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Approved Butte Priority Soils Operable Unit (BPSOU) Unreclaimed and Insufficiently Reclaimed Sites Request for Information 2022-01

Mike McAnulty

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Atlantic Richfield Company

Mike Mc Anulty

Liability Manager

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January 4, 2024

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RE: Approved Butte Priority Soils Operable Unit (BPSOU) Unreclaimed and Insufficiently Reclaimed Sites Request for Information 2022-01

Agency Representatives:

I am writing to you on behalf of Atlantic Richfield Company to distribute the approved Butte Priority Soils Operable Unit (BPSOU) Unreclaimed and Insufficiently Reclaimed Sites Request for Information (RFI) 2022-01 per Agencies' approval received on January 4, 2024.

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**



A bp affiliated company

Atlantic Richfield Company

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Mave Gasaway / DGS – email
Adam Cohen / DGS – email
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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 Duaine / MBMG – email
Gary Icopini / MBMG – email
Becky Summerville / MR – email
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John Gilmour / Kelley Drye – email
Leo Berry / BNSF – email
Robert Lowry / BNSF – email
Brooke Kuhl / BNSF – email
Lauren Knickrehm / BNSF – email
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CTEC of Butte – email
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BPSOU SharePoint – upload



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Ref: 8MO

January 4, 2024

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

**Re: Approval letter for the Butte Priority Soils Operable Unit (BPSOU) 2022 Final
Insufficiently Reclaimed Sites Quality Assurance Project Plan (QAPP) and 2022
Final Unreclaimed Sites QAPP Request for Information (dated December 22, 2023)**

Dear Mike:

The U. S. Environmental Protection Agency (EPA), in consultation with the Montana Department of Environmental Quality (DEQ), is approving the *2022 Final Insufficiently Reclaimed (IR) Sites Quality Assurance Project Plan (QAPP) and 2022 Final Unreclaimed Sites (UR) QAPP Request for Information (RFI) (dated December 22, 2023)*. Please attach the signature page and distribute as final.

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

Sincerely,

**NIKIA
GREENE**

A red digital signature, appearing as a stylized, flowing line, is positioned to the right of the name NIKIA GREENE.

Digitally signed by NIKIA GREENE
Date: 2024.01.04 07:56:07 -07'00'

Nikia Greene
Remedial Project Manager

Attachments: EPA and MDEQ Signature Page (electronic version only)

Butte File
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Josh Bryson / Atlantic Richfield
Mike Mc Anulty / Atlantic Richfield
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ATLANTIC RICHFIELD COMPANY

