Fall 10-20-2021

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

Pioneer Technical Services, Inc.

Atlantic Richfield Company

317 Anaconda Road
Butte MT 59701

Mike Mc Anulty
Liability Manager

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October 20, 2021

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Helena, Montana 59620-0901

RE: Final RMAP QAPP (Non-Residential RMAP Parcels) Addendum #1

Dear Agency Representatives:

I am writing to you on behalf of Atlantic Richfield Company to submit the Final Residential Metals Abatement Program (RMAP) Quality Assurance Project Plan (QAPP) (Non-Residential RMAP Parcels) Addendum #1 which addresses additional sampling and investigation at the Silver Bow Montessori School. This submittal addresses all EPA comments presented in EPA's October 7, 2021 letter regarding the Draft Final version of this document (dated September 17, 2021). The report and appendices may be downloaded at the following link:

https://pioneertechnicalservices.sharepoint.com/:f:/s/submitted/EixkgAMvkqhLg7I8DO1EkdwBT1xPOle9UnSVFkEOf9XjUQ

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

Sincerely,

Mike McAnulty

Mike Mc Anulty
Liability Manager & Global Risk Champion
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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Ted Duaime / MBMG - email
Gary Icopini / MBMG - email
Becky Summerville / MR - email
Kristen Stevens / UP - email
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Pat Sampson / Pioneer - email
Mike Borduin / Pioneer - email
Joe McElroy / Pioneer – email
Andy Dare / Pioneer – email
Karen Helfrich / Pioneer - email
Leesla Jonart / Pioneer - email
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Ian Magruder/ CTEC- email
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BPSOU SharePoint - upload

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Ref: 8MO

October 7, 2021

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

Re: Comments for the Draft Final Residential Metals Abatement Program (RMAP) Quality Assurance Project Plan (QAPP) (Non-Residential Parcels) Addendum #1 (dated September 17, 2021)

Dear Mike:

The U. S. Environmental Protection Agency (EPA), in consultation with the Montana Department of Environmental Quality (DEQ), is providing comments on the *Draft Final Residential Metals Abatement Program (RMAP) Quality Assurance Project Plan (QAPP) (Non-Residential Parcels) Addendum #1 (dated September 17, 2021)* that was prepared by Pioneer Technical Services, Inc., on behalf of the Butte-Silver Bow County (BSB) and Atlantic Richfield Company. Please incorporate the comments below and submit the final version of the report for review.

General Comment:

- *In general, EPA and DEQ found the addendum to be well-written and clearly organized. Although a sound basis for the use of x-ray fluorescence (XRF) as a screening tool was described, EPA doesnot wish to conduct any additional XRF testing beyond the original four subsample locations in any of the subareas identified for evaluation at this time.*

  Atlantic Richfield Company Response (10/20/21) – Section 2.1 of the text has been updated to address Agency Comment.

Specific Comments:

- *Section 2.1, first, second, and third paragraphs. As written, the XRF and inductively-coupled plasma mass spectrometry (ICP-MS) analysis is limited to reporting results for lead only. For completeness, please report XRF and the ICP-MS results for both lead and arsenic for all samples.*

Atlantic Richfield Company Response (10/20/21) – Section 2.1 of the text has been updated to address Agency Comment.

- *Section 2.1, fourth paragraph. The text in the lower third of this paragraph states that grab sampleswill be collected and submitted for laboratory analysis of lead by ICP-MS when the XRF lead result reports a concentration greater than 1,200 milligrams per kilogram (mg/kg). The standard operating procedure (SOP) for XRF analysis developed by EPA Region 4 (i.e., SOP SESDPROC-107-R4[1]) recommends ICP-MS analysis for all samples with XRF concentrations with 70-80% of the action level (i.e., between 960 and 1,440 mg/kg). Thus, please modify the analysis approach to analyze by ICP-MS all grab samples with XRF concentrations greater than 960 mg/kg.*

  Atlantic Richfield Company Response (10/20/21) – Section 2.1 of the text has been updated to address Agency Comment.

