Fall 9-21-2023

Residential Metals Abatement Program Investigation Summary Report (Non-Residential Parcels – Indoor Dust) Highland View Christian School

Environmental Resource Management (ERM)

Atlantic Richfield Company

317 Anaconda Road
Butte MT 59701

Mike McAnulty
Liability Manager

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September 21, 2023

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P.O. Box 200901
Helena, Montana 59620-0901

RE: Residential Metals Abatement Program – Interior School Dust – Investigation Summary Report – Highland View Christian School

Agency Representatives:

I am writing to you on behalf of Atlantic Richfield Company to submit the Final 2023 *Residential Metals Abatement Program Investigation Summary Report (Non-Residential Parcels – Indoor Dust) – Highland View Christian School.* Revisions have been made to address comments received 23 May 2022.

The report may be downloaded at the following link:

https://theermgroup-my.sharepoint.com/:f:/g/personal/thomas_beckman_erm_com/Eg4dOFYWA7ZBqjc2J6vVrzABWwPpdmx_eAVN6gS60AkdMA?e=lQHNtN

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

Sincerely,

Mike McAnulty

Mike McAnulty
Liability Manager
Remediation Management Services Company
An Affiliate of **Atlantic Richfield Company**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8, MONTANA OFFICE
FEDERAL BUILDING, 10 West 15TH Street, Suite 3200
Helena, MT 59626-0096
Phone 866-457-2690
www.epa.gov/region8

Ref: 8MO

May 23, 2023

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

Re: Comments for the Draft Residential Metals Abatement Program – Interior School Dust – Investigation Summary Report – Highland View Christian School (February 2, 2023)

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 Residential Metals Abatement Program – Interior School Dust – Investigation Summary Report – Highland View Christian School (dated February 2, 2023).* Please incorporate these comments and submit the final version of the plan for review.

Specific Comments

1) Section 2, Field Sampling Activities, Paragraph 3: As stated in the QAPP, filter blanks, field blanks, equipment blanks and floor mat blanks need to be collected per each sampling event and at the frequency identified in the QAPP. It appears that no field blanks, filter blanks or floor mat blanks were collected. These sample types should be discussed and if not collected added to the deviation section. It should also be discussed whether this affects data quality objectives.
2) Section 4, Data Quality and Usability Review, Paragraph 5: A brief summary of qualifications should be provided in this section.
3) Table 1: For sample S-0016-D-EB-01-20220622, EB, the sample concentration in the table is "and." Please update with the correct sample concentration.

Appendix D, Validation Reports

1) The CFRSSI documents should be referenced in the introduction section.

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

Sincerely,

NIKIA GREENE

Digitally signed by NIKIA GREENE
Date: 2023.05.23 18:24:18 -06'00'

Nikia Greene
Remedial Project Manager

cc: (email only)
Butte File
Daryl Reed; DEQ
Jon Morgan; DEQ counsel
Carolina Balliew; DEQ
Harley Harris; NRDP
Katherine Hausrath; NRDP
Jim Ford; NRDP
Pat Cunneen; NRDP
John Gallagher; BSBC
Sean Peterson; BSBC
Eileen Joyce; BSBC
Eric Hassler; BSBC
Brandon Warner; BSBC
Chad Anderson; BSBC
Karen Maloughney; BSBC
Julia Crain; BSBC
Abby Peltomaa; BSBC
Jeremy Grotbo; BSBC
Sean Peterson; BSBC counsel
John DeJong; UP
Robert Bylsma; UP counsel
Leo Berry; BNSF and UP counsel
Doug Brannan; Kennedy Jenks for BNSF and UP
Brooke Kuhl; BNSF counsel
Lauren Knickrehm; for BNSF
Philip Hooper; Kennedy Jenks for BNSF and UP
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Robert Lowry, BNSF counsel
Loren Burmeister; AR
Josh Bryson; AR
Chris Greco; AR

Mike Mcanulty; AR
Dave Griffis; AR
Jean Martin; Counsel AR
Mave Gasaway; attorney for AR
Adam Cohen; Counsel for AR
Pat Sampson; Pioneer for AR
Scott Sampson; Pioneer for AR
Scott Bradshaw; TREC
Karen Helfrich; Pioneer for AR
Andy Dare; Pioneer for AR
Scott Sampson; Pioneer for AR
Brad Archibald; Pioneer for AR
Andy Dare; Pioneer for AR
Tina Donovan; Woodardcurran for AR
Ted Duaime; MBMG
Gary Icopini; MBMG
David Shanight, CDM Smith
Curt Coover, CDM Smith
Chapin Storrar; CDM Smith
Erin Agee, EPA
Will Lindsey, EPA
Aaron Urdiales; EPA
Chris Wardell; EPA
Dana Barnicoat; EPA
Charlie Partridge; EPA
Ian Magruder; CTEC (Tech Advisor)
Janice Hogan; CTEC
Marissa Stockton; Rosendale State Director
Kristi Carroll; Montana Tech Library

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1) Section 2, Field Sampling Activities, Paragraph 3: As stated in the QAPP, filter blanks, field blanks, equipment blanks and floor mat blanks need to be collected per each sampling event and at the frequency identified in the QAPP. It appears that no field blanks, filter blanks or floor mat blanks were collected. These sample types should be discussed and if not collected added to the deviation section. It should also be discussed whether this affects data quality objectives.

   ERM response: Field and filter blanks associated with micro-vacuum sampling were not required at Highland View, since surface dust samples were not collected. Section 4 was updated to discuss the applicable equipment and floor mat blanks, and the effect on data quality objectives.

2) Section 4, Data Quality and Usability Review, Paragraph 5: A brief summary of qualifications should be provided in this section.

   ERM response: Section 4 was updated to summarize the data qualifications.

3) Table 1: For sample S-0016-D-EB-01-20220622, EB, the sample concentration in the table is "and." Please update with the correct sample concentration.

ERM response: The table was updated to replace "and" with "ND" for the non-detect result.

Appendix D, Validation Reports

1) The CFRSSI documents should be referenced in the introduction section.

ERM response: Comment noted. The Clark Fork River Superfund Site Investigation (CFRSSI) Data Management/Data Validation Plan (CFRSSI DM/DV Plan) (ARCO 1992a) was referenced in Section 5 of the Residential Metals Abatement Program Quality Assurance Project Plan (Non-Residential Parcels - Indoor Dust) 28 February 2022. However, the data validator notes that many of the quality assurance steps were not current or applicable to this project and does not feel it is necessary for their data validation report. The data validator will include this in 2023 data validation reports.

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

Sincerely,

NIKIA GREENE

Nikia Greene

Digitally signed by NIKIA GREENE Date: 2023.05.23 18:24:18 -06'00'

Remedial Project Manager

cc: (email only)
Butte File
Daryl Reed; DEQ
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Residential Metals Abatement Program Investigation Summary Report (Non-Residential Parcels – Indoor Dust)

Highland View Christian School

21 September 2023

Project No.: 0643586

The business of sustainability

ERM

Signature Page

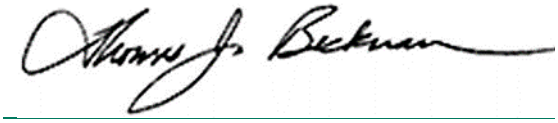
21 September 2023

Residential Metals Abatement Program Investigation Summary Report (Non-Residential Parcels – Indoor Dust)

Highland View Christian School

Elsie King
Quality Manager

Christopher Berg
Project Manager



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Acronyms and Abbreviations

Name	Description
ARCO	Atlantic Richfield Company
BPSOU	Butte Priority Soils Operable Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EDD	electronic data deliverable
ERM	Environmental Resources Management, Inc.
Environmental Standards	Environmental Standards, Inc.
FSP	Field Sampling Plan
MDL	method detection limit
mg/kg	milligrams per kilogram
QAPP	Quality Assurance Project Plan
RL	reporting limit
RMAP	Residential Metals Abatement Program
USEPA	United States Environmental Protection Agency

1. INTRODUCTION

This investigation summary report provides a summary of indoor dust field sampling activities and presents the results of the 2022 Residential Metals Abatement Program (RMAP) school indoor dust sampling for Highland View Christian School.

1.1 Background

The Butte-Silver Bow County Multi-Pathway RMAP (BSB and ARCO 2020) is designed to mitigate exposure of residents of the Butte Priority Soils Operable Unit (BPSOU), the larger Butte community, and rural residential development within the Silver Bow Creek/Butte Area Superfund Site to sources of arsenic, lead, and mercury contamination.

The United States Environmental Protection Agency (USEPA) has included schools (public and private schools, daycares, and preschools) in the RMAP in the First Amendment to the Administrative Order (USEPA Docket No. Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA]-08-2011-0011; USEPA 2020). Contamination of schools may originate from both mining-related (waste rock, tailings, aerial emissions) and non-mining-related sources (e.g., lead paint or broken mercury thermometers). The BPSOU residential action levels are 250 milligrams per kilogram (mg/kg) for arsenic, 1,200 mg/kg for lead, and 147 mg/kg for mercury (see Table 1). This component of the RMAP evaluates arsenic, lead, and mercury present in interior dust.

Environmental Resources Management , Inc. (ERM) performed sampling and assessment to determine whether remediation or abatement was required using the following decision logic:

- Remediation/abatement was required where accessible interior dust contained arsenic, lead, or mercury at concentrations in excess of solid media action levels, in areas currently accessible to children, students, or faculty. Accessible dust is defined as surface dust located in areas that are commonly occupied such as classrooms, hallways, bathrooms, and other areas (e.g., cafeterias) within the school or daycare.
- Remediation/abatement was required where inaccessible interior dust contained arsenic, lead, or mercury at concentrations in excess of solid media action levels, in areas mainly accessible to facility staff. Inaccessible dust is defined as surface dust found in locations such as boiler or mechanical rooms, tops of ceiling tiles, janitorial closets, on ventilation system ductwork or vents, and storage rooms in areas that are not commonly accessed or occupied by children or students.
- Remediation/abatement was required for buildings constructed in 1980 and earlier, where dust contained arsenic, lead, or mercury at concentrations in attics and/or crawlspaces in excess of solid media action levels and where there is an exposure pathway to an interior occupied space.

1.2 Site Description

Highland View Christian School is located at 2500 Grand Avenue in Butte, Montana (Figure 1). It was constructed in 2010 and has not been remodeled. Building attics and crawlspaces are not present. The results of a July 2021 exterior surface soil investigation performed by ARCO and Pioneer Technical Services, Inc. found exterior surface soils did not contain metals at concentrations above action levels requiring soil remediation.

Based on the BPSOU Non-Residential School/Daycare Dust Sampling Decision Framework provided in the *Residential Metals Abatement Program Quality Assurance Project Plan (Non-Residential Parcels – Indoor Dust)* (QAPP) (ERM 2022a), interior dust sampling focused on collection of indoor dust samples from entrance floor mats and floor surfaces in accessible areas at the Highland View Christian School.

Sampling locations for Highland View Christian School are subdivided into two location groups described below.

- Decision Unit 1: West classroom
- Inaccessible Areas: Storage areas, basement

2. FIELD SAMPLING ACTIVITIES

ERM collected indoor dust samples in accordance with the QAPP (ERM 2022a) and *2022 Residential Metals Abatement Program (RMAP) Field Sampling Plan – Indoor Dust – Group 1* (FSP) (ERM 2022b). Figure 2 shows the sample locations within the school. Table 1 summarizes the sample locations, collection dates, and location descriptions. Appendix A includes site photographs, and Appendix B includes field notes and sample data sheets.

Three floor mats were placed at building entrances on 26 April 2022. Floor mat samples and appropriate field quality control samples were collected on 5 May 2022. The floor mat samples collected are representative of a seven-school day sample accumulation timeframe. One floor surface sample and appropriate field quality control samples were collected on 22 June 2022.The following deviations to the QAPP or FSP occurred during sampling. The floorplan was overlaid onto the incorrect building on the figure shown in the FSP.[1] Floor mat sample locations were placed to match the actual entrances to the building, and the floor surface sample was taken from the west classroom. These deviations do not impact data quality as the areas sampled meet the data quality objectives stated in the QAPP.

3. INVESTIGATION RESULTS

Analytical results and corrective action requirement areas are depicted in Figure 3. Table 1 summarizes the analytical sample results and applicable laboratory and data validation qualifiers. The laboratory analytical reports from Pace Analytical Services, LLC are provided in Appendix C.

3.1 Floor Mat Sample Results

Arsenic, lead, and mercury were detected at concentrations below the residential action levels in all floor mat samples (see Table 1).

3.2 Floor Surface Sample Results

Arsenic, lead, and mercury were detected at concentrations below the residential action levels in the floor surface sample (see Table 1).

4. DATA QUALITY AND USABILITY REVIEW

Environmental Standards, Inc. (Environmental Standards) reviewed field documentation and laboratory data in accordance with the QAPP. Environmental Standards provided field documentation review in the form of Level A/B Field Documentation Screening Reviews and validated laboratory data in the form of Stage 2B and Stage 4 Quality Assurance Reviews (Appendix D). Environmental Standards assigned applicable validation qualifiers and usability qualifiers in an electronic data deliverable (EDD) format.

[1] As-builts provided by school representatives differed considerably due to changes in room use and building improvements. The field team updated ERM figures to match actual layout of school. Additional micro-vacuum dust samples were taken from newly identified inaccessible areas.

Data that meet the Level A and Level B criteria in the field documentation quality assessment as detailed in the QAPP, and not qualified as estimated or rejected during the data validation process, are considered enforcement-quality data and can be used for all Superfund purposes and activities. Data that meet only the Level A criteria and are not rejected during the data validation process can be considered screening-quality data in accordance with the QAPP. All data met Level A and Level B criteria.

Reported positive results between the method detection limit (MDL) and the reporting limit (RL) are considered estimated and have been flagged “J” in the qualified EDD. It is appropriate to note that sample results qualified as estimated “J” by the laboratory because the reported result is between the MDL and RL, values are considered enforcement-quality data if no other qualifiers were required during data review and validation.

When sample results were qualified both as estimated with a direction of bias (“J+” or “J-”) and as estimated with unknown bias (“J”) or the opposite bias, only the unknown bias qualifier was included in the qualified EDD.

Two equipment blanks were collected per the QAPP (ERM 2022a). One floor mat blank sample for the May – June 2022 interior dust sampling event was collected 4 May 2022. Lead was detected in the floor mat blank. Results for lead in the primary floor mat samples were all greater than ten times the floor mat blank concentration; data qualification was not required. No equipment blank contamination was noted, and analytical data qualification was not required.

Two results for mercury in floor surface dust samples were qualified “J” due to a difference in field duplicate results.

All data meet either enforcement or screening quality and are considered usable for project objectives. The analytical data completeness (defined as the percentage of usable data) for the samples included in the quality assurance review is 100 percent.

5. CONCLUSIONS AND REMEDIAL RECOMMENDATION

All data quality objectives were met, and indoor dust concentrations of arsenic, lead, and mercury are below the residential action levels. No further action is needed.

6. REFERENCES

BSB and ARCO (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.

ERM (ERM-West, Inc.). 2022a. *Residential Metals Abatement Program Quality Assurance Project Plan (Non-Residential Parcels – Indoor Dust)*. October.

ERM. 2022b. *2022 Residential Metals Abatement Program (RMAP) Field Sampling Plan (FSP) – Indoor Dust – Group 1*.

USEPA (United States Environmental Protection Agency). 2020. U.S. Environmental Protection Agency (EPA) Unilateral Administrative Order Amendment (UAO Amendment) for “Partial Remedial Design/Remedial Action Implementation and Certain Operation and Maintenance at the Butte Priority Soils Operable Unit/Butte Site” (USEPA Docket No. CERCLA-08-2011-0011).