RFI - REQUEST FOR INFORMATION

DATE December 22, 2023	RFC NO. RFI-UR-IR-2022-01	CONTRACTOR Pioneer Technical Services, Inc.	RFP NO. NA		
CONTRACT DESCRIPTION: Insufficiently Reclaimed Sites and Unreclaimed Sites Scope of Work, Appendix D, Attachment C, Section 7.0 and Section 8.0, respectively, of the BPSOU Consent Decree (EPA, 2020).		ATTENTION OF: Nikia Greene and Daryl Reed			
SUBJECT: <input type="radio"/> ELECTRICAL <input type="radio"/> MECHANICAL <input type="radio"/> CIVIL <input type="radio"/> STRUCTURAL/ARCHITECTURAL <input type="radio"/> INSTRUMENTATION <input checked="" type="checkbox"/> ENVIRONMENTAL					
OPERABLE UNIT: Butte Priority Soils Operable Unit (BPSOU) MAJOR WORK TASK: 2022 Insufficiently Reclaimed Sites and Unreclaimed Sites Sampling XRF Data Validation		REFERENCE DWG., P.O., TAG, SPECIFICATION NO. (FOR DEVIATIONS OR DEFICIENCIES) ETC: BPSOU 2022 Final Unreclaimed Sites Quality Assurance Project Plan and BPSOU 2022 Final BPSOU Insufficiently Reclaimed Sites Quality Assurance Project Plan			
PROBLEM DESCRIPTION: <p>As initially described in request for change (RFC), RFC-UR-2022-01/RFC-IR-2022-02, appended to the 2022 <i>Final Insufficiently Reclaimed (IR) Sites Quality Assurance Project Plan</i> (QAPP) (Atlantic Richfield Company, 2023a) and 2022 <i>Final Unreclaimed (UR) Sites QAPP</i> (Atlantic Richfield Company, 2023b), newer Niton XL5 X-Ray Fluorescence (XRF) analyzers were employed for 2022 field sampling with the goal of achieving decreased detection limits for cadmium and mercury. During the 2022 XRF analyzer calibration process, field personnel used calibration check standards provided by the equipment manufacturer, including USGS-SdAR-M2 (created by the U.S. Geological Survey [USGS]). This request for information (RFI) describes problems encountered using USGS-SdAR-M2 as a calibration check standard and assignment of XRF data qualifiers as described in RFC-UR-2022-01/RFC-IR-2022-02, specifically for cadmium and mercury.</p> <p>As described in the previously referenced RFC, calibration check standard USGS-SdAR-M2 was evaluated during data validation to ensure 2022 XRF results were within the specified control limits for all analytes. There were instances where USGS-SdAR-M2 was reported as “< LOD” (limit of detection; not detected above the associated XRF error). No data validation qualifiers were applied to the data when the calculated error was within control limits of USGS-SdAR-M2, regardless of whether or not the analyte was detected in USGS-SdAR-M2. This oversight resulted in cadmium data that were not qualified for eight UR Sites and one IR Site (all analyzed by XRF analyzer XL5-02357), as well as mercury data for two IR Sites (both analyzed by instrument XL5-02284). Table 1 and Table 2, below, provide a summary of the unassigned qualifications for cadmium and mercury samples collected in 2022.</p>					
Table 1. Summary of Unassigned Cadmium Qualifications resulting from SRM results < LOD					
Date	XRF ID	Site	Unassigned Cadmium "UJ"	Unassigned Cadmium "J-"	Count of Unassigned Cadmium results within +/- 35%
6/20/2022	X502357	UR-13	35	2	1
6/24/2022	X502357	UR-13	9	4	0
9/26/2022	X502357	UR-12	18	0	0
9/27/2022	X502357	UR-12	21	0	0
9/29/2022	X502357	UR-07	20	1	0
10/3/2022	X502357	UR-20	20	1	0
10/4/2022	X502357	UR-28	9	0	0
10/13/2022	X502357	UR-22	31	5	2
10/13/2022	X502357	UR-06	11	7	0
10/13/2022	X502357	IR-96	1	0	0
12/7/2022	X502357	UR-27	4	0	0
Total Data Points:			179	20	3



Table 2. Summary of Unassigned Mercury Qualifications resulting from SRM results < LOD

Date	XRF ID	Site	Unassigned Mercury "UJ"	Unassigned Mercury "J"
8/12/2023	X502284	IR-16	8	0
8/16/2023	X502284	IR-50	9	0
Total Data Points:			17	0

While data validation qualifiers, as listed above in Table 1 and Table 2, were not assigned for instances where USGS-SdAR-M2 was not detected but the LOD value was within control limits specified, the overarching problem is the Niton XL5 LODs for cadmium and mercury are higher than anticipated and the USGS-SdAR-M2 standard is not appropriate for evaluating 2022 cadmium or mercury results, as highlighted for the Niton XL5 XRF analyzers in Table 3.

Table 3. Niton XL5 LODs compared to USGS-SdAR-M2

Element	Theoretical Niton XL5 Soil LOD (ppm)	Reported Niton XL5 Soil LOD (XL5-02284 ¹ ; ppm)	Actual Niton XL5 Soil LOD (XL5-02284 ² ; ppm)	Reported Niton XL5 Soil LOD (XL5-02357 ¹ ; ppm)	Actual Niton XL5 Soil LOD (XL5-02357 ² ; ppm)	USGS-SdAR-M2 Reference Values (ppm)
Cadmium	2	2.5	12.4	2.9	9.6	5.1
Mercury	3	6.2	1.9	8.4	1.4	1.44

ppm: parts per million.