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

Sincerely,

NIKIA GREENE Digitally signed by NIKIA GREENE Date: 2021.10.07 15:29:46 -06'00'

Nikia Greene
Remedial Project Manager

1https://www.epa.gov/sites/default/files/2016-01/documents/field_xrf_measurement107_af.r3.pdf

cc: (email only)
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Kristi Carroll; Montana Tech Library

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

Final

Residential Metals Abatement Program (RMAP) Quality Assurance Project Plan (QAPP) (Non-Residential Parcels)

Addendum #1

Butte-Silver Bow County

and

Atlantic Richfield Company

October 20, 2021

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

Final

Residential Metals Abatement Program (RMAP) Quality Assurance Project Plan (QAPP) (Non-Residential Parcels)

Addendum #1

Prepared for:

Butte-Silver Bow County
Superfund Division
155 W. Granite
Butte, Montana 59701

and

Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

Prepared by:

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

October 20, 2021

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DOCUMENT MODIFICATION SUMMARY

Modification	Author	Version	Description	Date
0	Jesse Schwarzrock	Draft Final	Issued for Agency Approval	09/17/2021
1	Jesse Schwarzrock	Final	Issued Final for Agency Records	10/20/2021

1.0 INTRODUCTION

Atlantic Richfield Company (Atlantic Richfield) conducted soil sampling work on Butte, Montana, area schools on behalf of the *Butte-Silver Bow (BSB) Multi-Pathway Residential Metals Abatement Program Plan* (RMAP) (BSB and Atlantic Richfield Company, 2020) (hereafter referred to as the Program) during July and August 2021. All work was conducted in accordance with the *Final Residential Metals Abatement Program (RMAP) Quality Assurance Project Plan* (QAPP) *(Non-Residential Parcels)* (Butte-Silver Bow County and Atlantic Richfield Company, 2021).

As part of this 2021 sampling effort, soil sampling was conducted at the Silver Bow Montessori School (see Table 1) between July 19, 2021 and July 23, 2021. One hundred nineteen (119) soil samples were collected and analyzed for arsenic, lead, and mercury.

Preliminary results (data validation is not yet complete) indicate that the entire parcel is below residential action levels for arsenic and mercury for all sampling components. The entire parcel was also below the lead residential action level except for one lead exceedance noted in polygon GA5 in the 6 to 12-inch depth interval (see Attachment A). This sample was a 4-point composite sample with a lead value of 1,350 milligrams per kilogram (mg/kg). This value is an outlier compared to the remainder of the data set. Even when including the 1,350 mg/kg value in the average lead concentration for the parcel, the average lead concentration is 58 mg/kg.

1.1 Purpose

Given the outlier nature of the lead exceedance in polygon GA5 compared to the remainder of the data set, additional soil sampling and investigation are being proposed through this QAPP Addendum within polygon GA5 at the Silver Bow Montessori School to better characterize and define the area containing the lead exceedance. Given the fact that this exceedance was a 4-point composite, it is likely that the lead exceedance is concentrated in one or more of the subsample locations (rather than all of them). The additional investigation would allow Atlantic Richfield to narrow the focus of the required remedial work to the area containing the elevated lead therefore reducing inconvenience to the Silver Bow Montessori School.

This QAPP Addendum pertains only to the Silver Bow Montessori School and is driven by the site-specific draft data compiled during the 2021 soil sampling operations.

2.0 SILVER BOW MONTESSORI ADDITIONAL INVESTIGATION

2.1 Soil Sampling Plan

A combination of field X-ray fluorescence (XRF) data and laboratory Inductively-Coupled Plasma Mass Spectrometry (ICP-MS) data will be collected during the additional investigation at Silver Bow Montessori School. The XRF data will be considered screening level quality to help with characterization, not to direct RA decisions. The ICP-MS data will represent enforcement quality data that will drive remedial decisions, consistent with the Agency-approved *Final*

RMAP QAPP (Non-Residential Parcels) (Butte-Silver Bow County and Atlantic Richfield Company, 2021) and the original Data Quality Objectives (DQOs) contained within it.