TABLES

Table 1
Summary of Analytical Sampling Results
Highland View Christian School
Butte RMAP Indoor Dust
Butte, Montana

					Constituent		Arsenic					Lead					Mercury				
					Butte Priority Soils Residential Action Level		250 mg/kg					1200 mg/kg					147 mg/kg				
Location Type	Location ID	Sample ID	Sample Type	Date	Matrix	Location Description	Result	MDL	RL	Interp Qual	E / S	Result	MDL	RL	Interp Qual	E / S	Result	MDL	RL	Interp Qual	E / S
Floor	S-0016-F-01	S-0016-D-F-01-20220622	N	6/22/2022	Dust	West office/wing of building	**21.2**	0.51	2.3		E	**62.6**	0.14	2.3		E	**0.036**	0.0085	0.020	J	S
Floor	S-0016-F-01	S-0016-D-F-01D-20220622	FD	6/22/2022	Dust	West office/wing of building	**20.1**	0.51	2.3		E	**57.1**	0.14	2.3		E	**0.085**	0.0080	0.019	J	S
Floor Mat	S-0016-FM-01	S-0016-D-FM-01-20220505	N	5/5/2022	Dust	South-east access door	**20.3**	0.53	2.5		E	**64.4**	0.14	2.5		E	**0.036**	0.024	0.056	J	E
Floor Mat	S-0016-FM-03	S-0016-D-FM-03-20220505	N	5/5/2022	Dust	South-west access door	**36.0**	0.50	2.3		E	**77.4**	0.14	2.3		E	**0.061**	0.025	0.058		E
Floor Mat	S-0016-FM-03	S-0016-D-FM-03D-20220505	FD	5/5/2022	Dust	South-west access door	**35.1**	0.52	2.4		E	**76.0**	0.14	2.4		E	**0.048**	0.025	0.057	J	E
Floor Mat	S-0016-FM-04	S-0016-D-FM-04-20220505	N	5/5/2022	Dust	North access door	**14.1**	0.51	2.3		E	**62.4**	0.14	2.3		E	**0.050**	0.025	0.058	J	E
	QC	S-0016-D-EB-01-20220622	EB	6/22/2022	Dust QC	-	ND	0.10	0.48	U	E	ND	0.028	0.48	U	E	and	0.0081	0.019	U	E
	QC	S-0016-D-EB-02-20220505	EB	5/5/2022	Dust QC	-	ND	0.10	0.48	U	E	ND	0.028	0.48	U	E	ND	0.025	0.058	U	E

Notes:

Gray highlighting indicates result value is greater than or equal to the Butte Priority Soils Site-Specific Residential Action Levels for indoor soil and dust. Reference: 2006 Record of Decision, Butte Priority Soils Operable Unit,

Bold text indicates detection.

All reported values in mg/kg.

Acronyms:

EB	Equipment Blank
FD	Field Duplicate
MDL	Method Detection Limit
mg/kg	milligrams per kilogram
N	Normal / Primary
ND	Not detected above the MDL
QC	Quality Control
RL	Reporting Limit

Interpreted Qualifiers:

J	The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample. This will also include results reported between the MDL and RL.
U	The result is qualified as non-detect due to the detection of the analyte in anassociated QC blank.

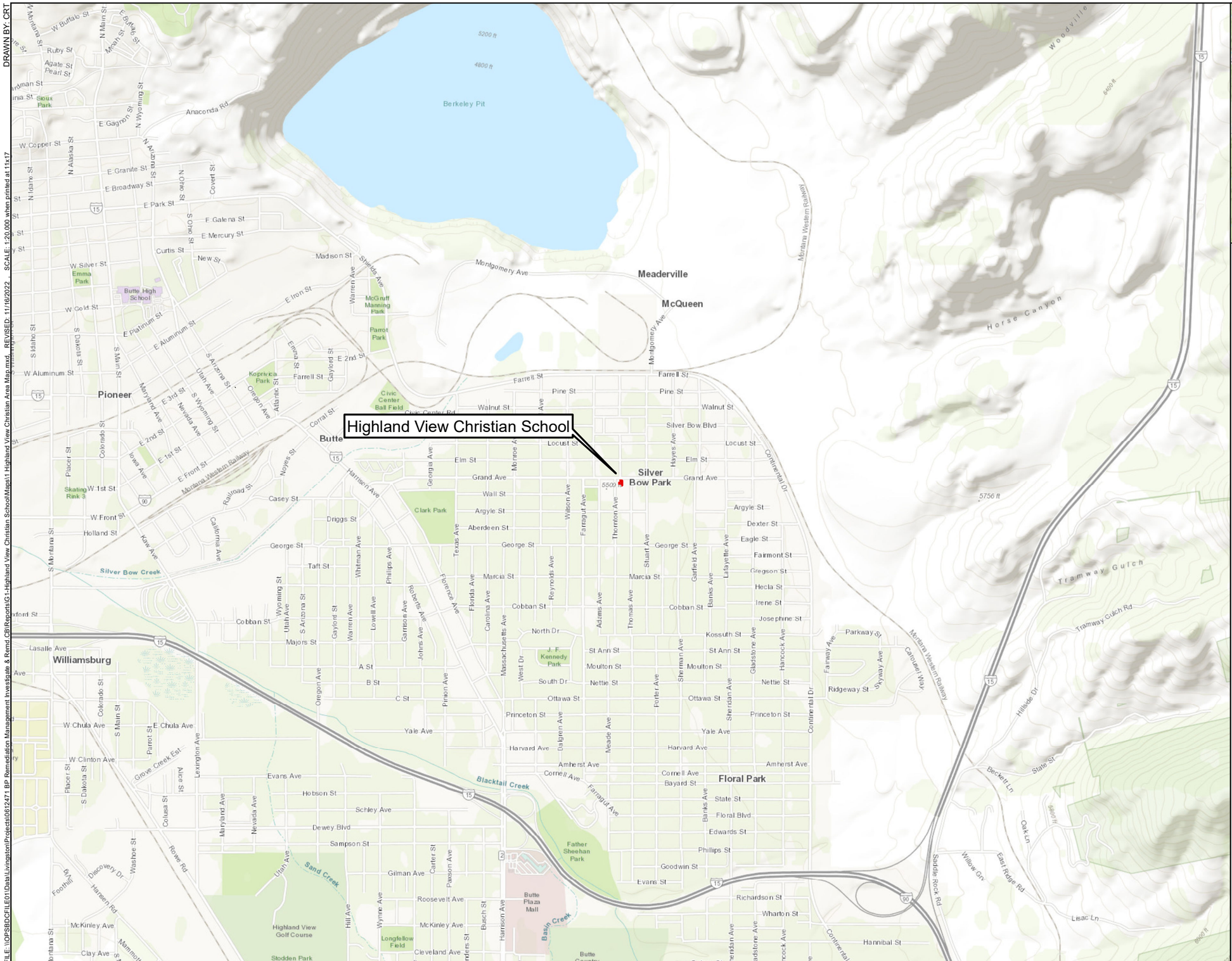
E / S:

E	Enforcement quality. No qualifiers, U qualifier, or J qualifier and meets Level A and B criteria.
S	Screening quality. J or UJ qualifier and/or meets only Level A criteria.

FIGURES

DRAWN BY: CRT

FILE: \\OPSBDCFILE01\Data\Livingston\Projects\0612471 BP Remediation Management Investigate & Remd OB\Reports\GIS\Highland View Christian School\Maps\1 Highland View Christian Area Map.mxd REVISED: 11/16/2022 SCALE: 1:20,000 when printed at 11x17



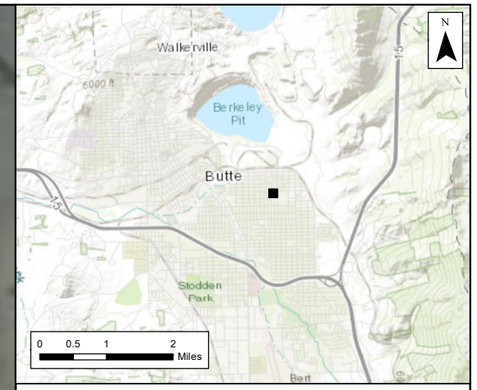
Legend

Site Area

Figure 1
Highland View Christian Location
2500 Grand Ave
Butte, MT 59701

Environmental Resources Management
www.erm.com

Source: Esri - USGS Topo Webservice; NAD 1983 StatePlane Montana FIPS 2500 Feet



Legend

- Floor Surface Sample
- Floor Mat Sample
- Inaccessible Area
- Decision Unit 1

Notes:
Room IDs reflect verbiage used on site maps provided by Highland View Christian School.

N

0 10 20
Feet

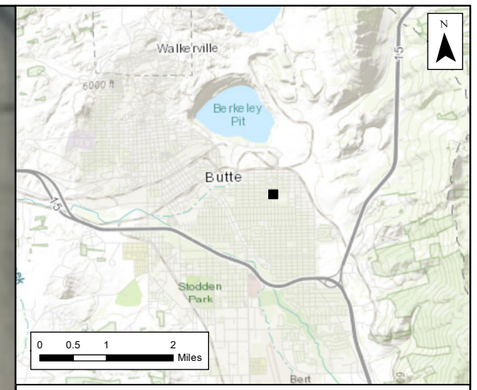
Figure 2
Highland View Christian Sampling Locations
2500 Grand Ave
Butte, MT 59701

Environmental Resources Management
www.erm.com

Source: Esri - USGS Topo Webservice; NAD 1983 StatePlane Montana FIPS 2500 Feet

DRAWN BY: CRT

FILE: \\OPSBDCFILE01\Data\Livingston\Projects\0612471 BP Remediation Management Investigate & Remd CBI\Reports\G1-Highland View Christian School\Maps\2 Highland View Christian Site Map.mxd REVISED: 01/20/2023 , SCALE: 1:240 when printed at 11x17



Legend

No Action Required

Notes:
Room IDs reflect verbiage used on site maps provided by Highland View Christian School.

N

0 10 20
Feet

Figure 3
Highland View Christian Action Areas
2500 Grand Ave
Butte, MT 59701

Environmental Resources Management
www.erm.com

Source: Esri - USGS Topo Webservice; NAD 1983 StatePlane Montana FIPS 2500 Feet

DRAWN BY: CRT REVISED: 01/20/2023 SCALE: 1:240 when printed at 11x17

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APPENDIX A SITE PHOTOGRAPHS

Photograph: 0007	Floor mat sample, by southeast access door (S-0016-D-FM-01-20220505).

Photograph: 0010	Floor mat sample, by southwest access door (S-0016-D-FM-03-20220505).

Photograph: 0011	Floor mat sample, north access door (S-0016-D-FM-04-20220505).

Photograph: 160337	Floor surface sample, west wing of building (S-0016-D-F-01-20220622).

APPENDIX B FIELD NOTES AND SAMPLE DATA SHEETS

BUTTE RMAP
26-APR-2022
(6)
J.KMETZ / C.BERG
50°F / M CLOUDY

SMALL WORLD DAY CARE

PHOTO	DESC
0005	SOUTH ACCESS DOOR
0006	NORTH " "

1030 LEFT SITE

1039 ARRIVED @ HIGHLAND VIEW CHRISTIAN SCHOOL @ MET WITH DIANE

1050 PLACED FLOOR MATS @
(1) SOUTH-EAST ACCESS DOOR
(2) " WEST ACCESS DOOR
(3) NORTH ACCESS DOOR

PHOTO	DESC
0007	SOUTH-EAST ACCESS DOOR
0008	" -WEST " "
0009	NORTH ACCESS DOOR

DIANE SAID LUNCHTIME (12:00) OR AFTER 3:00 WORKS FOR SAMPLING BUT ASKED THAT WE CONTACT HER TO COORDINATE

1115 LEFT SITE AND WENT TO EAT LUNCH AND RESEARCH STORAGE FACILITIES FOR FIELD EQUIPT

4/26/22

4/26/22

2/4

Scale: 1 square = _____

BUTTE RMAP
26-APR-2022
(7)
J.KMETZ / C. BERG
50°F / M. CLOUDY

1335 ARRIVED @ SILVER BOW MONTESSORI AND MET WITH BRIANNA PEET

1345 PLACED FLOORMATS @
(1) NORTH BLDG SOUTH DOOR
(2) WEST CLASSROOM SOUTH-WEST DOOR
(3) " " " -EAST "
(4) CLASSROOM NORTH-EAST DOOR
(5) " " -WEST "

BASED ON DISCUSSION WITH BRIANNA, WE RELOCATED THE FLOOR MAT LOCATION FROM THE EAST SIDE OF THE MAIN CLASSROOM TO THE NORTH-WEST ENTRANCE SINCE THEY DO NOT USE THE EAST ENTRANCE BUT KIDS USE THE NW ENTRANCE TO ACCESS BATHROOM FROM PLAYGROUND

PHOTO	DESC
0010	NORTH BLDG SOUTH DOOR
0011	WEST CLASSROOM SW DOOR
0012	" " SE "
0013	CLASSROOM NE DOOR

3/4

Scale: 1 square = _____

4/26/22

BUTTE RMAP
04-MAY-2022
(10)
J. KMETZ / R. STEFANSKI
60°F / SUNNY

THROUGH VAC B CYCLONE
(S-0020-D-EB-03-20220504)

1657 DECONNED VAC B CYCLONE

1708 LEAK TESTED VAC-B
RESULT 0.01 in H_2O

1712 COLLECTED FLOOR MAT
SAMPLE @ NORTH ACCESS DOOR
(S-0020-D-FM-04-20220504)
ONLY GOT 0.10 grams

1735 LEFT SMALL WORLD DAY CARE

1750 ARRIVED @ HOTEL
ADDED ICE TO SAMPLES, COPIED
NOTES & DATA SHEETS &
DOWNLOADED PHOTOS

04-MAY 2022

Scale: 1 square = 2/2

5/4/22

BUTTE RMAP
05-MAY-2022
(11)
J. KMETZ / R. STEFANSKI
40°F / SUNNY

0730 HELD FIELD SAFETY MTG
AND DISCUSSED LOGISTICS

0830 DROPPED OFF EXTRA EQUIP
@ U-HAUL STORAGE
UNIT: AA1036P
LOCK COMBO: PORK

0925 ARRIVED @ HIGHLAND VIEW
CHRISTIAN SCHOOL

0930 DECONNED VAC B SN 2006

0951 LEAK TESTED VAC B
RESULT 0.00 in H_2O

0954 COLLECTED FLOOR MAT SAMPLE
@ SOUTH-EAST ACCESS DOOR
(S-0016-D-FM-01-20220505)

1012 DECONNED VAC B

~~LEAK TESTED VAC B~~
~~RESULT 1" H_2O~~ 5/5/22

1022 COLLECTED EQUIPMENT BLANK
THROUGH VAC B CYCLONE
(S-0016-D-EB-02-20220505)

1028 DECONNED VAC B CYCLONE

1035 LEAK TESTED VAC B
RESULT 0.00 in H_2O

1048 COLLECTED FLOOR MAT SAMPLE @
SOUTH-WEST ACCESS DOOR →

Scale: 1 square

5/5/22

Rite in the Rain

BUTTE RMAP (12) J.KMETZ/R.STEFANSKI
05-MAY-2022 60°F/PC

(CONT'D) SOUTH-WEST ACCESS DOOR
FLOOR MAT SAMPLE
(S-0016-D-FM-03-20220505)
SINCE WE HAD 12.25 grams WE
TRANSFERRED 6.21 grams TO
ANOTHER BOTTLE AS A FIELD DUP

1101 FIELD DUPLICATE OF FLOOR
MAT SAMPLE S-0016-D-FM-03-20220505
(S-0016-D-FM-03D-20220505)

1115 DECONNED VAC B
LEAK TESTED VAC B
RESULT 0.00 in H_2O

1140 Collected floor mat sample @
North door. (S-0016-D-FM-04-20220505)

1200 ~~5/4/22~~ 5/4/22 as Left site after collecting all
samples.