¹Reported Niton XL5 soil LOD is the 95th Percentile of the reported error of not detected XRF results (LOD reported by the XRF analyzer).

²Actual Niton XL5 soil LOD is the 95th Percentile of corresponding detected laboratory results for not detected XRF results (detected laboratory results).

For the 2022 dataset, since the actual (cadmium) and reported (mercury) Niton XL5 LODs are higher than the anticipated theoretical values, and for the 2018 and 2021 dataset, Niton XL3 field XRF results for cadmium and mercury were not evaluated using low level standards, appropriate assignment of data qualifiers including high and low bias is not supported. With the absence of a detectable low-level calibration check standard, cadmium and mercury field XRF data collected in 2018, 2021, and 2022 should be used with the knowledge that accuracy of results was not verified in the range of sample concentrations.

PROPOSED APPROACH:

Field sampling conducted during 2018, 2021, and 2022 incorporated confirmation laboratory analyses of field XRF results, which enables the comparison of field XRF data against laboratory generated data and supports classification of waste using laboratory-generated data (within a specified range surrounding applicable action levels (plus or minus 25% for IR Sites and plus or minus 35% for UR Sites). Although the accuracy of field XRF results for cadmium and mercury collected to date cannot be verified using a calibration check standard, the field XRF concentrations used for evaluation of each site remain unaltered and, paired laboratory and field XRF data collected to date, support that these concentrations are useable to determine necessary remedial action. Plots of paired laboratory and field XRF data, where both laboratory and field XRF data were detected, are available in *BPSOU Field XRF to Laboratory Correlation and Regression Analysis Procedure for UR and IR Sites* (Atlantic Richfield Company, 2023c). Paired laboratory and field XRF cadmium and mercury results collected in 2022 have been appended with field XRF not-detected data and provided in Attachment 1 to show the LOD ranges, specific to each Niton XL5 XRF analyzer. The 2022 paired dataset for cadmium includes outlier values, where both detected and not-detected field XRF values reveal paired laboratory values above the cadmium action level of 20 milligrams per kilogram (mg/kg). Outlier values shown are likely attributed to the variability of the matrix, with different aliquots of sample used for field XRF versus laboratory analyses. The 2022 paired dataset for mercury illustrates high variability between field XRF detected and not-detected values; these data also show that the field XRF method reports consistently higher values compared to laboratory-analyzed data. The inability to assign appropriate data qualifiers for cadmium and mercury field XRF data highlights the necessity for further evaluation, using an Agency-approved regression method or alternate approach, to confirm that the specified ranges used to obtain laboratory samples (plus or minus 25% for IR Sites and plus or minus 35% for UR Sites) are sufficient to prescribe appropriate remedial action (Atlantic Richfield Company, 2023c).

Per RFC-UR-IR-2023-1 (Atlantic Richfield Company, 2023d), field XRF is not employed for the 2023 UR Sites or IR Sites investigations, and all 2023 samples are submitted for laboratory metals analyses. Subsequently, the issues discussed above are not relevant for 2023 laboratory-generated data. However, identifying detectable field XRF calibration check standards for cadmium and mercury will enable appropriate assignment of data qualifiers for future sampling efforts. Therefore, efforts will be made to identify alternate calibration check standards and test as suitable for detecting concentrations in the range of interest for cadmium (15 to 20 mg/kg) and mercury (10 to 15 mg/kg), prior to prescribing further field XRF analysis for future site characterization efforts.