Field personnel will use a Niton XL3 XRF for the XRF field analysis. A sample stand, which allows the samples to be analyzed in plastic bags, will be used during analysis to ensure consistent exposure times and position of the XRF aperture for each sample. Arsenic and lead results will be recorded on the field data sheets. The XRF samples will be screened through #10 (2 millimeter [mm]) stainless steel screens and/or disposable sieves prior to analysis. For general procedures associated with XRF analyzer operation, please see the Standard Operating Procedure (SOP) located in Attachment B.

Sampling polygon GA5 will be sub-divided into 4 subareas for the purposes of the additional soil sampling event (see Figure 1). Three-point composite soil samples will ultimately be collected from each of these 4 subareas at each depth interval (0 to 2 inches, 2 to 6 inches, and 6 to 12 inches). These 12 composite samples will be collected, packaged, shipped, and analyzed via ICP-MS for arsenic and lead per the original *Final RMAP QAPP (Non-Residential Parcels)* (Butte-Silver Bow County and Atlantic Richfield Company, 2021). If any of these 12 composite samples exceed the residential arsenic and/or lead action level, then the corresponding subarea(s) will be subject to remediation.

The XRF investigation will focus on the 4 original GA5 subsample locations (see Figure 1). New subsample holes will be dug directly adjacent to the original subsample locations to avoid any issues related to cross contamination of the depth intervals associated with backfill material. Samples will be collected from each depth interval (0 to 2 inches, 2 to 6 inches, and 6 to 12 inches) at each of the original 4 subsamples locations per the original *Final RMAP QAPP (Non-Residential Parcels)* (Butte-Silver Bow County and Atlantic Richfield Company, 2021) procedures. These 12 samples will be analyzed with the Niton XL3 XRF machine for arsenic and lead. The resultant real time XRF values will ideally help identify the true location of the lead exceedance area and may drive sample locations for ICP-MS sampling/testing. If any of these field XRF values exceed 200 mg/kg for arsenic or 960 mg/kg for lead (80% of the residential action levels per EPA Region 4 XRF Analysis SOP SESDPROC-107-R4), a grab sample will be collected from the corresponding subarea(s) and depth interval(s). All grab samples associated with field XRF lead exceedances will be analyzed via ICP-MS for arsenic and lead. If any ICP-MS grab sample results exceed either the residential arsenic or lead action levels, then the corresponding subarea(s) will be subject to remediation. Furthermore, any field XRF lead exceedance subsample locations will be used as subsample locations for the 3-point composite sample collected from that subarea.

2.2 Quality Assurance/Quality Control

2.2.1 Field Quality Control (QC) Samples

Field quality control (QC) samples are used to identify any biases from transportation, storage, and field handling processes during sample collection and to determine sampling precision. This section includes brief descriptions of the QC samples to be collected during sampling activities

along with frequency, collection, and analytical instructions. The measured values of a standard will be compared to the expected results and if a measured value falls outside this range, then the check sample will be reanalyzed. If the value continues to fall outside the acceptance range, the sampler will note this information on the XRF log. If any of the check sample results indicate that the XRF is not analyzing accurately, the XRF will be cleaned, turned off, and the energy calibration rerun. This information will be noted in the logbook and on the XRF field data sheet. The batch of samples analyzed prior to the unacceptable calibration verification check samples will be reanalyzed.

2.2.2 Field XRF Quality Control Samples

2.2.2.1 Energy Calibration Check

Field personnel will run a pre-programmed energy calibration check on the equipment at the beginning of each working day. If the individual believes that drift is occurring during analysis, that individual will run the energy calibration check. The energy calibration check determines whether the characteristic X-ray lines are shifting, which would indicate drift within the instrument.

