTIC RICHFIELD COMPANY

RFC - REQUEST FOR CHANGE

DATE May 10, 2023	RFC NO. RFC-BRW-2023-01	CONTRACTOR Pioneer Technical Services, Inc.	RFP NO.
CONTRACT DESCRIPTION: Butte Reduction Works Smelter Area Site		ATTENTION OF: Josh Bryson Liability Manager	
SUBJECT: Installation of Additional Geotechnical Boreholes and Collection of Geotechnical Data ❍ ELECTRICAL ❍ MECHANICAL ❍ CIVIL ⊗ STRUCTURAL/ARCHITECTURAL ❍ INSTRUMENTATION ❍ ENVIRONMENTAL			
OPERABLE UNIT: Butte Priority Soils Operable Unit MAJOR WORK TASKS: Installation of Additional Geotechnical Boreholes		REFERENCE DWG., P.O., TAG, SPECIFICATION NO. (FOR DEVIATIONS OR DEFICIENCIES) ETC.: Final Butte Reduction Works (BRW) Smelter Area Mine Waste Remediation and Contaminated Groundwater Hydraulic Control Site Phase III Quality Assurance Project Plan (QAPP).	

PROBLEM DESCRIPTION:

This request for change (RFC) to the *Final Butte Reduction Works (BRW) Smelter Area Mine Waste Remediation and Contaminated Groundwater Hydraulic Control Site Phase III Quality Assurance Project Plan (QAPP)* (Atlantic Richfield Company, 2022) (Phase III QAPP) provides the procedures and protocols necessary for Atlantic Richfield Company (Atlantic Richfield) to install additional boreholes and collect additional geotechnical data to meet a data quality objective specified in the Phase III QAPP and provide the necessary information to support design and construction of the proposed bridge replacement (North Bridge) that will span the Silver Bow Creek channel on the north side of the site (Figure 1).

One of the data quality objectives within the Phase III QAPP is to help determine the geotechnical details of the site to ensure adequate soil stability around potential structural features. While previous investigations have collected data related to the soil lithologies and presence of slag near the existing bridge, a geotechnical investigation focused on evaluating the physical properties of the soil and slag has not been completed near the North Bridge (Figure 1).

Atlantic Richfield proposes to drill up to four boreholes as part of this RFC. Drilling methods will be selected to accommodate the anticipated materials. Coring and/or sonic drilling will be completed through upper slag materials and a sonic drill, or a hollow-stem auger, will be used to sample alluvial materials beneath the slag. *In-situ* field tests will be conducted to estimate the strength of the soils or slag (when appropriate) at either 2.5 or 5-foot depth intervals. Core and soil samples will be collected from the boreholes and analyzed for geotechnical properties (Table 1). The number and location of the boreholes may be modified as determined by the Field Team Leader and/or Contractor Project Manager (CPM) in consultation with the Contractor Quality Assurance Officer (QAO). Drilling and sampling are to be conducted as per all relevant and applicable Standard Operating Procedures in Appendix A of the Phase III QAPP. Procedures specific to this investigation are provided in this RFC.

Based on field conditions and recommendations from the geotechnical engineer, an appropriate drill rig will be used to complete field testing and collect sample solids for laboratory analysis. The following general procedures will be performed at each borehole location (Figure 1). Note that this list is not intended to be a complete list.