5/5/22

Scale: 1 square = 5/5/22

BUTTE RMAP (13) J.KMETZ/R.STEFANSKI
05-MAY-2022 60°F/OVERCAST

1500 ARRIVED @ SWARE EARLY HEAD START
1510 DECONNED VAC B
1530 LEAK TESTED VAC B
RESULT 0.00 in H_2O
1535 COLLECTED FLOOR MAT SAMPLE
@ NORTH ACCESS DOOR
(S-0019-D-FM-01-20220505)
SINCE WE COLLECTED 6.38gms
WILL USE AS MS/MSD
1550 DECONNED VAC B
1613 LEAK TESTED VAC B
RESULT 0.00 in H_2O
1615 COLLECTED FLOOR MAT SAMPLE
@ WEST ACCESS DOOR
(S-0019-D-FM-02-20220505)
1627 DECONNED VAC B
1651 LEAK TESTED VAC B
RESULT 0.00 in H_2O
1656 COLLECTED FLOOR MAT SAMPLE
@ EAST ACCESS DOOR
(S-0019-D-FM-03-20220505)
* NIC PISCIOTTA FROM CDM SMITH
WAS AT THE SCHOOL FOR ALL OF
THE SAMPLING
1730 LEFT SCHOOL; PUT SAMPLES ON ICE

Scale: 1 square = 5/5/22 Rite in the Rain

RMAP FIELD SAMPLE DATA SHEET (FSDS) FOR HVS3 FLOOR DUST

Project Name/Number: Butte RMAP Indoor Dust / 0643586
Location: Butte, Montana
School: HIGHLAND VIEW CHRISTIAN SCHOOL
Group #: 1

Sampling Date: 05-MAY-2022
Field Logbook No: 1
Page No: 11-12

Sampling Team: (ERM) Other _____ Name(s): JOSEPH KMETZ & RHOWE STEFANSKI

Data Item	1	2	3
Sample ID	S-0016-D-FM-01-20220505	S-0016-D-EB-02-20220505	S-0016-D-FM-03-20220505
Bottle Lot #	032221-1KM	032221-1KM	032221-1KM
Sample Category (circle)	(FS-(Field Sample)) FD-(Field Duplicate) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))	FS-(Field Sample) FD-(Field Duplicate) FB-(Field Blank) (EB-(Equipment Blank)) MS/MSD-(Matix Spike/(duplicate))	(FS-(Field Sample)) FD-(Field Duplicate) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))
Sample Parent ID (if a duplicate sample)	N/A	N/A	N/A
Location Description (e.g., room number, etc.)	DECISION UNIT 1 SOUTH-EAST ACCESS DOOR	N/A	DECISION UNIT 1 SOUTH-WEST ACCESS DOOR
Location Floor (circle)	Basement, (Ground/Main Floor,) 1st Floor, 2nd Floor, 3rd Floor Other_____	Basement, Ground/Main Floor, 1st Floor, 2nd Floor, 3rd Floor Other N/A	Basement, (Ground/Main Floor,) 1st Floor, 2nd Floor, 3rd Floor Other_____
Floor Type (circle)	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, (Floor Mat) Other: _____	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, Floor Mat Other: N/A	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, (Floor Mat) Other: _____
Approximate Sample Area (include units)	15 SF	N/A	15 SF
Date Last Vacuumed/ Cleaned	NOT CLEANED SINCE INSTALLED	N/A	NOT CLEANED SINCE INSTALLED
Photo ID	0007, 0008	0009	0010
HVS3 Vacuum ID No.	VAC B SN 2006	VAC B SN 2006	VAC B SN 2006
Leak Check? (circle)	(Yes) No	N/A Yes No	(Yes) No
20 sec cleaning @ end? (circle)	(Yes) No	N/A Yes No	(Yes) No
Total Sample Time	9 5/5/22 minutes	N/A minutes	8 minutes
Flow Drop	5 inches of water	N/A inches of water	5 inches of water
Nozzle Drop	10 inches of water	N/A inches of water	10 inches of water
Final Weight	128.85 grams	131.32 grams	137.18 grams
Tare Weight	126.46 grams	126.24 grams	124.93 grams
Net Weight (Final - Tare)	2.39 grams	5.08 grams	(*) 6.04 ~~42.25~~ grams 5/5/22
Decon Time	09:30	10:12	10:12 / 10:28 (CYCLONE)
Comments	SAMPLE COLLECTION TIME = 09:54	COLLECTED EB BY POURING GLASS BEADS THROUGH VAC B CYCLONE @ 10:22	SAMPLE COLLECTED @ 10:48 (*) TRANSFERRED 6.21g TO FIELD DUPLICATE

Lab: Pace Analytical — Container: HVS3 Catch Bottle = 250 mL LDPE; Transfer to 4 oz. glass jar

For Field Team Completion (Initials) — Completed by: [signature] QC by: [signature]

RMAP FIELD SAMPLE DATA SHEET (FSDS) FOR HVS3 FLOOR DUST

Project Name/Number: Butte RMAP Indoor Dust / 0643586
Location: Butte, Montana
School: HIGHLAND VIEW CHRISTIAN SCHOOL
Group #: 1

Sampling Date: 05-MAY-2022
Field Logbook No: 1
Page No: 12

Sampling Team: (ERM) Other ________ Name(s): JOE KMETZ & RHOWE STEFANSKI

Data Item	1	2	3
Sample ID	S-0016-D-FM-03D-20220505	S-0016-D-FM-04-20220505	
Bottle Lot #	022122-1KM	032221-1KM	
Sample Category (circle)	FS-(Field Sample) (FD-(Field Duplicate)) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))	(FS-(Field Sample)) FD-(Field Duplicate) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))	FS-(Field Sample) FD-(Field Duplicate) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))
Sample Parent ID (if a duplicate sample)	S-0016-D-FM-03 20220505	N/A	
Location Description (e.g., room number, etc.)	DECISION UNIT 1 SOUTH-WEST ACCESS DOOR	Decision Unit 1 North access door	5/5/22
Location Floor (circle)	Basement, (Ground/Main Floor,) 1st Floor, 2nd Floor, 3rd Floor Other______	Basement, (Ground/Main Floor,) 1st Floor, 2nd Floor, 3rd Floor Other______	Basement, Ground/Main Floor, 1st Floor, 2nd Floor, 3rd Floor Other______
Floor Type (circle)	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, (Floor Mat) Other: ______	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, (Floor Mat) Other: ______	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, Floor Mat Other: ______
Approximate Sample Area (include units)	15 SF	15 SF	______
Date Last Vacuumed/ Cleaned	NOT CLEANED SINCE INSTALLED	Not cleaned since Installed	
Photo ID	0010	0011	
HVS3 Vacuum ID No.	VAC B SN 2006	Vac B SN 2006	
Leak Check? (circle)	(Yes) No	(Yes) No	Yes No
20 sec cleaning @ end? (circle)	(Yes) No	(Yes) No	Yes No
Total Sample Time	8 minutes	3 minutes	______ minutes
Flow Drop	5 inches of water	5 inches of water	______ inches of water
Nozzle Drop	10 inches of water	10 inches of water	______ inches of water
Final Weight	134.26 grams	131.62 grams	______ grams
Tare Weight	128.05 grams	125.74 grams	______ grams
Net Weight (Final - Tare)	6.21 grams	5.88 grams	______ grams
Decon Time	10:12/10:28 (CYCLONE)	11:15/~~11:40~~ (cyclone) 5/5/22 RS	
Comments	SAMPLE TIME = 11:01	Sample time 11:40	

Lab: Pace Analytical   Container: HVS3 Catch Bottle = 250 mL LDPE; Transfer to 4 oz. glass jar

For Field Team Completion (Initials)
Completed by: JK
QC by: RS

6-22-22 (7) NC, TW, LB

West elementary

0700 Met up at Hotel Lobby, Logistics, Safety Meeting

~~0730~~ 0800 Arrived at West Elementary, Checked in at office, Unload and Set-up Equipment, Calibrated Mini-VACs

0900 Started Mini VAC at S-11 (Class Room 101 Top of Chalkboard)

0930 Sampled at S-11 S-0005-D-S-11-20220622

0945 Started Mini VAC at S-12 (Class Room 102, Top of Lights)

1015 Sampled S-12 S-0005-D-S-12-20220622 and S-6 (~~Room~~ Main Office)

1020 Started Mini VAC at S-13 (Class Room 103, Top of Lights & Shelving)

1030 Sampled S-6 and S-13 S-0005-D-S-06-20220622 S-0005-D-13-20220622

1035 Started Mini VAC at S-14 (Class Room 106, Top of Lights and Shelving)

1050 Sampled S-14 S-0005-S-D-S14-20220622

1100 Started VAC at S-8 (Storage Room in Main Office)

1125 Sampled S-8 S-0005-S-D-S08-20220622

1130 Started VAC at S-17 (Girl's Restroom ~~Junior~~ Construction)

1145 Sampled at S-17 S-0005-S-D-S-17-20220622

1150 Started VAC at S-18 (Class Room 108, Top of Lights) LB 6/22/22

1210 Sampled S-18 S-0005-S-D-S-18-20220622

1150 Started VAC at S-6, But No Dust in Room

1215 Started VAC at S-19 (Class Room 109, Top of Lights) LB 6/22/22

1224 Sampled S-19 S-0005-S-D-S-19-20220622

1245 Started VAC at S-20 (Class Room 112, Top of Lights)

1302 Sampled ~~S-19~~ S-20, NC 6/22/22 Duplicate S-0005-D-S-20-20220622 S-0005-D-S-20D-20220622

1430 Started VAC at S-21 (~~Room~~ Class Room 111, Top of Lights) NC 6/22/22

Rite in the Rain

Scale: 1 square = _____

6-22-22 (8) NC, TW, LB

West Elementary

1440 SAMPLED AT S-21 S-0005-D-S-21-20220622

1507 STARTED VAC AT S-24 (TEACHER'S LOUNGE)

1518 SAMPLED AT S-24 S-0005-D-S-24-20220622

1550 STARTED VAC AT S-25 (CLASS Room 205, TOP OF LIGHTS)

1620 SAMPLED S-25 S-0005-D-S-25-20220622

NC ~~1430~~ 1630 STARTED VAC ~~AT~~ S-22 (CLASS Room 208, TOP OF LIGHTS)

NC ~~1644~~ 1644 SAMPLED S-22 S-0005-D-S-22-20220622

1656 STARTED VAC AT S-23 (SCIENCE LAB, TOP OF LIGHTS)

1728 SAMPLED S-23 S-0005-D-S-22-20220622

1440 T. Wilson off site

1450 T. Wilson arrived at U-Haul, picked up gear

1505 Arrive at Highland Christian View

1514 speak with Dawn and unload gear

1531 Decon vacuum A, leak test

1543 Begin samplings F-01 S-0016-D-F-01-20220622

1553 Finish samplings F-01 (Duplicate) S-0016-D-F-01D-20220622

1557 Decon Vacuum A

1602 Take equipment Blank (Equal) S-0016-D-EB-01-20220622

1604 Pack up gear.

1610 off-site

1640 T. Wilson at West Elementary

1720 STARTED VAC AT S-40 (Room 306, TOP OF LIGHTS)

1742 SAMPLED S-40 S-0005-D-S-40-20220622

1736 STARTED VAC AT S-42 (Room 310 TOP OF LIGHTS)

See FSDS Highland View 6/22/22 TW emk 06/28/22

emk 06/28/22

Scale: 1 square = _____

6-22-22 (9) NC, TW, LB

West elementary

1751 Sampled S-42 S-0005-D-S-42-20220622

1745 Started VAC at S-41 (Room 305, Top of Lights)

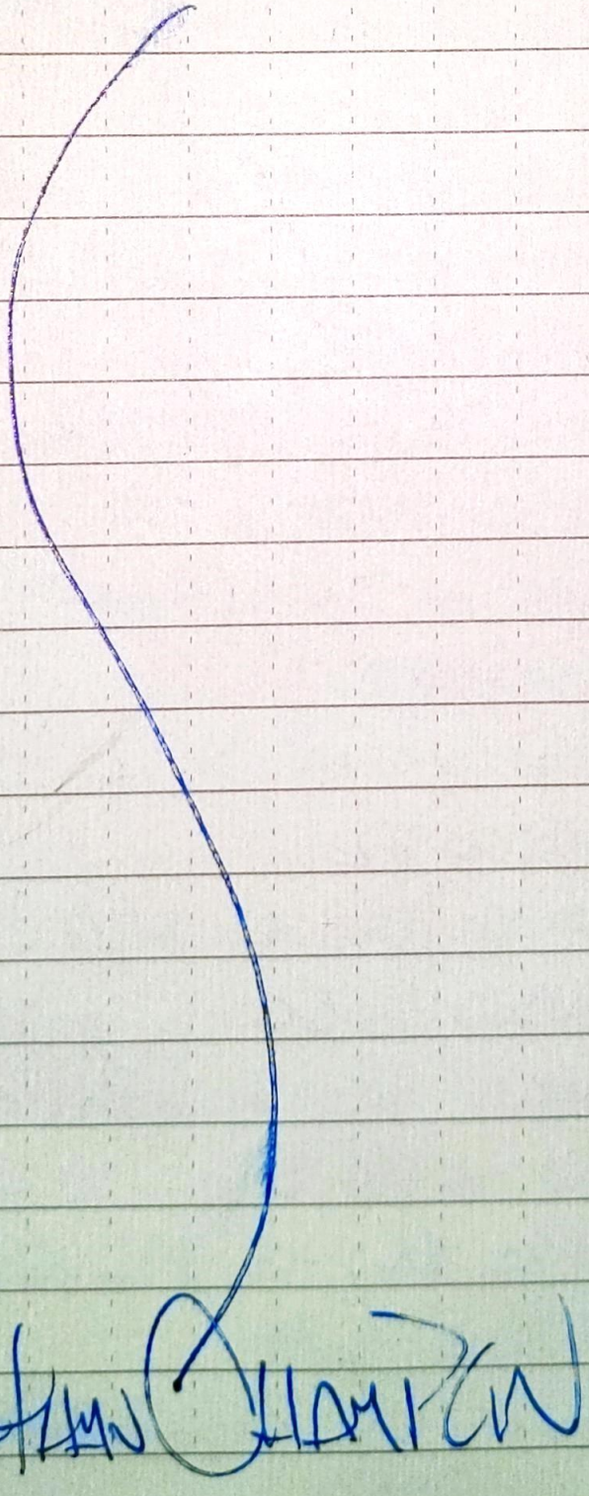
1810 Sampled S-41 S-0005-D-S-41-20220622

1800 Started VAC at S-43 (Room 309, Top of Lights)

1815 Sampled S-43 S-0005-D-S-43-20220622

1818 Pack up Equipment

1830 Depart West Elementary



Scale: 1 square = _____

Rite in the Rain

RMAP FIELD SAMPLE DATA SHEET (FSDS) FOR HVS3 FLOOR DUST

Project Name/Number: Butte RMAP Indoor Dust / 0643586
Location: Butte, Montana
School: Highland View Christian
Group #: 1