2.2.2.2 Blank Samples

The silicon dioxide sample, as provided by Niton, is a "clean" quartz or silicon dioxide matrix that contains concentrations of selected analytes near or below the XL3 XRF machine lower limit of detection. These samples are used to monitor for cross contamination. Field personnel will analyze this sample at the beginning of each day, once per every 20 samples, and at the end of each day's analysis. The sample information will be recorded as "SIO2" on the XRF field data sheets. This sample will also be analyzed whenever field personnel suspect contamination of the XRF aperture. Any elements with concentrations above the established lower limit of detection will be evaluated for potential contamination. If it is determined that the concentration is higher than that recorded at the start of the day, the probe window and the silicon dioxide sample will be checked for contamination. If it is determined that contamination is not a problem, and the concentration is significantly above the limit of detection, sample results will be qualified by the XRF operator as 'J' estimated, and the problem recorded on the XRF field data sheet and in the logbook. If the problem persists, the XRF will be returned to Niton for calibration.

2.2.2.3 Calibration Verification Check Samples

Calibration verification check samples help check the accuracy of the XL3 and assess the stability and consistency of the analysis for the analytes of interest. A check sample will be analyzed as 1 of the initial samples, once per every 20 samples and as the last analysis. Results for the check sample (standard reference material [SRM]) will be recorded on the individual site XRF field data sheets and identified as a check sample. There will be 3 Niton-provided SRM check samples for the project: NIST 2709a- Joaquin Soil, USGS SdAR-M2 (an SRM created by the U.S. Geological Survey [USGS]), and a Resource Conservation and Recovery Act (RCRA) sample. There will also be Niton-provided machine-specific expected results for several elements for the check samples. Pioneer has further refined the range of expected results for each SRM

standard for each of the field XRFs in use. The measured values of a standard will be compared to the expected results and if a measured value falls outside this range, then the check sample will be reanalyzed. If the value continues to fall outside the acceptance range, this information will be noted on the XRF log. If any of the check sample results indicate that the XRF is not analyzing accurately, the XRF will be cleaned, turned off, and the energy calibration rerun. This information will be noted in the logbook and on the XRF field data sheet. The batch of samples analyzed prior to the unacceptable calibration verification check samples will be reanalyzed.

2.2.2.4 Duplicate Samples

The XRF duplicate samples will be analyzed to assess reproducibility of field procedures and soil heterogeneity. To run a duplicate sample on the Niton XL3, field personnel will remove the sample bag from the analytical stand, knead it once or twice, and replace it in the stand to be analyzed a second time. Duplicate samples will be recorded on the XRF field data form with a D designator in the sample identification number. One duplicate sample will be analyzed at the rate of 1 per 20 samples.

2.2.2.5 Replicate Samples

Field personnel will analyze a replicate sample at the rate of 1 per 20 XRF samples. To run a replicate sample on the Niton XL3, once the primary sample analysis has been completed, requires restarting the XRF to analyze the same sample a second time with the same soil in the XRF aperture. Replicate samples help in assessing the stability and consistency of the XRF analysis. Replicate sample results will be recorded on the XRF field data form and designated with an R in the sample identification number.

3.0 REFERENCES

Butte-Silver Bow County and Atlantic Richfield Company, 2021. Silver Bow Creek/Butte Area NPL Site Butte Priority Soils Operable Unit, Final Residential Metals Abatement Program (RMAP) Quality Assurance Project Plan (QAPP). July 2021.

Butte-Silver Bow County and Atlantic Richfield Company, 2020. Revised Final Multi-Pathway Residential Metals Abatement Program (RMAP) Plan. Priority Soils Operable Unit Silver Bow Creek/Butte Area, National Priorities List Site, Butte, Montana. Butte-Silver Bow County and Atlantic Richfield Company. November 2020.