Forthcoming 2022 DSRs prepared for UR and IR site characterization efforts will include an explanation, as described in this RFI. The data validation tables and screening and enforcement assessments will be consistent with data validation protocols, as defined in the relevant QAPPs. Affects to the overall dataset did not warrant the effort of qualifying the unassigned cadmium and mercury data points, summarized above in Table 1 and Table 2, since the data quality objectives set forth in the project QAPPs are met with the knowledge that:

1. Cadmium evaluation is included as a component of the waste identification criteria, where at least three of six contaminants must exceed action level for the sample to be considered waste, and further assessment is performed to determine potential contributions to the degradation of surface water.



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2. Field XRF concentrations used for evaluation of each site remain unaltered, whether the data point is classified as Screening or Enforcement.
3. Paired laboratory and field XRF data collected to date support that these concentrations are useable to determine necessary remedial action.

REFERENCES:

EPA, 2020. Consent Decree for the Butte Priority Soils Operable Unit. Partial Remedial Design/Remedial Action and Operation and Maintenance. U.S. Environmental Protection Agency. February 13, 2020. <https://www.co.silverbow.mt.us/2161/ButtePriority-Soils-Operable-Unit-Conse>.

Atlantic Richfield Company, 2023a. 2022 Final Insufficiently Reclaimed Sites Quality Assurance Project Plan (QAPP), Revision 2. Prepared by Pioneer Technical Services, Inc. for Atlantic Richfield Company. August 4, 2023.

Atlantic Richfield Company, 2023b. 2022 Final Unreclaimed Sites Quality Assurance Project Plan (QAPP), Revision 1. Prepared by Pioneer Technical Services, Inc. for Atlantic Richfield Company. August 4, 2023.

Atlantic Richfield Company, 2023c. Butte Priority Soils Operable Unit (BPSOU) Field XRF to Laboratory Correlation and Regression Analysis Procedure for Unreclaimed (UR) and Insufficiently Reclaimed (IR) Sites. Prepared by Pioneer Technical Services, Inc. July 3, 2023.

Atlantic Richfield Company, 2023d. RFC-UR-IR-2023-02. Request for Change to the BPSOU 2023 Final Unreclaimed Sites Quality Assurance Project Plan and BPSOU 2023 Final Insufficiently Reclaimed Sites Quality Assurance Project Plan. 2023 Unreclaimed and Insufficiently Reclaimed Sites Soil, Sample Analysis. Submitted September 18, 2023. Approved by Agencies September 25, 2023.

ATTACHMENTS:

Attachment 1: 2022 Cadmium and Mercury Paired Field XRF and Laboratory Data

- | | |
|--|--|
| <input type="radio"/> Design Deficiency
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<input type="radio"/> Scope
<input checked="" type="checkbox"/> Clarification/Information
<input type="radio"/> Other Final Design Document |
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RESPONSE/DIRECTIVE

Project Manager  Date 12/22/2023

Atlantic Richfield Co. Representative Mike McNulty Date 12/22/2023

EPA Representative NIKIA GREENE Digitally signed by NIKIA GREENE
Date: 2024.01.04 07:59:53 -07'00' Date _____