- Prepare drill equipment for operation. This includes, but is not limited to, decontaminating drilling tools and sampling equipment, leveling the rig, preparing the down-hole tool, and establishing the drill location.
- Advance selected drill equipment to collect core approximately 2.5 inches in diameter, or similar size, through the slag.
- Advance the drill casing segment (anticipated to be 5 feet) to complete field testing and collect samples. Boreholes will be advanced at the direction of the Field Team Leader, CPM, or the geotechnical engineer.
- After drilling through the slag, perform Standard Penetration Tests (SPTs) in the soil beneath the slag in approximately 2.5 or 5-foot intervals in general accordance with the Standard Method for SPT and Split-Barrel Sampling of Soils (ASTM D1586; ASTM, 2017a included in Appendix C). Note that the SPTs will be performed by a subcontractor. The geotechnical engineer or Field Team Leader will log the number of blow counts for each test.
- Shelby tube samples will be collected to obtain samples of clay or silt, at the discretion of the Field Team Leader or geotechnical engineer, in accordance with the Standard Practice for Thin-Walled Tube Sampling of Fine-Grained Soils for Geotechnical Purposes (ASTM D1587; ASTM, 2017b included in Appendix C).
- Rock-Quality Designation (RQD) of the slag and soil classification and lithology of each borehole will be logged, and core and soil samples will be collected following the general procedures listed below.

- Continue adding drill casing segments and collecting samples until desired depth has been reached as determined by the Field Team leader or geotechnical engineer. The maximum depth will be 50 feet.
- Decontaminate the drill equipment between investigation locations by rinsing with tap water and/or using a high-pressure washer.
- Backfill borehole with bentonite hole plug.

The locations shown in Figure 1 are approximate and the number and location of the boreholes may be modified as determined by the Field Team Leader and/or CPM in consultation with the Contractor QAO.

A geotechnical engineer will log the RQD of the slag, number of blow counts during the SPT, and soil lithology. The geotechnical engineer will also collect samples for field and laboratory testing, observe existing groundwater conditions (where encountered), inform the driller when to take Shelby tube samples, note the ease or difficulty of drilling, and record any other notable features. Sampling will be performed at each location at the discretion of the geotechnical engineer, Field Team Leader, or CPM following these general procedures:

- Between boreholes, wash all utensils and drilling equipment with a detergent solution, followed by a tap water rinse, a diluted acid rinse, and a final rinse with deionized water.
- Upon receiving the slag cores, open the core, measure the length of recovered material, take a photograph from directly overhead, lock the slag using the RQD index, and place in a core box with the location name, depth interval, and date.
- Upon receiving the split spoon from the driller, open the split spoon, measure the length of recovered material, take a photograph from directly overhead, log the soils, and place in a ziplock bag labeled with the location name, soil depth interval, and date.
- Upon receiving a bag with soil cuttings from the driller, open the bag, take a photograph from directly overhead, and log the soils. Samples may be collected at the discretion of the geotechnical engineer, Field Team Leader, or CPM.
- Upon receiving a Shelby tube from the driller, keep the Shelby tube in an upright position, place the plastic caps over the top and bottom of the Shelby tube and use duct tape or a similar material to secure and seal the caps to the Shelby tube. Place the Shelby tube in a location where it will remain upright and will be subject to minimal movement.
- Select samples may be analyzed at Pioneer Technical Services, Inc. (Pioneer) Material Testing Laboratories for the following (Table 1):
    - Moisture Contents (ASTM D2216).
    - Soil Resistivity (AASHTO 288).
    - Corrosivity pH (AASHTO 289).
    - Soluble Sulfate Content (MT 232-04/EPA 300.0).
    - Mechanical Grain Size Analysis with Hydrometer (ASTM D422).
    - Consolidated Undrained Triaxial Test with Pore Water Pressure (ASTM D4767).
    - Consolidation of Soils (ASTM D2435).
- Place the core samples in properly labeled sample core boxes for transport (the labels will include location, depth interval, and core orientation). It is imperative that the core sample is marked clearly and is carefully transported horizontally, as it will be used for further observation, sample selection, and analysis.

Sediment cores from every borehole drilled during this project will be stored in their entirety (in increments) at the Pioneer field office at 244 Anaconda Road in Butte, Montana, or an alternate suitable location. When it has been determined that enough sample is present for design-related purposes, additional samples will be shared with other parties, transferred from Pioneer's field office, or disposed of appropriately.