FIGURES

LEGEND

- SampleLocations *Survey Data Locations*
- COMMUNICATIONS
- UNDERGROUND ELECTRIC
- GAS LINE
- OTHER
- SANITARY SEWER
- WATER LINE
- GA5-SA1
- GA5-SA2
- GA5-SA3
- GA5-SA4

NOTE:
1. SAMPLING CREW TO CONDUCT ADDITIONAL INVESTIGATION WITHIN GA5 SUBAREAS 1-4 PER RMAP QAPP (NON-RESIDENTIAL PARCELS) ADDENDUM #1.

N

DISPLAYED AS:
PROJECTION/ZONE: MSP
DATUM: NAD 83
UNITS: FEET
SOURCE: PIONEER

0 20 40 80
Feet

FIGURE 1

PIONEER TECHNICAL SERVICES, INC.

DATE: 9/14/2021

SILVER BOW MONTESSORI ADDITIONAL INVESTIGATION

Path: N:\AR\BPSOU\2021 School Sampling\Montessori Additional Investigation\Figures\RMAP_AI_SilverBowMontessori.mxd

TABLES

TABLE 1: SILVER BOW MONTESSORI PROPERTY INFORMATION
(RMAP Non-Residential QAPP Addendum #1)

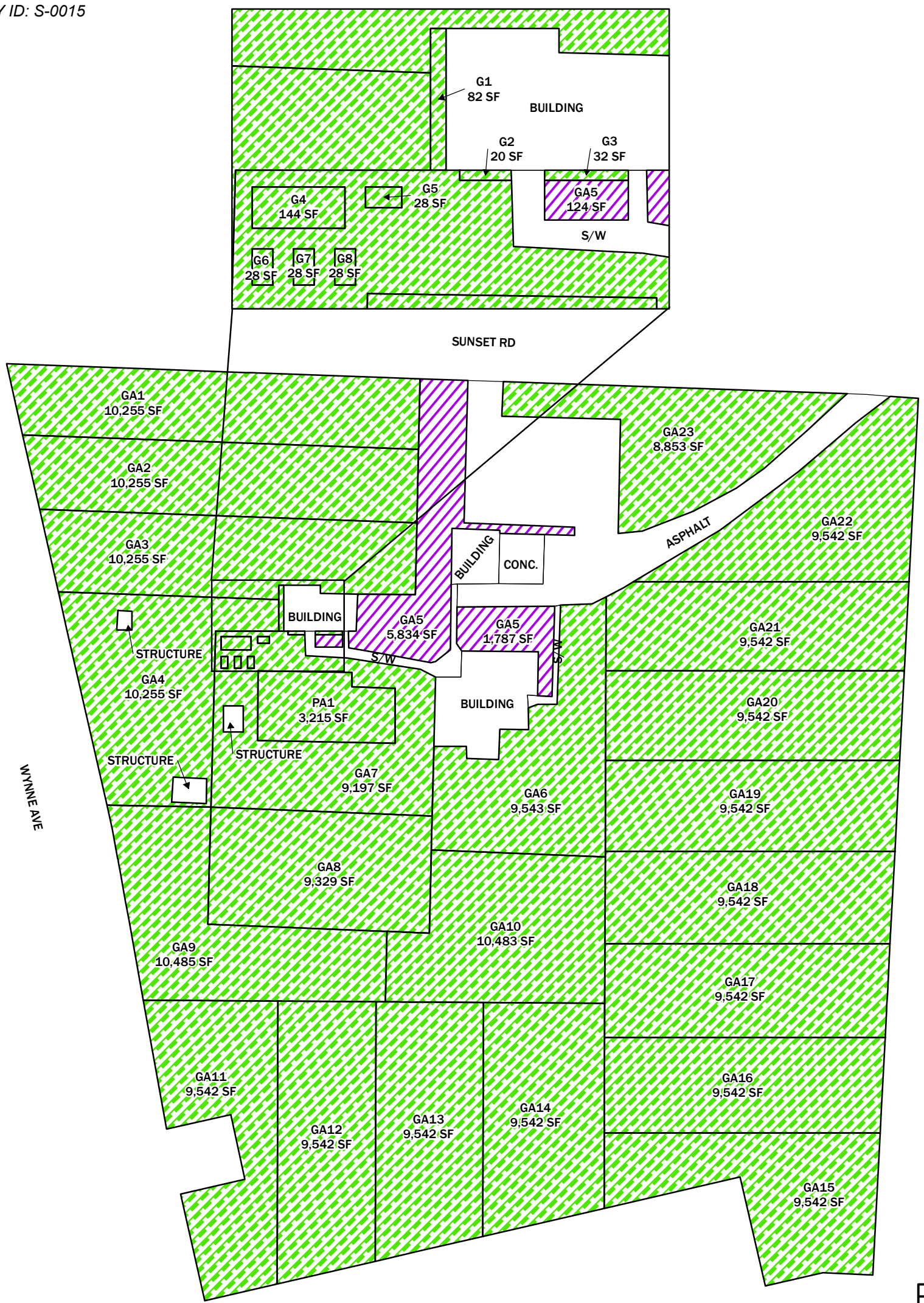
Count	Res-ID	Geocode	Name	Owner	Construction Date
1	S-0015	01109506106060000	Silver Bow Montessori	Montessori Campus LLC	1947