DEQ Representative  Date 1/3/2024

Cc: Chris Greco / Atlantic Richfield – email
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 Loren Burmeister / Atlantic Richfield – email
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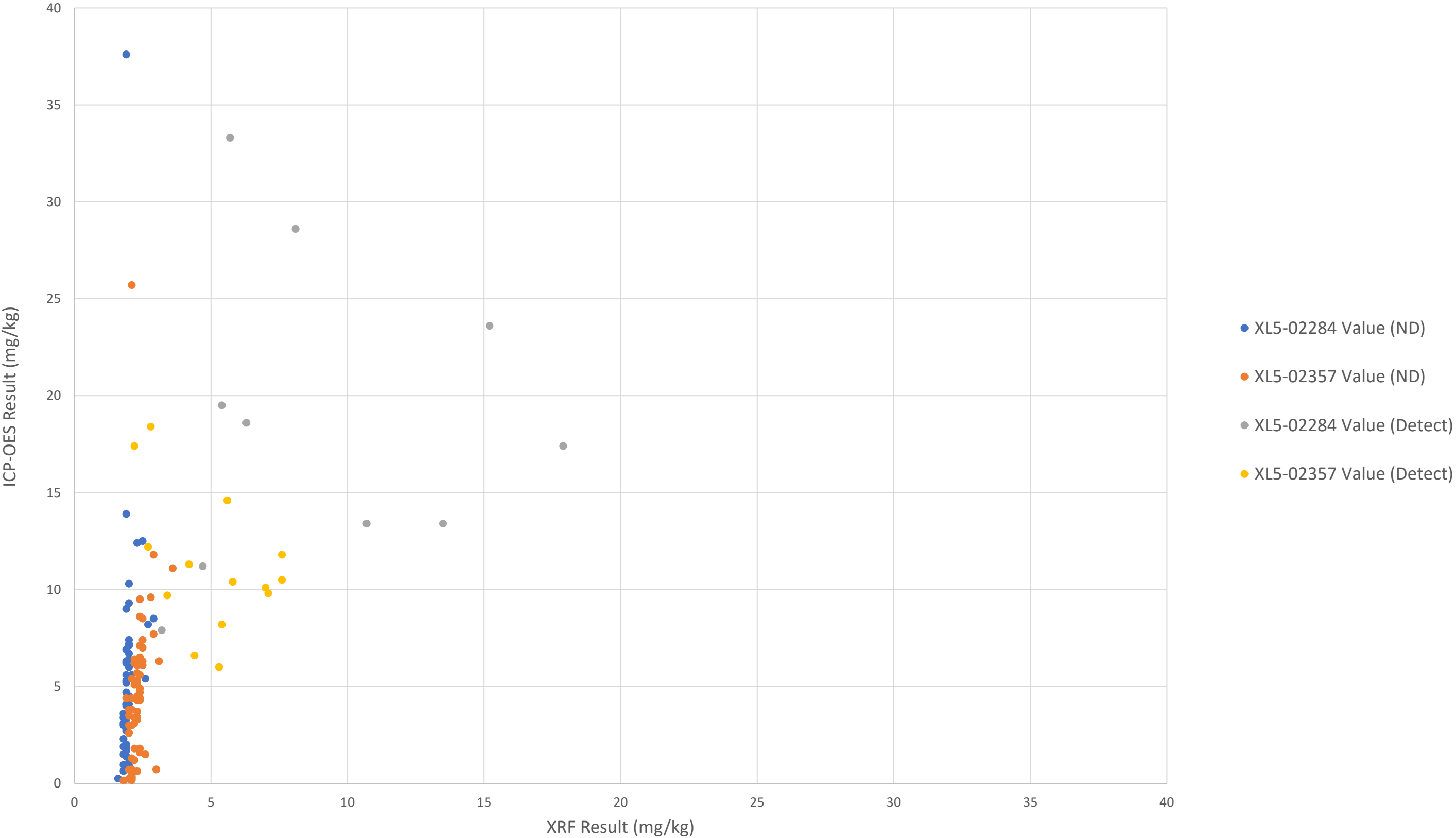