Sampling Date: 6/22/22
Field Logbook No: 2
Page No: 8

Sampling Team: (ERM) Other ______ Name(s): T. Wilson

Data Item	1	2	3
Sample ID	S-0016-D-F-01-20220622	S-0016-D-F01D-20220622	S-0016-D-EB-01-20220622
Bottle Lot #	003851	00B1259	003865
Sample Category (circle)	(FS-(Field Sample)) FD-(Field Duplicate) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))	FS-(Field Sample) (FD-(Field Duplicate)) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))	FS-(Field Sample) FD-(Field Duplicate) FB-(Field Blank) (EB-(Equipment Blank)) MS/MSD-(Matix Spike/(duplicate))
Sample Parent ID (if a duplicate sample)	N/A	S-0016-D-F-01-20220622	N/A
Location Description (e.g., room number, etc.)	West wing of building	West wing of building	N/A
Location Floor (circle)	(Basement), Ground/Main Floor, 1st Floor, 2nd Floor, 3rd Floor Other	Basement, Ground/Main Floor, (1st Floor), 2nd Floor, 3rd Floor Other	Basement, Ground/Main Floor, 1st Floor, 2nd Floor, 3rd Floor Other NA
Floor Type (circle)	Bare Floor: Tile, Laminate, Wood Carpet: Plush, (Level Loop), Multilevel, Shag, Floor Mat Other:	Bare Floor: Tile, Laminate, Wood Carpet: Plush, (Level Loop), Multilevel, Shag, Floor Mat Other:	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, Floor Mat Other: N/A
Approximate Sample Area (include units)	75 ft²	75 ft²	N/A
Date Last Vacuumed/ Cleaned	unknown	unknown	N/A
Photo ID	160337 (phone)	160337 (phone)	N/A
HVS3 Vacuum ID No.	Vacuum A	Vacuum A	Vacuum A
Leak Check? (circle)	(Yes) No	(Yes) No	Yes (No) NA
20 sec cleaning @ end? (circle)	(Yes) No	(Yes) No	Yes No NA
Total Sample Time	10 minutes	10 minutes	2 minutes
Flow Drop	5 inches of water	5 inches of water	N/A inches of water
Nozzle Drop	10 inches of water	10 inches of water	N/A inches of water
Final Weight	133.97 grams	131.31 grams	142.80 grams
Tare Weight	127.81 grams	127.83 grams	127.82 grams
Net Weight (Final - Tare)	6.16 grams	3.48 grams	14.98 grams
Decon Time	1531	1531	~~1602~~ TW 6/22/22 1557
Time Sample Collected	1553	1553	1602
Comments	Sample location was moved to west wing		

Lab: Pace Analytical   Container: HVS3 Catch Bottle = 250 mL LDPE; Transfer to 4 oz. glass jar

For Field Team Completion (Initials)   Completed by: TW   QC by: UB

APPENDIX C LABORATORY REPORTS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

May 17, 2022

Christopher Berg
ERM
1 Ninth St. Island Drive
Livingston, MT 59047

RE: Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Dear Christopher Berg:

Enclosed are the analytical results for sample(s) received by the laboratory on May 10, 2022. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 12.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Minneapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jennifer Anderson
jennifer.anderson@pacelabs.com
(612)607-6436
Project Manager

Enclosures

cc: Tom Beckman, ERM Alaska, Inc
AR Deliverables ESI, Environmental Standards, Inc.
Elsie King, ERM AK
Emmy Zartman, ERM

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Pace Analytical Services, LLC - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414
1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab
A2LA Certification #: 2926.01*
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009*
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014*
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Tribal Water Systems+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605*
Georgia Certification #: 959
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086*
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064*
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137*
Minnesota Dept of Ag Approval: via MN 027-053-137
Minnesota Petrofund Registration #: 1240*
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081*
New Jersey Certification #: MN002
New York Certification #: 11647*
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification (A2LA) #: R-036
North Dakota Certification (MN) #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification (1700) #: CL101
Ohio VAP Certification (1800) #: CL110*
Oklahoma Certification #: 9507*
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001*
Pennsylvania Certification #: 68-00563*
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192*
Utah Certification #: MN00064*
Vermont Certification #: VT-027053137
Virginia Certification #: 460163*
Washington Certification #: C486*
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01
USDA Permit #: P330-19-00208
*Please Note: Applicable air certifications are denoted with an asterisk (*).

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10607644001	**S-0016-D-FM-01-20220505**	Solid	05/05/22 09:45	05/10/22 08:50
10607644002	**S-0016-D-EB-02-20220505**	Solid	05/05/22 10:22	05/10/22 08:50
10607644003	**S-0016-D-FM-03-20220505**	Solid	05/05/22 10:48	05/10/22 08:50
10607644004	**S-0016-D-FM-03D-20220505**	Solid	05/05/22 11:01	05/10/22 08:50
10607644005	**S-0016-D-FM-04-20220505**	Solid	05/05/22 11:40	05/10/22 08:50

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10607644001	**S-0016-D-FM-01-20220505**	EPA 6020B	PW1	2	PASI-M
		EPA 7471B	LMW	1	PASI-M
10607644002	**S-0016-D-EB-02-20220505**	EPA 6020B	PW1	2	PASI-M
		EPA 7471B	LMW	1	PASI-M
10607644003	**S-0016-D-FM-03-20220505**	EPA 6020B	PW1	2	PASI-M
		EPA 7471B	LMW	1	PASI-M
10607644004	**S-0016-D-FM-03D-20220505**	EPA 6020B	PW1	2	PASI-M
		EPA 7471B	LMW	1	PASI-M
10607644005	**S-0016-D-FM-04-20220505**	EPA 6020B	PW1	2	PASI-M
		EPA 7471B	LMW	1	PASI-M

PASI-M = Pace Analytical Services - Minneapolis

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Method: **EPA 6020B**
Description: 6020B MET ICPMS
Client: BP-ERM-MT
Date: May 17, 2022

General Information:
5 samples were analyzed for EPA 6020B by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3050B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Method: **EPA 7471B**
Description: 7471B Mercury
Client: BP-ERM-MT
Date: May 17, 2022

General Information:
5 samples were analyzed for EPA 7471B by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 7471B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Sample: S-0016-D-FM-01-20220505 **Lab ID: 10607644001** Collected: 05/05/22 09:45 Received: 05/10/22 08:50 Matrix: Solid
Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**20.3**	mg/kg	2.5	0.53	5	05/11/22 12:27	05/13/22 00:52	7440-38-2	
Lead	**64.4**	mg/kg	2.5	0.14	5	05/11/22 12:27	05/13/22 00:52	7439-92-1	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.036J**	mg/kg	0.056	0.024	1	05/11/22 15:25	05/17/22 10:30	7439-97-6	

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ANALYTICAL RESULTS

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Sample: S-0016-D-EB-02-20220505 **Lab ID: 10607644002** Collected: 05/05/22 10:22 Received: 05/10/22 08:50 Matrix: Solid
Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**<0.10**	mg/kg	0.48	0.10	1	05/11/22 12:27	05/13/22 11:27	7440-38-2	
Lead	**<0.028**	mg/kg	0.48	0.028	1	05/11/22 12:27	05/13/22 11:27	7439-92-1	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**<0.025**	mg/kg	0.058	0.025	1	05/11/22 15:25	05/17/22 10:31	7439-97-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Sample: S-0016-D-FM-03-20220505 **Lab ID: 10607644003** Collected: 05/05/22 10:48 Received: 05/10/22 08:50 Matrix: Solid
Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**36.0**	mg/kg	2.3	0.50	5	05/11/22 12:27	05/13/22 00:59	7440-38-2	
Lead	**77.4**	mg/kg	2.3	0.14	5	05/11/22 12:27	05/13/22 00:59	7439-92-1	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.061**	mg/kg	0.058	0.025	1	05/11/22 15:25	05/17/22 10:33	7439-97-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Sample: S-0016-D-FM-03D-20220505 **Lab ID: 10607644004** Collected: 05/05/22 11:01 Received: 05/10/22 08:50 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**35.1**	mg/kg	2.4	0.52	5	05/11/22 12:27	05/13/22 01:02	7440-38-2	
Lead	**76.0**	mg/kg	2.4	0.14	5	05/11/22 12:27	05/13/22 01:02	7439-92-1	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.048J**	mg/kg	0.057	0.025	1	05/11/22 15:25	05/17/22 10:35	7439-97-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Sample: S-0016-D-FM-04-20220505 **Lab ID: 10607644005** Collected: 05/05/22 11:40 Received: 05/10/22 08:50 Matrix: Solid
Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**14.1**	mg/kg	2.3	0.51	5	05/11/22 12:27	05/13/22 01:06	7440-38-2	
Lead	**62.4**	mg/kg	2.3	0.14	5	05/11/22 12:27	05/13/22 01:06	7439-92-1	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.050J**	mg/kg	0.058	0.025	1	05/11/22 15:25	05/17/22 10:36	7439-97-6	

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QUALITY CONTROL DATA

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

QC Batch: 814468 Analysis Method: EPA 7471B
QC Batch Method: EPA 7471B Analysis Description: 7471B Mercury Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10607644001, 10607644002, 10607644003, 10607644004, 10607644005

METHOD BLANK: 4317663 Matrix: Solid
Associated Lab Samples: 10607644001, 10607644002, 10607644003, 10607644004, 10607644005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/kg	<0.0081	0.019	0.0081	05/17/22 10:27	

LABORATORY CONTROL SAMPLE: 4317664

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.43	0.45	105	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4317666 4317667

Parameter	Units	10607647001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.035J	1.4	1.4	1.4	1.4	101	101	80-120	0	20	

SAMPLE DUPLICATE: 4317665

Parameter	Units	10607647001 Result	Dup Result	RPD	Max RPD	Qualifiers
Mercury	mg/kg	0.035J	0.038J		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

QC Batch: 814465
QC Batch Method: EPA 3050B
Analysis Method: EPA 6020B
Analysis Description: 6020B Solids UPD5
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10607644001, 10607644002, 10607644003, 10607644004, 10607644005

METHOD BLANK: 4317652 Matrix: Solid
Associated Lab Samples: 10607644001, 10607644002, 10607644003, 10607644004, 10607644005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	<0.10	0.47	0.10	05/13/22 00:45	
Lead	mg/kg	<0.028	0.47	0.028	05/13/22 00:45	

LABORATORY CONTROL SAMPLE: 4317653

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	46.7	49.8	107	80-120	
Lead	mg/kg	46.7	53.0	113	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4317654 4317655

Parameter	Units	10607647001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	17.4	48.5	48.5	70.8	63.9	110	96	75-125	10	20	
Lead	mg/kg	84.1	48.5	48.5	135	123	104	81	75-125	9	20	

SAMPLE DUPLICATE: 4317656

Parameter	Units	10607647001 Result	Dup Result	RPD	Max RPD	Qualifiers
Arsenic	mg/kg	17.4	17.5	0	20	
Lead	mg/kg	84.1	83.6	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
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QUALIFIERS

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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Minneapolis, MN 55414
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10607644001	**S-0016-D-FM-01-20220505**	EPA 3050B	814465	EPA 6020B	814770
10607644002	**S-0016-D-EB-02-20220505**	EPA 3050B	814465	EPA 6020B	814770
10607644003	**S-0016-D-FM-03-20220505**	EPA 3050B	814465	EPA 6020B	814770
10607644004	**S-0016-D-FM-03D-20220505**	EPA 3050B	814465	EPA 6020B	814770
10607644005	**S-0016-D-FM-04-20220505**	EPA 3050B	814465	EPA 6020B	814770
10607644001	**S-0016-D-FM-01-20220505**	EPA 7471B	814468	EPA 7471B	814716
10607644002	**S-0016-D-EB-02-20220505**	EPA 7471B	814468	EPA 7471B	814716
10607644003	**S-0016-D-FM-03-20220505**	EPA 7471B	814468	EPA 7471B	814716
10607644004	**S-0016-D-FM-03D-20220505**	EPA 7471B	814468	EPA 7471B	814716
10607644005	**S-0016-D-FM-04-20220505**	EPA 7471B	814468	EPA 7471B	814716

Laboratory Management Program (LaMP) Chain of Custody Record
Soil, Sediment and Groundwater Samples

BP/RM Facility No: MT_Butte Priority Soils

Lab Work Order Number:

Turn Around Time (Days): 5

Chain of Custody: 20220505-0134-PACE_MPLS-S-0016

Lab Name: PACE, INC., MINNEAPOLIS, MN	BP/ARC Facility Address:	Consultant/Contractor: ERM
Lab Address: 1700 Elm Street SE	City, State, ZIP Code: Butte, MT,	Consultant/Contractor Project No: 0643586
Lab PM:	Lead Regulatory Agency:	Address: 1 9th St Island Dr, Livingston, MT 59047
Lab Phone: 612-607-6398	California Global ID No.:	Consultant/Contractor PM: Christopher Berg
Lab Shipping Accnt:	Accounting Information:	Phone: 9167699050 Email: Christopher.Berg@erm.com
Lab Bottle Order No:		Send/Submit EDD to: mcanumc@bp.com; Christopher.Berg@erm.com
Other Info:		Invoice To: mcanumc@bp.com; Christopher.Berg@erm.com
BP/RM PM: Mike Mc Anulty/mcanumc@bp.com	PM Phone: PM Email:	**Report Type & QC Level:**

Sample Details

Lab No.	Sample Description	Date	Time	Field Matrix	Start Depth	End Depth	Depth Unit	Grab (G) or Composite (C)	Total Number of Containers	Requested Analyses: Filt	Pres	Analysis	SW6020B (arsenic and lead)	SW7471B (mercury)	
										N		N			
1	S-0016-D-FM-01-20220505	05/05/2022	09:54	SDU				G					X	X	WO1
2	S-0016-D-EB-02-20220505	05/05/2022	10:22	WQ				G					X	X	WO2
3	S-0016-D-FM-03-20220505	05/05/2022	10:48	SDU				G					X	X	WO3
4	S-0016-D-FM-03D-20220505	05/05/2022	11:01	SDU				G					X	X	WO4
5	S-0016-D-FM-04-20220505	05/05/2022	11:40	SDU				G					X	X	WO5

WO#: 10607644

10607644

	Relinquished By / Affiliation	Date / Time	Accepted By / Affiliation	Date / Time
Sampler's Name: Rhowe Stefanski, Joe Kmetz				
Sampler's Company: ERM	Rhowe Stefanski / ERM	5/5/2022 1:35:00 PM		5/10/22 850
Ship Method: Overnight Ship Date: 5/5/2022 1:34:00 PM				
Shipment Tracking No: 5150 1597 8836				

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: (Yes) / No | Temp Blank: (Yes) / No | Cooler Temp on Receipt: 0.9 °F/C | Trip Blank: Yes / (No) | MS/MSD Sample Submitted: Yes / (No)

Pace ANALYTICAL SERVICES	**DC#_Title: ENV-FRM-MIN4-0149 v03_Sample Condition Upon Receipt (SCUR) - ESI**
	Effective Date: 04/12/2022

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: bp-ERM

Project #: **WO#: 10607644**

PM: JMA **Due Date: 05/19/22**

CLIENT: BP-ERM-MT

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Pace [ ] SpeeDee [ ] Commercial

Tracking Number: 5150 1597 8836 See Exceptions [ ] ENV-FRM-MIN4-0142

Custody Seal on Cooler/Box Present? [X] Yes [ ] No Seals Intact? [X] Yes [ ] No Biological Tissue Frozen? [ ] Yes [ ] No [X] N/A

Packing Material: [ ] Bubble Wrap [X] Bubble Bags [ ] None [ ] Other: _____ Temp Blank? [X] Yes [ ] No

Thermometer: [ ] T1(0461) [X] T2(1336) [ ] T3(0459) [ ] T4(0254) [ ] T5(0489) [ ] T6(0235) [ ] T7(0042) Type of Ice: [X] Wet [ ] Blue [ ] None [ ] Dry [ ] Melted

Temp should be above freezing to 6°C Cooler Temp Read w/temp blank: 0.9 °C

Correction Factor: TNC Cooler Temp Corrected w/temp blank: 0.9 °C

Average Corrected Temp (no temp blank only): _____ °C [ ] See Exceptions ENV-FRM-MIN4-0142 [ ] 1 Container

USDA Regulated Soil: ([X] N/A, water sample/Other: SL)

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? [ ] Yes [ ] No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? [ ] Yes [ ] No