All additional quality control details for this project, including documentation; instrument/equipment testing, inspection, maintenance, and calibration; data management procedures; assessment and oversight; and data validation and usability are included in the Phase III QAPP. Additionally, the health and safety concerns and project organization and responsibilities are included in the Phase III QAPP.

References:

Atlantic Richfield Company, 2022. Silver Bow Creek/Butte Area NPL Site Butte Priority Soils Operable Unit Draft Final Butte Reduction Works (BRW) Smelter Area Mine Waste Remediation and Contaminated Groundwater Hydraulic Control Site Phase III Quality Assurance Project Plan (QAPP). Prepared by Pioneer Technical Services, Inc. December 7, 2022.

Figures:
Figure 1 Phase III RFC North Bridge Design Geotechnical Borehole Locations

Tables:
Table 1: Sample Collection, Preservation, and Holding Times

	❍Design Deficiency ❍ Engineering Change Request ❍ Agency Directive ❍ Construction Deficiency ❍ Schedule ❍ Material Substitution ❍ Vendor Material Deficiency ⊗ Scope ⊗ Additional Data Collection ❍ Clarification/Information ❍ Other	

RESPONSE/DIRECTIVE

1. Approve the installation of additional geotechnical boreholes and collection of additional geotechnical data.

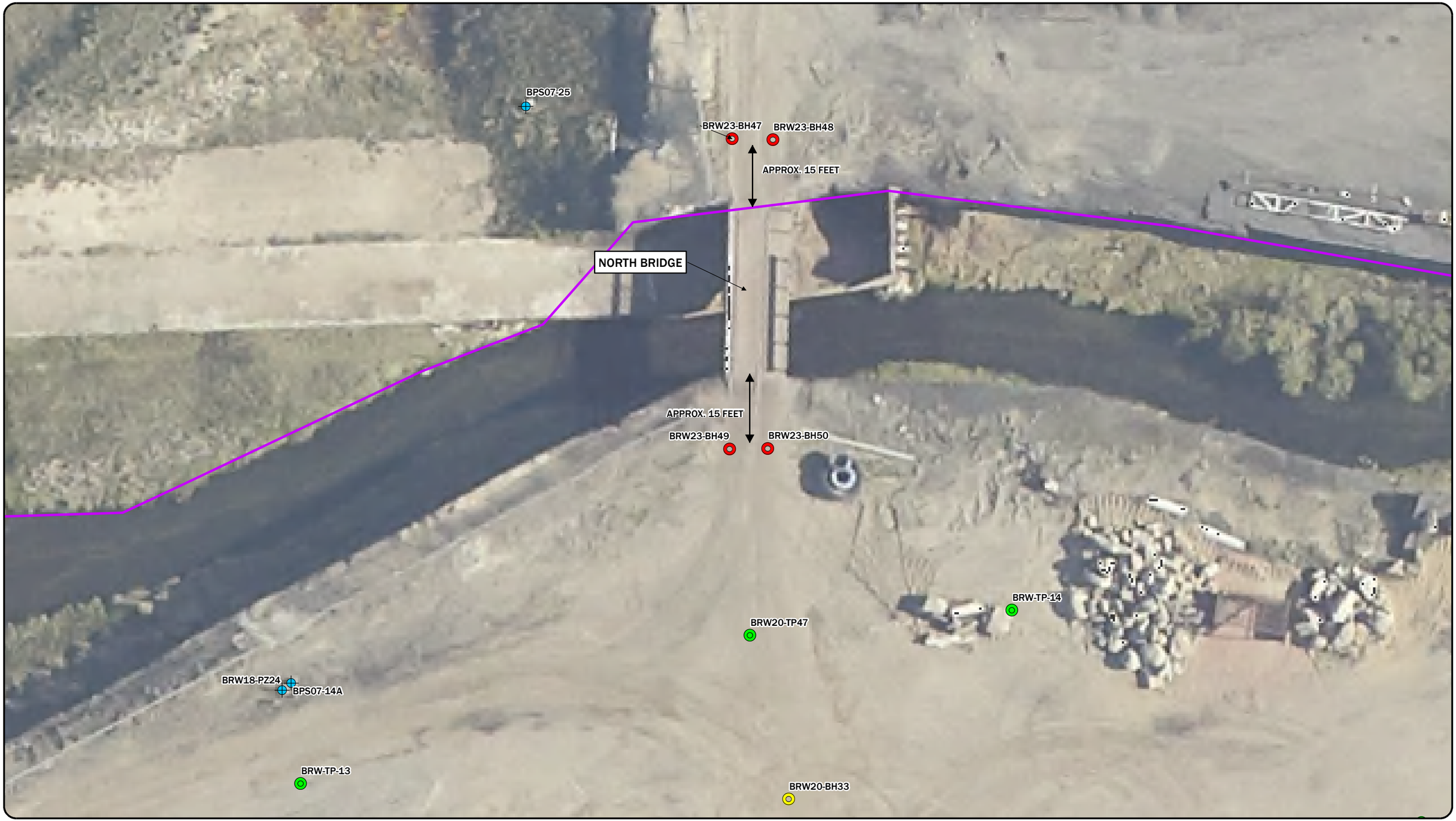
Project Manager Karen Helfrich Date 05/10/2023 .