ATTACHMENT A

DRAFT SILVER BOW MONTESSORI SCHOOL

INDIVIDUAL SITE WORK PLAN (ISWP)

ADDRESS: 1800 SUNSET ROAD
PROPERTY ID: S-0015



S-0015

LEGEND

- No Action Required
- 12" Removal
- 24" Removal

NOTES:

1. LOOK ON BACK OF SHEET FOR DATA TABLE.

SILVER BOW MONTESSORI
INDIVIDUAL SITE WORK PLAN

RESIDENTIAL METALS ABATEMENT PROGRAM (RMAP)

BUTTE, MONTANA
SHEET 1 OF 2

DRAFT
DATA VALIDATION NOT YET COMPLETE

Boundaries on this site work plan DO NOT represent a legal survey. These boundaries are to be used for general reference only. No liability is assumed by Atlantic Richfield Company or Pioneer Technical Services for the accuracy of these.

N

70 35 0 70 Feet

Atlantic Richfield Company
A BP affiliated company

BY: PIONEER TECHNICAL SERVICES, INC.

Date: 8/18/2021
Revision#: 0
File Name: RMAP_ISWP_SilverBowMontessori

REMEDIAL ACTION SUMMARY TABLE

Resident ID	SAMPLING COMPONENTS	COMPONENT SURFACE AREA (Square Feet)	COMPONENT ARSENIC CONCENTRATION (mg/kg)					COMPONENT LEAD CONCENTRATION (mg/kg)					COMPONENT MERCURY CONCENTRATION (mg/kg)					ESTIMATED QUANTITIES		
S-0015			0-2"	2-6"	6-12"	12-18"	18-24"	0-2"	2-6"	6-12"	12-18"	18-24"	0-2"	2-6"	6-12"	12-18"	18-24"	Excavation (Cubic Yards)	General Backfill (Cubic Yards)	Sod (Square Feet)
S-0015-PA1	Playground Area 1 (PA1)	3,215	5	6	5	N/A	N/A	11	10	9	N/A	N/A	0.02	0.02	0.02	N/A	N/A	0.0	0.0	0
S-0015-GA1	Grass Area 1 (GA1)	10,255	65	75	8	N/A	N/A	64	41	13	N/A	N/A	0.05	0.06	0.01	N/A	N/A	0.0	0.0	0
S-0015-GA2	Grass Area 2 (GA2)	10,255	70	123	8	N/A	N/A	58	71	14	N/A	N/A	0.03	0.04	0.01	N/A	N/A	0.0	0.0	0
S-0015-GA3	Grass Area 3 (GA3)	10,255	79	91	25	N/A	N/A	91	47	22	N/A	N/A	0.06	0.02	0.02	N/A	N/A	0.0	0.0	0
S-0015-GA4	Grass Area 4 (GA4)	10,255	84	18	11	N/A	N/A	36	18	15	N/A	N/A	0.02	0.01	0.01	N/A	N/A	0.0	0.0	0
S-0015-GA5	Grass Area 5 (GA5)	7,745	87	102	55	N/A	N/A	117	129	1,350	N/A	N/A	0.02	0.03	0.02	N/A	N/A	286.9	286.9	7,745
S-0015-GA6	Grass Area 6 (GA6)	6,543	40	51	56	N/A	N/A	61	64	64	N/A	N/A	0.03	0.03	0.02	N/A	N/A	0.0	0.0	0
S-0015-GA7	Grass Area 7 (GA7)	9,197	57	66	15	N/A	N/A	56	48	13	N/A	N/A	0.05	0.04	0.01	N/A	N/A	0.0	0.0	0
S-0015-GA8	Grass Area 8 (GA8)	9,329	41	51	47	N/A	N/A	40	32	25	N/A	N/A	0.03	0.03	0.02	N/A	N/A	0.0	0.0	0
S-0015-GA9	Grass Area 9 (GA9)	10,485	65	66	41	N/A	N/A	42	50	33	N/A	N/A	0.04	0.02	0.01	N/A	N/A	0.0	0.0	0