Date/Initials of Person Examining Contents: MK 5-10-22

If Yes to either question, fill out a Regulated Soil Checklist (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present and Filled Out?	[X] Yes	[ ] No		1.
Chain of Custody Relinquished?	[X] Yes	[ ] No		2.
Sampler Name and/or Signature on COC?	[X] Yes	[ ] No	[ ] N/A	3.
Samples Arrived within Hold Time?	[X] Yes	[ ] No		4.
Short Hold Time Analysis (<72 hr)?	[ ] Yes	[X] No		5. [ ] Fecal Coliform [ ] HPC [ ] Total Coliform/E coli [ ] BOD/cBOD [ ] Hex Chrome [ ] Turbidity [ ] Nitrate [ ] Nitrite [ ] Orthophos [ ] Other_____
Rush Turn Around Time Requested?	[X] Yes	[ ] No		6.
Sufficient Sample Volume?	[X] Yes	[ ] No		
Triple Volume Provided for MS/MSD (if more than 10 samples)?	[ ] Yes	[ ] No	[X] N/A	7.
Correct Containers Used?	[X] Yes	[ ] No		8.
-Pace Containers Used?	[X] Yes	[ ] No		
Containers Intact?	[X] Yes	[ ] No		9.
Field Filtered Volume Received for Dissolved Tests?	[ ] Yes	[ ] No	[X] N/A	10. Is sediment visible in the dissolved container? [ ] Yes [ ] No
Is sufficient information available to reconcile the samples to the COC?	[X] Yes	[ ] No		11. If no, write ID/ Date/Time on Container Below: See Exception [ ] ENV-FRM-MIN4-0142
Matrix: [ ] Water [ ] Soil [ ] Oil [X] Other SL				
All containers needing acid/base preservation have been checked?	[ ] Yes	[ ] No	[X] N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	[ ] Yes	[ ] No	[X] N/A	[ ] NaOH [ ] HNO_3 [ ] H_2SO_4 [ ] Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS *If adding preservative to a container it must be added to associated field and equipment blanks (verify with PM first)	[ ] Yes	[ ] No	[X] N/A	Positive for Res. Chlorine? [ ] Yes [ ] No pH Paper Lot# See Exception [ ] ENV-FRM-MIN4-0142
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	[ ] Yes	[ ] No	[X] N/A	13. See Exception [ ] ENV-FRM-MIN4-0140
Headspace in VOA Vials (greater than 6mm)?	[ ] Yes	[ ] No	[X] N/A	
3 Trip Blanks Present?	[ ] Yes	[ ] No	[X] N/A	14.
Trip Blank Custody Seals Present?	[ ] Yes	[ ] No	[X] N/A	Pace Trip Blank Lot # (if purchased):

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1320	Temp: 0.9	Corrected Temp: 0.9	
Time: 1340	put in cooler		
Time:	Temp:	Corrected Temp:	

CLIENT NOTIFICATION/RESOLUTION Field Data Required? [ ] Yes [ ] No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: [signature] Date: 05/10/2022

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: MK 2

BP/RM Facility No: MT_Butte Priority Soils

Lab Work Order Number:

Turn Around Time (Days): **5**

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

July 12, 2022

Christopher Berg
ERM
1 Ninth St. Island Drive
Livingston, MT 59047

RE: Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Dear Christopher Berg:

Enclosed are the analytical results for sample(s) received by the laboratory on June 29, 2022. The results relate only to the samples included in this report. Results contained within this report conform to the most current version of the TNI standards, BP LaMP Technical Requirements Revision 12.1, and any applicable Quality Assurance Project Plan (QAPP), or Work Plan unless otherwise narrated in the body of this report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Minneapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jennifer Anderson
jennifer.anderson@pacelabs.com
(612)607-6436
Project Manager

Enclosures

cc: Tom Beckman, ERM Alaska, Inc
AR Deliverables ESI, Environmental Standards, Inc.
Elsie King, ERM AK
Emmy Zartman, ERM

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Pace Analytical Services, LLC - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414
A2LA Certification #: 2926.01*
1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009*
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014*
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Tribal Water Systems+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605*
Georgia Certification #: 959
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086*
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064*
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137*
Minnesota Dept of Ag Approval: via MN 027-053-137
Minnesota Petrofund Registration #: 1240*
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081*
New Jersey Certification #: MN002
New York Certification #: 11647*
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification (A2LA) #: R-036
North Dakota Certification (MN) #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification (1700) #: CL101
Ohio VAP Certification (1800) #: CL110*
Oklahoma Certification #: 9507*
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001*
Pennsylvania Certification #: 68-00563*
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192*
Utah Certification #: MN00064*
Vermont Certification #: VT-027053137
Virginia Certification #: 460163*
Washington Certification #: C486*
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01
USDA Permit #: P330-19-00208
*Please Note: Applicable air certifications are denoted with an asterisk (*).

Pace Analytical Services, LLC
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SAMPLE SUMMARY

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10614861001	**S-0016-D-F-01-20220622**	Solid	06/22/22 15:53	06/29/22 08:50
10614861002	**S-0016-D-F-01D-20220622**	Solid	06/22/22 15:53	06/29/22 08:50
10614861003	**S-0016-D-EB-01-20220622**	Solid	06/22/22 16:02	06/29/22 08:50

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10614861001	**S-0016-D-F-01-20220622**	EPA 6020B	PW1	2	PASI-M
		EPA 7471B	LMW	1	PASI-M
10614861002	**S-0016-D-F-01D-20220622**	EPA 6020B	PW1	2	PASI-M
		EPA 7471B	LMW	1	PASI-M
10614861003	**S-0016-D-EB-01-20220622**	EPA 6020B	PW1	2	PASI-M
		EPA 7471B	LMW	1	PASI-M

PASI-M = Pace Analytical Services - Minneapolis

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Method: **EPA 6020B**
Description: 6020B MET ICPMS
Client: BP-ERM-MT
Date: July 12, 2022

General Information:
3 samples were analyzed for EPA 6020B by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3050B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Method: **EPA 7471B**
Description: 7471B Mercury
Client: BP-ERM-MT
Date: July 12, 2022

General Information:
3 samples were analyzed for EPA 7471B by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 7471B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 825614

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10614861001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 4373144)
  - Mercury

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Sample: S-0016-D-F-01-20220622 **Lab ID: 10614861001** Collected: 06/22/22 15:53 Received: 06/29/22 08:50 Matrix: Solid
Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**21.2**	mg/kg	2.3	0.51	5	07/05/22 12:36	07/11/22 20:12	7440-38-2	
Lead	**62.6**	mg/kg	2.3	0.14	5	07/05/22 12:36	07/11/22 20:12	7439-92-1	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.036**	mg/kg	0.020	0.0085	1	07/06/22 10:52	07/06/22 18:32	7439-97-6	M1

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Sample: S-0016-D-F-01D-20220622 **Lab ID: 10614861002** Collected: 06/22/22 15:53 Received: 06/29/22 08:50 Matrix: Solid
Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**20.1**	mg/kg	2.3	0.51	5	07/05/22 12:36	07/11/22 20:34	7440-38-2	
Lead	**57.1**	mg/kg	2.3	0.14	5	07/05/22 12:36	07/11/22 20:34	7439-92-1	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.085**	mg/kg	0.019	0.0080	1	07/06/22 10:52	07/06/22 18:39	7439-97-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Sample: S-0016-D-EB-01-20220622 **Lab ID: 10614861003** Collected: 06/22/22 16:02 Received: 06/29/22 08:50 Matrix: Solid
Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**<0.10**	mg/kg	0.48	0.10	1	07/05/22 12:36	07/11/22 20:37	7440-38-2	
Lead	**<0.028**	mg/kg	0.48	0.028	1	07/05/22 12:36	07/11/22 20:37	7439-92-1	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**<0.0081**	mg/kg	0.019	0.0081	1	07/06/22 10:52	07/06/22 18:40	7439-97-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

QC Batch: 825614
QC Batch Method: EPA 7471B
Analysis Method: EPA 7471B
Analysis Description: 7471B Mercury Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10614861001, 10614861002, 10614861003

METHOD BLANK: 4373140 Matrix: Solid
Associated Lab Samples: 10614861001, 10614861002, 10614861003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/kg	<0.0081	0.019	0.0081	07/06/22 18:29	

LABORATORY CONTROL SAMPLE: 4373141

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.45	0.39	88	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4373143 4373144

Parameter	Units	10614861001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.036	0.49	0.49	0.45	0.42	85	79	80-120	6	20	M1

SAMPLE DUPLICATE: 4373142

Parameter	Units	10614861001 Result	Dup Result	RPD	Max RPD	Qualifiers
Mercury	mg/kg	0.036	0.036	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

QC Batch: 825608
QC Batch Method: EPA 3050B
Analysis Method: EPA 6020B
Analysis Description: 6020B Solids UPD5
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10614861001, 10614861002, 10614861003

METHOD BLANK: 4373117 Matrix: Solid
Associated Lab Samples: 10614861001, 10614861002, 10614861003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	<0.11	0.50	0.11	07/11/22 20:05	
Lead	mg/kg	<0.029	0.50	0.029	07/11/22 20:05	

LABORATORY CONTROL SAMPLE: 4373118

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	48.8	48.8	100	80-120	
Lead	mg/kg	48.8	53.2	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4373120 4373121

Parameter	Units	10614861001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	21.2	46.7	47	67.1	70.6	98	105	75-125	5	20	
Lead	mg/kg	62.6	46.7	47	107	120	96	122	75-125	11	20	

SAMPLE DUPLICATE: 4373119

Parameter	Units	10614861001 Result	Dup Result	RPD	Max RPD	Qualifiers
Arsenic	mg/kg	21.2	21.1	0	20	
Lead	mg/kg	62.6	64.8	3	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10614861001	**S-0016-D-F-01-20220622**	EPA 3050B	825608	EPA 6020B	826243
10614861002	**S-0016-D-F-01D-20220622**	EPA 3050B	825608	EPA 6020B	826243
10614861003	**S-0016-D-EB-01-20220622**	EPA 3050B	825608	EPA 6020B	826243
10614861001	**S-0016-D-F-01-20220622**	EPA 7471B	825614	EPA 7471B	826328
10614861002	**S-0016-D-F-01D-20220622**	EPA 7471B	825614	EPA 7471B	826328
10614861003	**S-0016-D-EB-01-20220622**	EPA 7471B	825614	EPA 7471B	826328

bp rm

Laboratory Management Program (LaMP) Chain of Custody F

Soil, Sediment and Groundwater Samples

WO# : 10614861

10614861

BP/RM Facility No: MT_Butte Priority Soils

Lab Work Order Numbe

Time (Days): 5

Chain of Custody: 20220628-0200-PACE_MPLS-S-0016

Lab Name: PACE, INC., MINNEAPOLIS, MN	BP/ARC Facility Address:	Consultant/Contractor: ERM
Lab Address: 1700 Elm Street SE	City, State, ZIP Code: Butte, MT,	Consultant/Contractor Project No: 0643586
Lab PM:	Lead Regulatory Agency:	Address: 1 9th St Island Dr, Livingston, MT 59047
Lab Phone: 612-607-6398	California Global ID No.:	Consultant/Contractor PM: Christopher Berg
Lab Shipping Accnt:	Accounting Information:	Phone: 9167699050 Email: Christopher.Berg@erm.com
Lab Bottle Order No:		Send/Submit EDD to: mcanumc@bp.com; Christopher.Berg@erm.com
Other Info:		Invoice To: mcanumc@bp.com; Christopher.Berg@erm.com
BP/RM PM: Mike Mc Anulty/mcanumc@bp.com	PM Phone: PM Email:	**Report Type & QC Level:**

Sample Details											Requested Analyses													Comments
Lab No.	Sample Description	Date	Time	Field Matrix	Start Depth	End Depth	Depth Unit	Grab (G) or Composite (C)	Total Number of Containers		Filt	N	N											
										Pres	Unpres	4°C												
										Analysis	SW6020B (arsenic and load)	SW7471B (mercury)												
1	S-0016-D-F-01-20220622	06/22/2022	15:53	SDU				G			×	×												001
2	S-0016-D-F-01D-20220622	06/22/2022	15:53	SDU				G			×	×												002
3	S-0016-D-EB-01-20220622	06/22/2022	16:02	SQ				G			×	×												003

	Relinquished By / Affiliation	Date / Time	Accepted By / Affiliation	Date / Time
Sampler's Name: Tim Wilson				
Sampler's Company: ERM	ERM	6/28/2022 1:47:00 PM	Pace 6/29/22	850
Ship Method: Ship Date: 6/28/2022 2:00:00 PM				
Shipment Tracking No:				

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

This Page is Intentionally Left Blank

Pace ANALYTICAL SERVICES	**DC#_Title: ENV-FRM-MIN4-0149 v03_Sample Condition Upon Receipt (SCUR) - ESI**
	Effective Date: 04/12/2022

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: Bprm

Project

WO#: 10614861

PM: JMA **Due Date: 07/07/22**

CLIENT: BP-ERM-MT

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ SpeeDee ☐ Commercial

Tracking Number: 5405 1819 4960

See Exceptions ☐ ENV-FRM-MIN4-01

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: _____ **Temp Blank?** ☑ Yes ☐ No

Thermometer: ☐ T1(0461) ☐ T2(1336) ☑ T3(0459) ☐ T4(0254) ☐ T5(0489) ☐ T6(0235) ☐ T7(0042) **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Dry ☐ Melted

Temp should be above freezing to 6°C **Cooler Temp Read w/temp blank:** 2.5 °C

Correction Factor: IWE **Cooler Temp Corrected w/temp blank:** 2.5 °C

Average Corrected Temp (no temp blank only): _____ °C ☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

USDA Regulated Soil: (☑ N/A, water sample/Other: SOU + SG

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Date/Initials of Person Examining Contents: AH 6/29/22

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present and Filled Out?	☑ Yes	☐ No		1.
Chain of Custody Relinquished?	☑ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☑ N/A	3. JMA 6/29/22
Samples Arrived within Hold Time?	☑ Yes	☐ No		4.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E coli ☐ BOD/cBOD ☐ Hex Chrome ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other_____
Rush Turn Around Time Requested?	☑ Yes	☐ No		6.
Sufficient Sample Volume?	☑ Yes	☐ No		
Triple Volume Provided for MS/MSD (if more than 10 samples)?	☐ Yes	☐ No	☑ N/A	7.
Correct Containers Used?	☑ Yes	☐ No		8.
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☑ Yes	☐ No		11. If no, write ID/ Date/Time on Container Below: See Exception ☐ ENV-FRM-MIN4-0142
Matrix: ☐ Water ☐ Soil ☐ Oil ☑ Other SOU + SG				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☑ N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS *If adding preservative to a container it must be added to associated field and equipment blanks (verify with PM first)	☐ Yes	☐ No	☑ N/A	Positive for Res. Chlorine? ☐ Yes ☐ No pH Paper Lot# See Exception ☐ ENV-FRM-MIN4-0142
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☑ N/A	13. See Exception ☐ ENV-FRM-MIN4-0140
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☑ N/A	
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	Pace Trip Blank Lot # (if purchased): _____

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1257	Temp: 2.5	Corrected Temp: 2.5	
Time: 12:57	put in cooler		
Time: JMA 6/29/22	Temp:	Corrected Temp:	

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: _____ **Date:** 06/29/2022

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e., out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: AH 6/29/22

APPENDIX D VALIDATION REPORTS

ENVIRONMENTAL® STANDARDS

Setting the Standards for Innovative Environmental Solutions

STAGE 4 QUALITY ASSURANCE REVIEW

SILVER BOW CREEK/BUTTE AREA NATIONAL PRIORITIES LIST SITE, BUTTE PRIORITY SOILS OPERABLE UNIT, RESIDENTIAL METALS ABATEMENT PROGRAM PROJECT

DUST SAMPLES COLLECTED ON

MAY 5, 2022

RESIDENT IDENTIFICATION: S-0016

SAMPLE DELIVERY GROUP: 10607644

May 25, 2022

Prepared for:

ATLANTIC RICHFIELD COMPANY
317 Anaconda Road
Butte, MT 59701

Prepared by:

ENVIRONMENTAL STANDARDS, INC.
1140 Valley Forge Road
P.O. Box 810
Valley Forge, PA 19482-0810

TABLE OF CONTENTS

INTRODUCTION

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the samples collected on May 5, 2022, as part of the Silver Bow Creek/Butte Area National Priorities List (NPL) Site, Butte Priority Soils Operable Unit, Residential Metals Abatement Program (RMAP) sampling event. The samples that have undergone a rigorous QA review are listed on Table 1. Table 1 also presents the laboratory sample number, collection date, matrix, parameter(s) examined, and the review level for each sample. Stage 2B review includes an evaluation of data package completeness and review of the summary forms provided (raw data are not reviewed). In addition to all the elements included in a Stage 2B review, a Stage 4 review includes the evaluation of raw data and the verification of calculated results.