Atlantic Richfield Co. Representative _____ Date 05/10/2023 .

EPA Representative _____ Date _____.

DEQ Representative _____ Date _____.

CC: See Cover Letter



LEGEND

PROPOSED LOCATIONS
- PHASE III RFC GEOTECHNICAL BOREHOLE

PREVIOUSLY INSTALLED INVESTIGATION LOCATIONS
- BOREHOLE
- MONITORING WELL OR PIEZOMETER
- TEST PIT

BRW SITE BOUNDARY

N

DISPLAYED AS:
PROJECTION/ZONE: PROJECTION
DATUM: DATUM
UNITS: UNITS
SOURCE: SOURCE

0 10 20 40
Feet

FIGURE 1

PHASE III RFC
NORTH BRIDGE DESIGN
GEOTECHNICAL BOREHOLE
LOCATIONS

PIONEER TECHNICAL SERVICES, INC.

DATE: 4/20/2023

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Table 1. Sample Collection, Preservation, and Holding Times

Analytical Group	Analytical Lab/Company[1]	Analyte	Analytical Method	Lab Reporting Limit	Lab Method Detection Limit	Holding Time	Container Size	Preservation	Justification
Soil Laboratory Samples									
(1)	Pioneer's Material Testing Laboratory	Moisture Content	ASTM D2216	NA	NA	10 Days	500 grams	None	Identify soil parameters for geotechnical analysis and liquefaction calculations.
		Resistivity	AASHTO T288			16 hours	1500 grams		
		Mechanical Grain Size Analysis with Hydrometer	ASTM D422			None	20000 grams. Approx. 3/4 of five gallon bucket		
		Atterberg Limits	ASTM D4318			None	200 grams		
		Consolidated Undrained Triaxial Test with Pore Water Pressure	ASTM D4767			3 days[2]	1 Shelby tube		
		Consolidation of Soils	ASTM D2435						
(2)	Alpine Analytical Laboratory	Corrosivity pH	AASHTO T289			15 minutes	300 grams		
		Soluble Sulfate (SO4)	EPA Method 300 or MT 232-04			28 days	300 grams		

[1] Atlantic Richfield may choose to use a different laboratory based on project needs. Regardless of the laboratory chosen, Atlantic Richfield will ensure the necessary reporting limits, required methodology, and the specified quality assurance/quality control and data validation requirements are followed as detailed in the Phase III QAPP. Agencies will be informed of any changes in the reporting limits, methodology, or the quality

[2] 3 days, if Shelby tubes are sealed with plastic caps and duct tape. The hold time can be extended by sealing the plastic caps with wax.