S-0015-GA10	Grass Area 10 (GA10)	10,483	30	26	39	N/A	N/A	56	38	47	N/A	N/A	0.03	0.03	0.06	N/A	N/A	0.0	0.0	0
S-0015-GA11	Grass Area 11 (GA11)	9,542	84	62	29	N/A	N/A	74	158	16	N/A	N/A	0.05	0.05	0.01	N/A	N/A	0.0	0.0	0
S-0015-GA12	Grass Area 12 (GA12)	9,542	60	56	36	N/A	N/A	116	67	59	N/A	N/A	0.07	0.04	0.03	N/A	N/A	0.0	0.0	0
S-0015-GA13	Grass Area 13 (GA13)	9,542	48	82	118	N/A	N/A	77	80	75	N/A	N/A	0.04	0.06	0.08	N/A	N/A	0.0	0.0	0
S-0015-GA14	Grass Area 14 (GA14)	9,542	43	41	56	N/A	N/A	97	59	46	N/A	N/A	0.37	0.05	0.03	N/A	N/A	0.0	0.0	0
S-0015-GA15	Grass Area 15 (GA15)	9,542	64	39	10	N/A	N/A	35	26	12	N/A	N/A	0.03	0.02	0.01	N/A	N/A	0.0	0.0	0
S-0015-GA16	Grass Area 16 (GA16)	9,542	55	39	20	N/A	N/A	41	44	16	N/A	N/A	0.03	0.04	0.02	N/A	N/A	0.0	0.0	0
S-0015-GA17	Grass Area 17 (GA17)	9,542	45	41	99	N/A	N/A	60	43	88	N/A	N/A	0.03	0.02	0.18	N/A	N/A	0.0	0.0	0
S-0015-GA18	Grass Area 18 (GA18)	9,542	46	53	9	N/A	N/A	87	55	10	N/A	N/A	0.04	0.03	0.08	N/A	N/A	0.0	0.0	0
S-0015-GA19	Grass Area 19 (GA19)	9,542	67	96	114	N/A	N/A	61	74	89	N/A	N/A	0.03	0.04	0.07	N/A	N/A	0.0	0.0	0
S-0015-GA20	Grass Area 20 (GA20)	9,542	43	106	49	N/A	N/A	38	71	37	N/A	N/A	0.03	0.05	0.02	N/A	N/A	0.0	0.0	0
S-0015-GA21	Grass Area 21 (GA21)	9,542	24	51	23	N/A	N/A	30	44	23	N/A	N/A	0.02	0.03	0.02	N/A	N/A	0.0	0.0	0
S-0015-GA22	Grass Area 22 (GA22)	9,542	39	70	82	N/A	N/A	44	60	65	N/A	N/A	0.03	0.04	0.04	N/A	N/A	0.0	0.0	0
S-0015-GA23	Grass Area 23 (GA23)	8,853	59	63	19	N/A	N/A	37	33	16	N/A	N/A	0.02	0.02	0.01	N/A	N/A	0.0	0.0	0
S-0015-G1	Garden Area 1 (G1)	82	84	80	15	16	13	71	46	14	16	15	0.05	0.03	0.01	0.03	0.01	0.0	0.0	0
S-0015-G2	Garden Area 2 (G2)	20	31	78	33	8	6	33	58	24	12	9	0.03	0.04	0.02	0.01	0.01	0.0	0.0	0
S-0015-G3	Garden Area 3 (G3)	32	40	57	162	5	6	70	66	76	11	11	0.05	0.05	0.04	0.01	0.01	0.0	0.0	0
S-0015-G4	Garden Area 4 (G4)	144	28	38	41	45	7	69	62	33	21	11	0.01	0.02	0.01	0.01	0.01	0.0	0.0	0
S-0015-G5	Garden Area 5 (G5)	28	43	58	83	35	12	40	47	58	20	13	0.03	0.06	0.05	0.02	0.01	0.0	0.0	0
S-0015-G6	Garden Area 6 (G6)	28	49	47	55	97	38	39	37	39	42	32	0.04	0.04	0.04	0.05	0.05	0.0	0.0	0
S-0015-G7	Garden Area 7 (G7)	28	45	43	46	63	6	38	36	39	41	11	0.04	0.04	0.04	0.04	0.01	0.0	0.0	0
S-0015-G8	Garden Area 8 (G8)	28	47	45	58	88	71	40	38	46	68	57	0.04	0.04	0.04	0.05	0.01	0.0	0.0	0
																		286.9	286.9	7,745