This review was performed with guidance from the RMAP Quality Assurance Project Plan Non-Residential Parcels –Indoor Dust (QAPP; February 28, 2022); the "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use," (US EPA, January 2009); and the "National Functional Guidelines for Inorganic Superfund Methods Data Review," (US EPA, January 2020). The National Functional Guidelines validation guidance documents specifically address analyses performed in accordance with the Contract Laboratory Program (CLP) analytical methods and are not completely applicable to the type of analyses and analytical protocols performed for the SW-846 methods utilized by the laboratory for these samples. Environmental Standards, Inc. (Environmental Standards) used professional judgment to determine the usability of the analytical results and compliance relative to the methods utilized by the laboratory.

The reported analytical results are presented as qualified electronic data deliverables (EDDs). Any required data validation qualifications have been annotated on the associated EDDs. Data were examined to determine the usability of the analytical results and compliance relative to the method requirements specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition" (SW-846) Methods 6020B and 7471B. This report was prepared to provide a critical review of the laboratory analyses and reported analytical results. Rigorous QA reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories. The data qualifications allow the data end-user to best understand the usability of the analytical results. Data not qualified in this report should be considered valid based on the quality control (QC) criteria that have been reviewed and be considered enforcement quality if the data also passed Level A and Level B field documentation quality assessment as detailed in the QAPP. Details of this QA review are presented in Section 1 of this report.

TABLE 1

SAMPLES INCLUDED IN THIS QUALITY ASSURANCE REVIEW

Field Sample Name	Laboratory Sample Number(s)	Sample Delivery Group	Collection Date	Parameter(s) Examined
S-0016-D-FM-01-20220505	10607644001	10607644	5/5/22	M, Hg
S-0016-D-EB-02-20220505 (Equipment Blank)	10607644002	10607644	5/5/22	M, Hg
S-0016-D-FM-03-20220505	10607644003	10607644	5/5/22	M, Hg
S-0016-D-FM-03D-20220505 (Field Duplicate of S-0016-D-FM-03-20220505)	10607644004	10607644	5/5/22	M, Hg
S-0016-D-FM-04-20220505	10607644005	10607644	5/5/22	M, Hg

NOTES:

M - Total Lead and Arsenic by SW-846 Method 6020B.
Hg - Total Mercury by SW-846 Method 7471B.

SECTION 1 QUALITY ASSURANCE REVIEW

The dust samples were collected on May 5, 2022, as part of the Silver Bow Creek/Butte Area NPL Site, Butte Priority Soils Operable Unit, RMAP sampling event. The samples were collectively shipped in iced coolers to Pace of Minneapolis, Minnesota and analyzed for lead and arsenic by inductively coupled plasma/mass spectrometry (ICP/MS) for digestion and analysis by SW-846 Method 6020B. The dust samples were also analyzed for mercury by Cold Vapor Atomic Absorption (CVAA), for wet digestion and analysis by SW-846 Method 7471B. The specific samples and analyses reviewed are identified on Table 1.

The findings in this QA review are based upon a review of sample holding times, condition of samples upon laboratory receipt, blank analysis results, laboratory matrix spike sample (LMS) results, laboratory control sample (LCS) results, laboratory and field duplicate results, initial and continuing calibrations, sample preparation, reporting limit (RL) standard results, interference check sample results, serial dilution results, internal standard performance, instrument sensitivity, analytical sequence, the quantitation of positive results, and a critical evaluation of instrumental raw data. Any required data validation qualifications are annotated in the qualified EDD as defined in Section 3.

Issues are typically presented in two categories – deliverable issues and procedural issues. Deliverable issues are data issues that can easily be corrected and that may or may not impact the usability of the reported results. Procedural issues are issues that cannot be corrected and address method compliance issues; these issues may or may not impact the usability of the reported results. Comments address issues for which the data reviewer has provided information in order to clarify issues relating to the data; comments do not typically impact the usability of the reported results. The data reviewer has edited the laboratory-reported data and QC summary forms based on the issues and comments in this QA review. Furthermore, the data reviewer has included copies of all relevant raw data, QC forms, and other documentation needed to support these edits in the Inorganic Data Support Documentation (Section 4) of this report.

<u>Deliverable Review</u>

- Deliverable issues were not observed for the data in this QA review.

<u>Procedural Review</u>

- Procedural issues were not observed for the data in this QA review.

<u>Comment</u>

- The laboratory logged in sample S-0016-D-FM-01-20220505 with a collection time of “09:45”. According to the Chain of Custody Record, the sample collection time was “09:54”. Upon Environmental Standards request, the laboratory provided a revised report and EDD to correct the collection time (see Project Correspondence [Section 6]). Qualification of data due to this issue was not warranted.

With regard to data usability, the principal area of concern is results reported below the sample-specific reporting limit. Based upon a complete review of the data package provided, the following qualifiers are offered. The following data usability issues represent an interpretation of the QC results obtained for the project samples. Quite often, data qualifications address issues relating to sample matrix problems. Similarly, the data validation guidelines routinely specify areas of the data that require qualification, yet the methods used for analysis may not require corrective action by the laboratory. Accordingly, the following data usability issues should not be construed as an indication of laboratory performance.

SECTION 2 DATA VALIDATION CHECKLIST FOR METALS SAMPLE ANALYSIS

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times*	Collection Date(s)	Batch(es)	Analysis Date(s)	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Lead and Arsenic	Pace – Minneapolis, MN	Dust	SW-846 Method 6020B	6 months from sample collection	5/5/22	814770	5/13/22	Y	N/A
Mercury	Pace – Minneapolis, MN	Dust	SW-846 Method 7471B	28 days from sample collection	5/5/22	814716	5/17/22	Y	N/A

*Reference for Holding Times – Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition" (SW-846) Methods 6020B and 7471B and Chapter 3

Were any data flagged because of holding time? Yes ☐ No ☒
Were any data flagged because of preservation problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

2. Instrument Calibration

Was the Tune analysis performed? Yes ☒ No ☐
Were the peak widths and resolution of the masses within the required control limits? Yes ☒ No ☐
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions? Yes ☒ No ☐
Was the Instrument successfully calibrated at the correct frequency? Yes ☒ No ☐
Was the Instrument calibrated with appropriate standards and blanks? Yes ☒ No ☐
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed? Yes ☒ No ☐
Were ICV and CCV results within the control window? Yes ☒ No ☐
Were any data flagged because of calibration problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed? Yes ☒ No ☐
Were ICBs and CCBs within the control window? Yes ☒ No ☐
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch? Yes ☒ No ☐
Were MBs within the control window? Yes ☒ No ☐
Were any data flagged because of blank problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

4. Interference Check Samples

Were ICP/MS Interference Check Samples (ICS) within the control limits? Yes ☒ No ☐
Were any data flagged because of ICS problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Information provided in the data package(s) was insufficient to permit assessment of the potential for molecular or other interferences or the adequacy of corrections for such interferences. The fact that the analysis was performed with an instrument that includes collision cell technology reduces the likelihood of significant interference if one or more of the potentially interfering elements were present. The data user should consider this information when determining the ultimate use of the reported results.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?
Yes ☒ No ☐
What was the source of the LCS?
Metals: 343315 and 343316
Mercury: 350870
Were LCS results within the control window? Yes ☒ No ☐
Were any data flagged because of LCS problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch? Yes ☒ No ☐
Were LDS results within the control window? Yes ☒ No ☐
Were any data flagged because of LDS problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

7. Matrix Spike/Matrix Spike Duplicate/Post Digestion Spike Sample Results

Were LMS analyzed at the frequency of 1 per batch? Yes ☒ No ☐
Were LMS percent recovery (%R) results within the control window? Yes ☒ No ☐
Were any data flagged because of LMS problems? Yes ☐ No ☒
Was a Post Digestion Spike (PDS) performed? Yes ☐ No ☒
Were PDS percent recovery (%R) results within the control window? Yes ☐ No ☐ N/A ☒
Were any data flagged because of PDS problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

8. ICP/MS Serial Dilutions

Were ICP/MS Serial Dilutions (SD) analyzed at the frequency of 1 per batch? Yes ☒ No ☐
Were SD percent differences (%D) results within the control window? Yes ☒ No ☐
Were any data flagged because of SD problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch? Yes ☒ No ☐
Were the percent relative recoveries (%RI) within the control window? Yes ☒ No ☐
Were any data flagged because of internal standard problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

10. Field Blanks

Were field blanks submitted as specified in the Sampling Analysis Plan (SAP)?
Yes ☒ No ☐ N/A ☐
Were field blanks within the control window? Yes ☒ No ☐ N/A ☐
Were any data qualified because of field blank problems? Yes ☐ No ☒ N/A ☐

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

A field blank was not submitted with this data set; however, an equipment blank had been collected on May 5, 2022. Section 10 was completed in regard to the equipment blank.

11. Field Duplicates

Were field duplicates submitted as specified in the Sampling Analysis Plan (SAP)?
Yes ☒ No ☐ N/A ☐
Were the field duplicates within the control window? Yes ☒ No ☐ N/A ☐
Were any data qualified because of field duplicate problems? Yes ☐ No ☒ N/A ☐

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Yes ☐ No ☒

Comments:

- Data that meet the Level A and Level B criteria in the field documentation quality assessment as detailed in the QAPP, and not qualified as estimated or rejected during the data validation process, are considered enforcement-quality data and can be used for all Superfund purposes and activities. Data that meet only the Level A criteria and are not rejected during the data validation process can be considered screening-quality data in accordance with Section 5.3 of the QAPP. Level A and Level B acceptance of these data are documented in a separate report.

- Reported positive results between the MDL and the RL should be considered estimated and have been flagged “J” in the qualified EDD. It is appropriate to note that sample results qualified as estimated “J” by the laboratory because the reported result is between the MDL and RL, values are considered enforcement-quality data if no other qualifiers were required during validation.

Complete support documentation for this inorganic QA review is presented in Section 4 of this report. The cover sheet for this section is a checklist of all QA procedures required by the protocol and examined in this data review.

The analytical data completeness (defined as the percentage of usable data) for the samples included in this QA review is 100%.

13. Authorization of Data Validation

Report prepared by: Robiana L. Beegle-Rebba, Quality Assurance Chemist
Report reviewed by: Alyssa M. Reed, Senior Quality Assurance Chemist
Report approved by: Lester J. Dupes, CEAC, Senior Quality Assurance Chemist
Report approved by: Rock J. Vitale, CEAC, Technical Director of Chemistry/Principal
Date: 5/25/22

SECTION 3 DATA VALIDATION QUALIFIER DEFINITIONS

U	The result is qualified as non-detect due to the detection of the analyte in an associated QC blank.
J	The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample. This will also include results reported between the MDL and RL.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was not detected above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
No Flag	Result accepted without qualification.

RMAP REASON CODES

1	Holding time violation
2	Method blank contamination
3	Surrogate recovery
4	Matrix spike/matrix spike duplicate recovery
5	Matrix spike/matrix spike duplicate precision outside limits
6	Laboratory control sample recovery
7	Field blank contamination
8	Field duplicate precision outside limits
9	Other deficiencies (including cooler temperature)
A	Absence of supporting QC
S	ICV, CCV, or column performance check problem
Y	Initial and continuing calibration blank problem
M	Interference check samples problem
O	Post-digestion spike outside of 75-125%
F	MSA correlation coefficient < 0.995, or MSA not done
G	Serial dilution problem
K	DFTPP or BFB tuning problem
Q	Initial calibration problem
X	Internal standard recovery problem
V	Second-source standard calibration verification problem
L	Low bias
Z	Retention time problem
N	Counting time error (radionuclide chemistry)
W	Detector instability (radionuclide chemistry)
C	Co-elution of compounds
E	Value exceeds linear calibration range
I	Interferences present during analysis
T	Trace-level compound, poor quantitation
P	1C/2C precision outside of limits
B	LCS/LCSD precision outside limits
D	Lab Dup/Rep precision outside limits
H	High Bias

SECTION 4

INORGANIC DATA SUPPORT DOCUMENTATION

ENVIRONMENTAL STANDARDS

INORGANIC ANALYSIS SUPPORT DOCUMENTATION

Client Name:	Atlantic Richfield	EnvStd Project Manager:	Lester Dupes
Site/Project Name:	2022 RMAP DV and DM	Reviewed by:	Robiana L. Beegle-Renna
Job Number/Task/Subtask:	20229825.A000	Approved by:	Alyssa Reed
Laboratory/Location:	Pace Minneapolis	Completion Date:	5/23/22
SDG:	10607644	Validation Level:	4
Sample Collection Dates:	5/5/22		

The following table indicates criteria that were examined, the identified problems, and support documentation attachments.

Criteria Examined in Detail	Problems Identified
Note: All items examined have been included in the Support Document unless otherwise noted.	

Check (√) if Yes or Footnote Letter for Comments Below

Parameter/ Method	Metals	Mercury						Metals	Mercury					
Condition upon Receipt	√	√												
Sample Preservation	√	√												
Holding Times	√	√												
Blank Analysis Results	√	√												
Laboratory Control Sample	√	√												
Matrix Spike (Pre-Digestion Spike)	√	√												
Laboratory Duplicate	√	√												
Field Duplicate	√	√												
Total *vs.* Dissolved Results Comparison														
Sample Preparation	√	√												
Mass Tuning	√													
Initial Calibrations	√	√												
Continuing Calibrations	√	√												
Detection Limit/Reporting Limit Standards	√	√												
Negative Bias														
Interference Checks	√													
Post-Digestion Spike														
Serial Dilution	√													
Analytical Sequence	√	√												
Linear Range Analysis	√	√												
Interelement Correction Factors														
Detection Limit/Sensitivity	√	√												
Dilutions	√													
Internal Standard Performance	√													
Quantitation of Results	√	√												
Multiple Exposures %RSD	√	√												
Percent Solids														
Deliverable was Complete	√	√												
Others:														

Comments: Quantitation of Results and Multiple Exposures are not included in the Support Documentation unless a problem was identified.

ENVIRONMENTAL STANDARDS

BLANK ANALYSIS RESULTS FOR INORGANIC PARAMETERS

	Blank Type									
	Method									
Matrix (Aq., S.)	ICB	CCB	Prep.	Trip	Equip	Field	Blank Sample Number	Contaminant	Concentration (µg/L, mg/L, µg/kg, mg/kg)	Qualification limit (5×)
							All 10607644 blanks	none		0
										0
										0
										0
										0
										0
										0
										0
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										0
										0
										0
										0

Aq = Aqueous; S = Solid

Notes:

ENVIRONMENTAL STANDARDS, INC.
EVALUATION OF DUPLICATE RESULTS

Matrix: ○ Aqueous ◉ Non-aq.
Reporting Level: ◉ MDL ○ QL
Units: mg/kg

PRECISION OBJECTIVES:
If Both Results ≥ 5 × Their QL, RPD ≤: 35
If Either Result < 5 × Its QL, Dif. ≤: 2 **× Highest QL**

Sample ID:	S-0016-D-FM-03-20220505				**Duplicate Sample ID:**	S-0016-D-FM-03D-20220505					
Analyte	**Sample Concentration**	**Qual**	**QL**	**MDL**	**Duplicate Concentration**	**Qual**	**QL**	**MDL**	**Difference**	**RPD**	**Flag**
Arsenic	36		2.3	0.5	35.1		2.4	0.52	NA	3%	
Lead	77.4		2.3	0.14	76		2.4	0.14	NA	2%	
Mercury	0.061		0.058	0.025	0.048	J	0.057	0.025	0.013	NA	

NOTES:

Qual: Qualifier(s) based on evaluation(s) other than Total/ vs. Dissolved comparison, if applicable (J, U, U* or B)
RPD: Relative Percent Difference
QL: Quantitation Limit
MDL: Method Detection Limit
RL: Reporting Limit. RL = QL for QL reporting and MDL for MDL reporting
J: The analyte concentration should be considered estimated
U: The analyte was not detected in the sample at or above the RL indicated. The RL will be used for comparison purposes.
UJ: The analyte was not detected in the sample at or above the Reporting Limit Indicated. The RL is approximate.
R: The analyte was analyzed for and detected, but sample results are unreliable. The presence or absence of the analyte cannot be verified.
UR: The analyte was analyzed for and not detected, but the determination that the analyte was not present in the sample is unreliable. The presence or absence of the analyte cannot be verified.
U* The result was blank qualified. The RL will be used for comparison purposes.
NA: The MDL (for QL reporting), RPD or Difference is not applicable

Comments:

SAMPLE NO.