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RFC Logbook



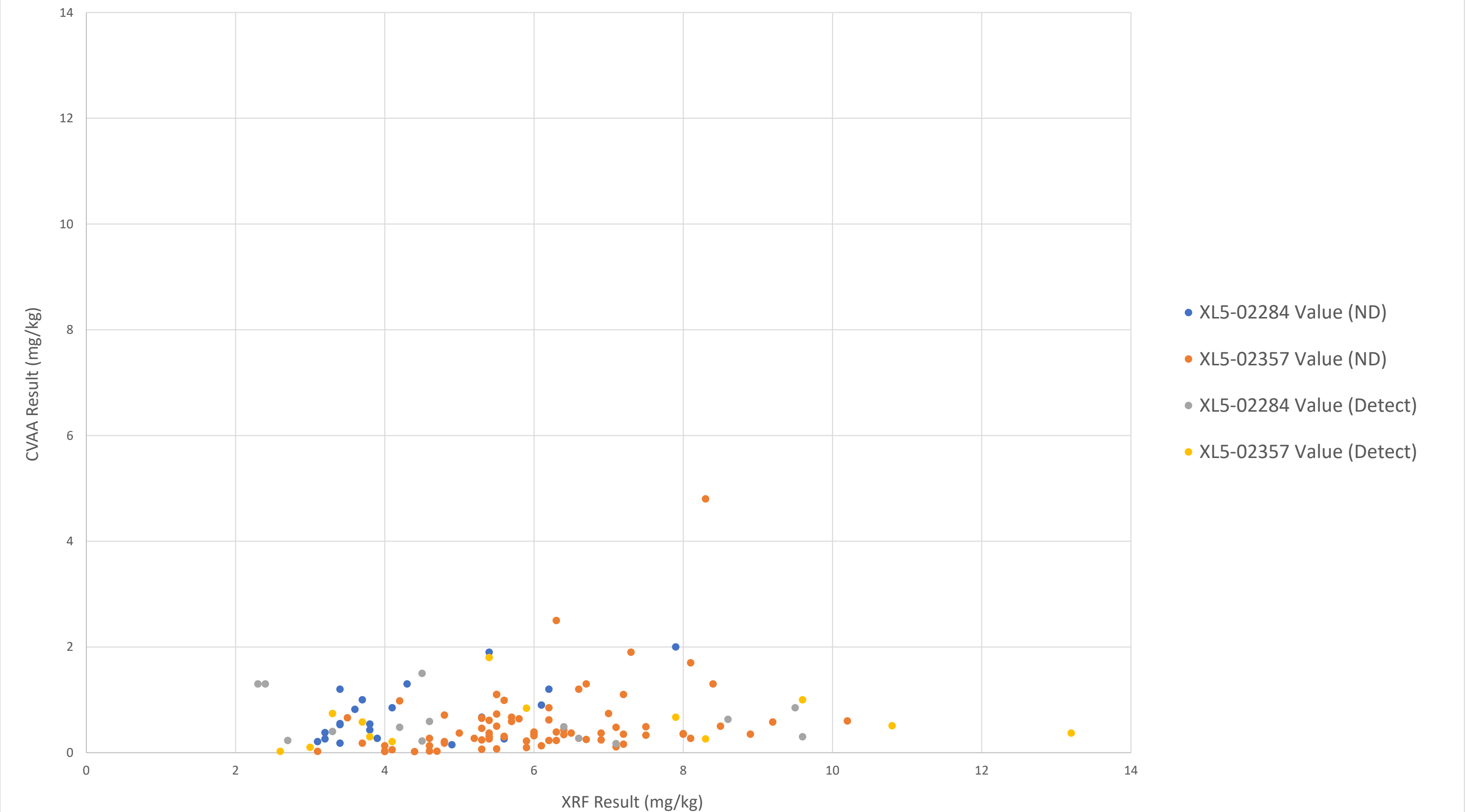
Cadmium ICP-OES v. XRF



XRF: X-Ray Fluorescence; ICP-OES: Inductively Coupled Plasma Optical Emission Spectroscopy; mg/kg: milligrams per kilogram

Count of paired data points presented (n): XL5-02284 Value (ND) = 55; XL5-02357 Value (ND) = 69; XL5-02284 Value (Detect) = 10; XL5-02357 Value (Detect) = 14

Mercury CVAA v. XRF



XRF: X-Ray Fluorescence; CVAA: Cold Vapor Atomic Absorption; mg/kg: milligrams per kilogram

Count of paired data points presented (n): XL5-02284 Value (ND) = 21; XL5-02357 Value (ND) = 77; XL5-02284 Value (Detect) = 14; XL5-02357 Value (Detect) = 13