	Component Arsenic Concentration is ≥ 250 mg/kg.
	Component Lead Concentration is ≥ 1,200 mg/kg.
	Component Mercury Concentration is ≥ 147 mg/kg.
N/A	= Not applicable per 2021 RMAP Quality Assurance Project Plan.

SILVER BOW MONTESSORI
INDIVIDUAL SITE WORK PLAN

RESIDENTIAL METALS
ABATEMENT PROGRAM (RMAP)

BUTTE, MONTANA
SHEET 2 OF 2

DRAFT
DATA VALIDATION NOT YET COMPLETE

Atlantic Richfield Company
A BP affiliated company

BY: PIONEER TECHNICAL SERVICES, INC.

ATTACHMENT B

SOP-SFM-02

OPERATING XL3 XRF ANALYZER

(GENERAL PROCEDURES)

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PURPOSE	To provide standard instructions for operating XL3 X-Ray Fluorescence (XRF) analyzer
SCOPE	This practice has been prepared for task trained personnel conducting work on unreclaimed sites within the BPSOU area. The tasks are general and are to be used in conjunction with published manufacturer and internal practices.

WORK INSTRUCTIONS

The following instructions are intended to provide general 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. All work carried out under this SOP will be consistent with procedures and policies described within appropriate internal policies.

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. Refer to SOP General Equipment Decontamination 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 case.	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 says '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 in appropriate password 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. 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 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 duplicate sample (after every 20 samples analyzed) 1. After every 20 samples, analyze a duplicate sample by recording the results of the 20th 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.

DRAWINGS, DOCUMENTS, AND TOOLS/EQUIPMENT **The following documents should be referenced to assist in completing the associated task**.	
Drawings	
Related SOPs/ Procedures/ Work Plans	SOP-DE-02 General Equipment Decontamination.
Tools	XRF and hand tools.
Forms/Checklist	Private Property Access Agreement, if required.

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 an acknowledgement that I have received training on the procedure and associated competency training

Manager	**Date**
Lead Operator	**Date**
Operator	**Date**