S-0016-D-FM-01-20220505

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Lab Sample ID: 10607644001 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7440-38-2	Arsenic	20.3		mg/kg	5	05/13/2022 00:52
7439-92-1	Lead	64.4		mg/kg	5	05/13/2022 00:52

SAMPLE NO.

S-0016-D-EB-02-20220505

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Lab Sample ID: 10607644002 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7440-38-2	Arsenic	<0.10	U	mg/kg	1	05/13/2022 11:27
7439-92-1	Lead	<0.028	U	mg/kg	1	05/13/2022 11:27

SAMPLE NO.

S-0016-D-FM-03-20220505

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Lab Sample ID: 10607644003 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7440-38-2	Arsenic	36.0		mg/kg	5	05/13/2022 00:59
7439-92-1	Lead	77.4		mg/kg	5	05/13/2022 00:59

SAMPLE NO.

S-0016-D-FM-03D-20220505

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Lab Sample ID: 10607644004 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7440-38-2	Arsenic	35.1		mg/kg	5	05/13/2022 01:02
7439-92-1	Lead	76.0		mg/kg	5	05/13/2022 01:02

SAMPLE NO.

S-0016-D-FM-04-20220505

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Lab Sample ID: 10607644005 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7440-38-2	Arsenic	14.1		mg/kg	5	05/13/2022 01:06
7439-92-1	Lead	62.4		mg/kg	5	05/13/2022 01:06

FORM II INORGANIC-1

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source: 365918

Continuing Calibration Verification Source: 365918

Concentration Units: ug/L Instrument ID: 10ICM8

	Initial Calibration Verification				Continuing Calibration Verification						
	05/12/2022 14:12 ✓				05/12/2022 14:34 ✓			05/12/2022 21:35 ✓			
Analyte	True	Found	%R	Control Limit	True	Found	%R	True	Found	%R	Control Limit
Arsenic	80	78.4	98.0	90-110	80	77.1	96.3	80	76.8	96.0	90-110
Lead	80	82.7	103.3	90-110	80	82.7	103.3	80	82.1	102.7	90-110

FORM II INORGANIC-2

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source:

Continuing Calibration Verification Source: 365918

Concentration Units: ug/L Instrument ID: 10ICM8

	Continuing Calibration Verification									
	05/12/2022 22:11 ✓			05/13/2022 00:37 ✓			05/13/2022 01:20 ✓			Control Limit
Analyte	True	Found	%R	True	Found	%R	True	Found	%R	
Arsenic	80	76.9	96.1	80	78.7	98.3	80	77.5	96.9	90-110
Lead	80	82.2	102.8	80	83.0	103.7	80	81.7	102.2	90-110

FORM II INORGANIC-3

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source:

Continuing Calibration Verification Source: 365918

Concentration Units: ug/L Instrument ID: 10ICM8

	Continuing Calibration Verification									
	05/13/2022 01:56 ✓			05/13/2022 02:28 ✓			05/13/2022 03:00 ✓			Control Limit
Analyte	True	Found	%R	True	Found	%R	True	Found	%R	
Arsenic	80	77.8	97.2	80	80.6	100.7	80	77.7	97.1	90-110
Lead	80	83.2	103.9	80	86.0	107.4	80	83.1	103.8	90-110

FORM II INORGANIC-1

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source: 366137

Continuing Calibration Verification Source: 366137

Concentration Units: ug/L Instrument ID: 10ICM8

	Initial Calibration Verification				Continuing Calibration Verification						
	05/13/2022 09:57 ✓				05/13/2022 10:15 ✓			05/13/2022 11:20 ✓			Control Limit
Analyte	True	Found	%R	Control Limit	True	Found	%R	True	Found	%R	
Arsenic	80	76.4	95.6	90-110	80	76.0	95.1	80	77.3	96.6	90-110
Lead	80	81.7	102.1	90-110	80	82.2	102.8	80	81.1	101.3	90-110

FORM II INORGANIC-2

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source:

Continuing Calibration Verification Source: 366137

Concentration Units: ug/L Instrument ID: 10ICM8

	Continuing Calibration Verification						
	05/13/2022 12:02 ✓			05/13/2022 12:45 ✓			Control Limit
Analyte	True	Found	%R	True	Found	%R	
Arsenic	80	77.1	96.3	80	77.6	97.0	90-110
Lead	80	81.2	101.5	80	80.7	100.9	90-110

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 365917 Analysis Date/Time: 05/12/2022 14:23

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Arsenic	0.5	0.48	96.0	80-120
Lead	0.5	0.52	105.0	80-120

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 365917 Analysis Date/Time: 05/12/2022 21:42 ✓

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Arsenic	0.5	0.44	87.6 ✓	80-120
Lead	0.5	0.51	102.8	80-120

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 365917 Analysis Date/Time: 05/13/2022 02:35

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Arsenic	0.5	0.45	89.6	80-120
Lead	0.5	0.51	102.0	80-120

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 366136 Analysis Date/Time: 05/13/2022 10:04 ✓

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Arsenic	0.5	0.44	88.2 ✓	80-120
Lead	0.5	0.49	98.8	80-120

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 366136 Analysis Date/Time: 05/13/2022 12:09 ✓

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Arsenic	0.5	0.49	98.2 ✓	80-120
Lead	0.5	0.51	102.8	80-120

FORM III INORGANIC-1

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract : 0643586 RMAP Interior School

Method Blank Matrix: Solid Instrument ID: 10ICM8

Method Blank Concentration Units: mg/kg

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Method Blank	
	05/12/2022 14:20 ✓	C	05/12/2022 14:38 ✓	C	05/12/2022 21:39 ✓	C	05/12/2022 22:14 ✓	C	4317652 ✓	C
Arsenic	0.11	U	0.11	U	0.11	U	0.11	U	<0.10	U
Lead	0.029	U	0.029	U	0.029	U	0.029	U	<0.028	U

FORM III INORGANIC-2

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract : 0643586 RMAP Interior School

Method Blank Matrix: Instrument ID: 10ICM8

Method Blank Concentration Units:

Analyte	Initial Calibration Blank		Continuing Calibration Blank (ug/L)					
		C	05/13/2022 00:41 ✓	C	05/13/2022 01:24 ✓	C	05/13/2022 01:59 ✓	C
Arsenic			0.11	U	0.11	U	0.11	U
Lead			0.029	U	0.029	U	0.029	U

FORM III INORGANIC-3

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract : 0643586 RMAP Interior School

Method Blank Matrix: Instrument ID: 10ICM8

Method Blank Concentration Units:

Analyte	Initial Calibration Blank		Continuing Calibration Blank (ug/L)					
		C	05/13/2022 02:31 ✓	C	05/13/2022 03:03 ✓	C		C
Arsenic			0.11	U	0.11	U		
Lead			0.029	U	0.029	U		

FORM III INORGANIC-1

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract : 0643586 RMAP Interior School

Method Blank Matrix: Instrument ID: 10ICM8

Method Blank Concentration Units:

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)					
	05/13/2022 10:01 ✓	C	05/13/2022 10:19 ✓	C	05/13/2022 11:23 ✓	C	05/13/2022 12:06 ✓	C
Arsenic	0.11	U	0.11	U	0.11	U	0.11	U
Lead	0.029	U	0.029	U	0.029	U	0.029	U

FORM III INORGANIC-2

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract : 0643586 RMAP Interior School

Method Blank Matrix: Instrument ID: 10ICM8

Method Blank Concentration Units:

Analyte	Initial Calibration Blank		Continuing Calibration Blank (ug/L)					
		C	05/13/2022 12:49 ✓	C		C		C
Arsenic			0.11	U				
Lead			0.029	U				

FORM IV INORGANIC-1
INTERFERENCE CHECK SAMPLE

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Instrument ID: 10ICM8 Solution A Run Date: 05/12/2022 14:27

ICS Source: 365916,365915 Solution AB Run Date: 05/12/2022 14:30

Concentration Units: ug/L

Analyte	True		Found				
	Sol. A	Sol. AB	Sol. A	%R	Sol. AB	%R	Limits
Aluminum	25000	27500	24431.034	97.7	26517.795	96.4	80-120
Arsenic		100	0.025		96.874	96.9	80-120
Calcium	25000	27500	24258.046	97	26688.986	97.1	80-120
Iron	25000	26250	25046.98	100.2	25943.663	98.8	80-120
Lead		100	0.013		94.149	94.1	80-120
Magnesium	25000	27500	24562.373	98.2	26784.06	97.4	80-120
Molybdenum	500	600	511.655	102.3	603.589	100.6	80-120
Potassium	25000	27500	24706.862	98.8	26548.614	96.5	80-120
Sodium	25000	27500	25081.187	100.3	26937.049	98	80-120
Titanium	500	600	485.321	97.1	586.526	97.8	80-120

FORM IV INORGANIC-1
INTERFERENCE CHECK SAMPLE

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Instrument ID: 10ICM8 Solution A Run Date: 05/13/2022 10:08

ICS Source: 366135,366134 Solution AB Run Date: 05/13/2022 10:12

Concentration Units: ug/L

Analyte	True		Found				
	Sol. A	Sol. AB	Sol. A	%R	Sol. AB	%R	Limits
Aluminum	25000	27500	23931.537	95.7	27781.142	101	80-120
Arsenic		100	0.045		101.48	101.5	80-120
Calcium	25000	27500	23789.128	95.2	27855.29	101.3	80-120
Iron	25000	26250	24305.012	97.2	27046.536	103	80-120
Lead		100	0.017		100.616	100.6	80-120
Magnesium	25000	27500	23932.867	95.7	27804.863	101.1	80-120
Molybdenum	500	600	490.04	98	605.461	100.9	80-120
Potassium	25000	27500	24075.279	96.3	27782.505	101	80-120
Sodium	25000	27500	24387.052	97.5	28438.667	103.4	80-120
Titanium	500	600	456.178	91.2	584.016	97.3	80-120

SAMPLE NO.

4317654MS

FORM V INORGANIC-1

MATRIX SPIKE SAMPLE RECOVERY

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Matrix: Solid Basis: Wet Parent Sample ID: 10607647001

Percent Moisture:

Analyte	Units	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R
Arsenic	mg/kg	75-125	70.8	17.4	48.5	110
Lead	mg/kg	75-125	135	84.1	48.5	104

SAMPLE NO.

4317655MSD

FORM V INORGANIC-2

MATRIX SPIKE SAMPLE RECOVERY

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Matrix: Solid Basis: Wet Parent Sample ID: 10607647001 ✓

Percent Moisture:

Analyte	Units	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R
Arsenic	mg/kg	75-125	63.9	17.4	48.5	96 ✓
Lead	mg/kg	75-125	123	84.1	48.5	81

SAMPLE NO.

4317655MSD

FORM VI INORGANIC-1
DUPLICATES

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Matrix: Solid Concentration Units: mg/kg

Percent Moisture: Basis: Wet

Analyte	RPD Control Limit	Sample	Duplicate	RPD
Arsenic	20	70.8	63.9	10
Lead	20	135	123	9

SAMPLE NO.

4317656DUP

FORM VI INORGANIC-2
DUPLICATES

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Matrix: Solid Concentration Units: mg/kg

Percent Moisture: _____ Basis: Wet

Analyte	RPD Control Limit	Sample	Duplicate	RPD
Arsenic	20	17.4	17.5	0 ✓
Lead	20	84.1	83.6	1

35% criteria

SAMPLE NO.

4317653LCS

FORM VII INORGANIC-1
LABORATORY CONTROL SAMPLE

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Matrix: Solid

Analyte	Units	True	Found	%R	Limits	
Arsenic	mg/kg	46.7	49.8	107	80	120
Lead	mg/kg	46.7	53.0	113	80	120

SAMPLE NO.

4319035SD

FORM VIII INORGANIC-1
SERIAL DILUTIONS

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Matrix: Solid Parent Sample ID: 10607647001

Analyte	Units	Initial Sample Result	Serial Dilution Result	% Difference	Control Limit %D
Arsenic	ug/L	3.6J	10.9U		10
Lead	ug/L	17.3	19.1J	10.1*	10

25%

* Indicates that the % Difference exceeds the control limit.
No difference is calculated if either result is a non-detect.

05/18/2022 09:52

FORM IX INORGANIC-1
INSTRUMENT DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Preparation Method: None Instrument ID: 10ICM8

Concentration Units: ug/L

Analyte	PQL	IDL	IDL Date
Arsenic	0.50	0.11	04/01/2022
Lead	0.50	0.029	04/01/2022

FORM IX INORGANIC-2
METHOD DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Preparation Method: EPA 3050B Instrument ID: 10ICM8

Concentration Units: mg/kg

Analyte	PQL	MDL	MDL Date	
Arsenic	0.50	0.11	07/19/2021	✓
Lead	0.50	0.029	07/19/2021	

FORM XI - INORGANIC-1
LINEAR DYNAMIC RANGES

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract : 0643586 RMAP Interior

Instrument ID: 10ICM8 Effective Date:09/12/2021

Analyte	Concentration (ug/L)
Arsenic	450
Lead	450

FORM XII INORGANIC-1
PREPARATION LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Preparation Method: EPA 3050B Batch: MPRP 124221

Lab Sample ID	Sample Name	Preparation Date	Initial Weight (g) ✓	Final Volume (mL)
4317652	4317652	05/11/2022	1.06	50
4317653	4317653	05/11/2022	1.07	50
4317654	4317654	05/11/2022	1.03	50
4317655	4317655	05/11/2022	1.03	50
4317656	4317656	05/11/2022	1.03	50
10607644001	S-0016-D-FM-01-20220505	05/11/2022	1.02	50
10607644002	S-0016-D-EB-02-20220505	05/11/2022	1.05	50
10607644003	S-0016-D-FM-03-20220505	05/11/2022	1.08	50
10607644004	S-0016-D-FM-03D-20220505	05/11/2022	1.04	50
10607644005	S-0016-D-FM-04-20220505	05/11/2022	1.07	50

FORM XIII INORGANIC-1
ANALYSIS RUN LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Instrument ID: 10ICM8 Analysis Method: EPA 6020B

Start Date: 05/12/2022 13:38 End Date: 05/13/2022 03:03

Sample Name	Lab Sample ID	D/F	Date	Time	As	Pb
29967222CAL0	29967222CAL0	1	05/12/2022	13:38	X	X
29967223CAL1	29967223CAL1	1	05/12/2022	13:42	X	X
29967224CAL2	29967224CAL2	1	05/12/2022	13:46	X	X
29967225CAL4	29967225CAL4	1	05/12/2022	13:54	X	X
29967226CAL3	29967226CAL3	1	05/12/2022	13:57	X	X
29967227CAL5	29967227CAL5	1	05/12/2022	14:01	X	X
29967228CAL6	29967228CAL6	1	05/12/2022	14:05	X	X
29967229CAL7	29967229CAL7	1	05/12/2022	14:09	X	X
29967230ICV	29967230ICV	1	05/12/2022	14:12	X	X
29967231ICB	29967231ICB	1	05/12/2022	14:20	X	X
29967232CRDL	29967232CRDL	1	05/12/2022	14:23	X	X
29967233ICSA	29967233ICSA	1	05/12/2022	14:27	X	X
29967234ICSAB	29967234ICSAB	1	05/12/2022	14:30	X	X
29967235CCV	29967235CCV	1	05/12/2022	14:34	X	X
29967236CCB	29967236CCB	1	05/12/2022	14:38	X	X
29967263CCV	29967263CCV	1	05/12/2022	21:35	X	X
29967264CCB	29967264CCB	1	05/12/2022	21:39	X	X
29967265CRDL	29967265CRDL	1	05/12/2022	21:42	X	X
29967312CCV	29967312CCV	1	05/12/2022	22:11	X	X
29967313CCB	29967313CCB	1	05/12/2022	22:14	X	X
29967329CCV	29967329CCV	1	05/13/2022	00:37	X	X
29967330CCB	29967330CCB	1	05/13/2022	00:41	X	X
4317652BLANK	4317652	1	05/13/2022	00:45	X	X
4317653LCS	4317653	1	05/13/2022	00:48	X	X
S-0016-D-FM-01-20220505	10607644001	5	05/13/2022	00:52	X	X
S-0016-D-FM-03-20220505	10607644003	5	05/13/2022	00:59	X	X
S-0016-D-FM-03D-20220505	10607644004	5	05/13/2022	01:02	X	X
S-0016-D-FM-04-20220505	10607644005	5	05/13/2022	01:06	X	X
10607647001	10607647001	5	05/13/2022	01:09	X	X
4319035SD	4319035	25	05/13/2022	01:17	X	X
29967331CCV	29967331CCV	1	05/13/2022	01:20	X	X
29967332CCB	29967332CCB	1	05/13/2022	01:24	X	X
4317656DUP	4317656	5	05/13/2022	01:27	X	X
4317654MS	4317654	5	05/13/2022	01:31	X	X
4317655MSD	4317655	5	05/13/2022	01:34	X	X
29967333CCV	29967333CCV	1	05/13/2022	01:56	X	X
29967334CCB	29967334CCB	1	05/13/2022	01:59	X	X
29967335CCV	29967335CCV	1	05/13/2022	02:28	X	X
29967336CCB	29967336CCB	1	05/13/2022	02:31	X	X
29967337CRDL	29967337CRDL	1	05/13/2022	02:35	X	X
29967338CCV	29967338CCV	1	05/13/2022	03:00	X	X
29967339CCB	29967339CCB	1	05/13/2022	03:03	X	X

FORM XIII INORGANIC-1

ANALYSIS RUN LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Instrument ID: 10ICM8 Analysis Method: EPA 6020B

Start Date: 05/13/2022 09:23 End Date: 05/13/2022 12:49

Sample Name	Lab Sample ID	D/F	Date	Time	As	Pb
29983523CAL0	29983523CAL0	1	05/13/2022	09:23	X	X
29983524CAL1	29983524CAL1	1	05/13/2022	09:27	X	X
29983525CAL2	29983525CAL2	1	05/13/2022	09:31	X	X
29983526CAL3	29983526CAL3	1	05/13/2022	09:35	X	X
29983527CAL4	29983527CAL4	1	05/13/2022	09:39	X	X
29983528CAL5	29983528CAL5	1	05/13/2022	09:46	X	X
29983529CAL6	29983529CAL6	1	05/13/2022	09:50	X	X
29983530CAL7	29983530CAL7	1	05/13/2022	09:53	X	X
29983531ICV	29983531ICV	1	05/13/2022	09:57	X	X
29983532ICB	29983532ICB	1	05/13/2022	10:01	X	X
29983533CRDL	29983533CRDL	1	05/13/2022	10:04	X	X
29983534ICSA	29983534ICSA	1	05/13/2022	10:08	X	X
29983535ICSAB	29983535ICSAB	1	05/13/2022	10:12	X	X
29983536CCV	29983536CCV	1	05/13/2022	10:15	X	X
29983537CCB	29983537CCB	1	05/13/2022	10:19	X	X
29983540CCV	29983540CCV	1	05/13/2022	11:20	X	X
29983541CCB	29983541CCB	1	05/13/2022	11:23	X	X
S-0016-D-EB-02-20220505	10607644002	1	05/13/2022	11:27	X	X
29983542CCV	29983542CCV	1	05/13/2022	12:02	X	X
29983543CCB	29983543CCB	1	05/13/2022	12:06	X	X
29983544CRDL	29983544CRDL	1	05/13/2022	12:09	X	X
29983545CCV	29983545CCV	1	05/13/2022	12:45	X	X
29983546CCB	29983546CCB	1	05/13/2022	12:49	X	X

Calibration for 242SMPL.d

Batch Folder:	C:\Agilent\ICPMH\1\DATA\051222.b\
Analysis File:	051222.batch.bin
DA Date-Time:	5/13/2022 07:03:12
Calibration Title:	
Calibration Method:	External Calibration
VIS Interpolation Fit:	

Level	Standard Data File	Sample Name	Acq. Date-Time
1	004CALB.d	CAL 0	5/12/2022 13:38:32
2	005CALS.d	CAL 1	5/12/2022 13:42:25
3	006CALS.d	CAL 2	5/12/2022 13:46:18
4	009CALS.d	CAL 3	5/12/2022 13:57:45
5	008CALS.d	CAL 4	5/12/2022 13:54:00
6	010CALS.d	CAL 5	5/12/2022 14:01:29
7	011CALS.d	CAL 6	5/12/2022 14:05:13
8	012CALS.d	CAL 7	5/12/2022 14:09:00

US EPA 200.8/6020 Tune Check Report

Acq/Data Batch	C:\Agilent\ICPMH\1\DATA\051222.b
Report Comment	10ICM8 PW
Instrument Name	G3281A JP13142395

[He]

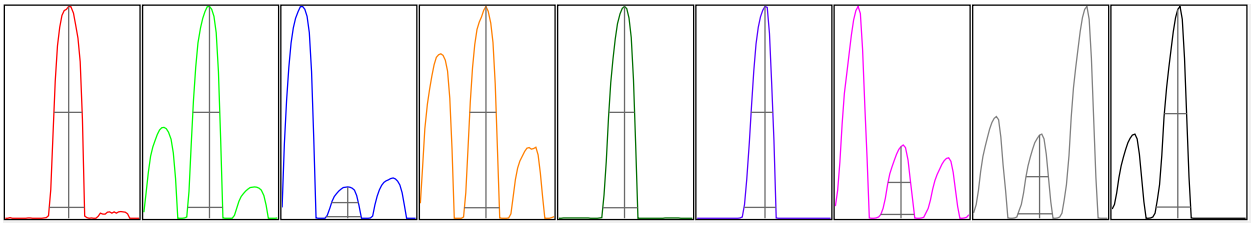
Sensitivity

Mass	Count	RSD%	RSD%(Rqd)	RSD%(Flag)
9	159	3.361	5.000	
24	1992	1.791	5.000	
25	293	2.748	5.000	
26	368	1.448	5.000	
59	31881	0.703	5.000	
115	40327	0.315	5.000	
206	17324	0.861	5.000	
207	14417	0.684	5.000	
208	35636	1.161	5.000	

Rep#1 Count	Rep#2 Count	Rep#3 Count	Rep#4 Count	Rep#5 Count
162	159	163	150	163
2050	2000	1966	1982	1963
305	298	287	291	286
367	377	365	363	366
32148	31574	31979	31741	31962
40115	40346	40450	40335	40388
17142	17462	17432	17185	17400
14542	14337	14474	14431	14302
35848	36045	35492	35811	34987

Integration Time [sec] 0.1

Resolution/Axis



Mass	Peak Height	Axis	Axis (Required)	Axis (Flag)	W-5%	W-5% (Required)	W-5% (Flag)
9	267.57	8.95	8.90 - 9.10		0.780	0.900	
24	3503.12	24.00	23.90 - 24.10		0.775	0.900	
25	517.03	25.00	24.90 - 25.10		0.767	0.900	
26	665.23	26.00	25.90 - 26.10		0.773	0.900	
59	58718.48	59.00	58.90 - 59.10		0.770	0.900	
115	84999.18	115.05	114.90 - 115.10		0.705	0.900	
206	35848.24	206.00	205.90 - 206.10		0.743	0.900	
207	29855.32	207.00	206.90 - 207.10		0.763	0.900	
208	74940.62	208.00	207.90 - 208.10		0.764	0.900	

Integration Time [sec] 0.1 Acquisition Time [sec] 212.5 Y Axis Linear

Tune Parameters

Plasma Parameters

Plasma Mode	---	Nebulizer Gas	0.70 L/min	Dilution Gas	0.35 L/min
RF Power	1550 W	Option Gas	---	Auxiliary Gas	0.90 L/min
RF Matching	1.80 V	Nebulizer Pump	0.10 rps	Plasma Gas	15.0 L/min
Sample Depth	8.0 mm	S/C Temp	2 °C		

Lens Parameters

Extract 1	0.0 V	Omega Lens	5.0 V	Deflect	-1.2 V
Extract 2	-130.0 V	Cell Entrance	-40 V	Plate Bias	-60 V
Omega Bias	-70 V	Cell Exit	-60 V		

Cell Parameters

Use Gas	Yes	3rd Gas Flow	---	Energy Discrimination	3.0 V
He Flow	4.5 mL/min	OctP Bias	-18.0 V		
H2 Flow	0.0 mL/min	OctP RF	170 V		

US EPA 200.8/6020 Tune Check Report

Acq/Data Batch	C:\Agilent\ICPMH\1\DATA\051222.b
Report Comment	10ICM8 PW
Instrument Name	G3281A JP13142395

[H2]

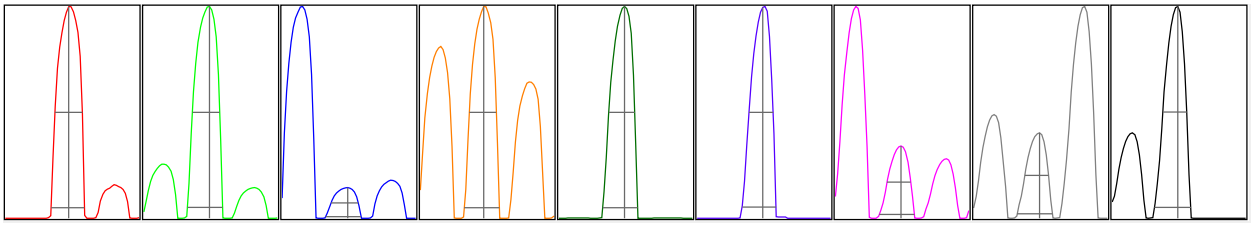
Sensitivity

Mass	Count	RSD%	RSD%(Rqd)	RSD%(Flag)
9	1298	0.878	5.000	
24	17749	3.702	5.000	
25	2577	3.413	5.000	
26	3123	3.371	5.000	
59	32990	0.462	5.000	
115	94037	0.830	5.000	
206	18793	0.709	5.000	
207	15707	0.951	5.000	
208	38574	1.454	5.000	

Rep#1 Count	Rep#2 Count	Rep#3 Count	Rep#4 Count	Rep#5 Count
1294	1302	1316	1289	1288
18304	18406	17866	17298	16871
2632	2663	2618	2514	2455
3213	3228	3135	3057	2979
33194	33009	32890	32799	33056
92818	93911	94133	94933	94389
18698	18700	18811	18740	19017
15488	15726	15864	15639	15816
37652	38547	38634	38962	39078

Integration Time [sec] 0.1

Resolution/Axis



Mass	Peak Height	Axis	Axis (Required)	Axis (Flag)	W-5%	W-5% (Required)	W-5% (Flag)
9	2274.42	8.95	8.90 - 9.10		0.739	0.900	
24	30896.40	24.00	23.90 - 24.10		0.780	0.900	
25	4478.62	25.00	24.90 - 25.10		0.779	0.900	
26	5522.72	25.95	25.90 - 26.10		0.776	0.900	
59	60356.83	59.00	58.90 - 59.10		0.773	0.900	
115	180945.41	115.00	114.90 - 115.10		0.750	0.900	
206	36970.84	206.00	205.90 - 206.10		0.778	0.900	
207	30466.09	207.00	206.90 - 207.10		0.779	0.900	
208	75510.43	208.00	207.90 - 208.10		0.801	0.900	

Integration Time [sec] 0.1 Acquisition Time [sec] 212.5 Y Axis Linear

Tune Parameters

Plasma Parameters

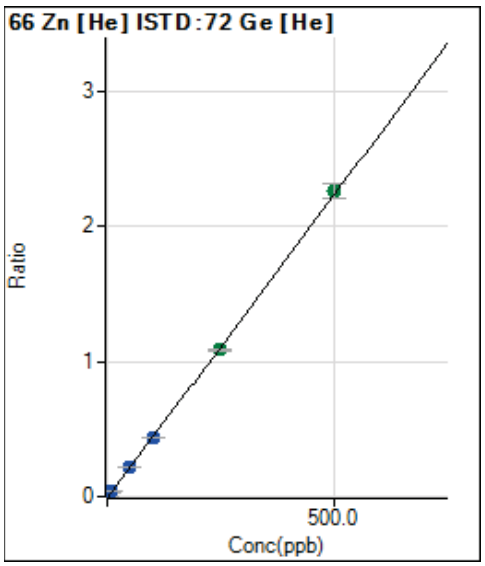
Plasma Mode	—	Nebulizer Gas	0.70 L/min	Dilution Gas	0.35 L/min
RF Power	1550 W	Option Gas	---	Auxiliary Gas	0.90 L/min
RF Matching	1.80 V	Nebulizer Pump	0.10 rps	Plasma Gas	15.0 L/min
Sample Depth	8.0 mm	S/C Temp	2 °C		

Lens Parameters

Extract 1	0.0 V	Omega Lens	5.0 V	Deflect	-2.2 V
Extract 2	-130.0 V	Cell Entrance	-40 V	Plate Bias	-60 V
Omega Bias	-70 V	Cell Exit	-60 V		

Cell Parameters

Use Gas	Yes	3rd Gas Flow	---	Energy Discrimination	2.0 V
He Flow	0.0 mL/min	OctP Bias	-18.0 V		
H2 Flow	4.0 mL/min	OctP RF	170 V		

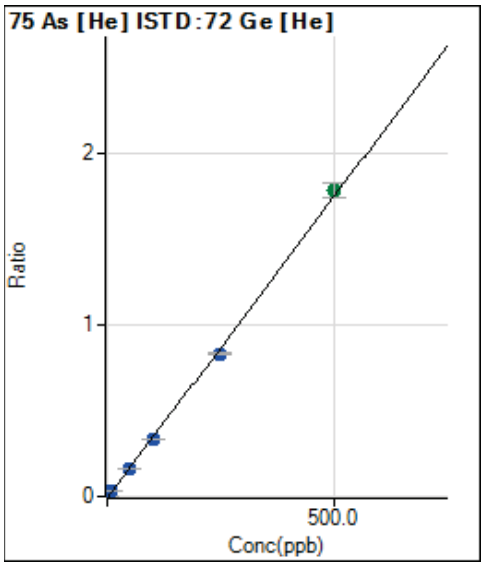


	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	636.01	0.0005	P	7.3	
2	☐	5.000	5.171	30104.53	0.0237	P	0.5	3.4
3	☐	10.000	10.121	59041.24	0.0459	P	0.8	1.2
4	☐	50.000	49.304	288627.19	0.2218	P	1.0	-1.4
5	☐	100.000	98.459	564455.36	0.4424	P	0.3	-1.5
6	☐	250.000	242.197	1400818.00	1.0874	A	1.0	-3.1
7	☐	500.000	504.275	2741974.33	2.2636	A	5.0	0.9
8	☐			4523.92	0.0036	P	2.6	

y = 0.0045 * x + 5.0494E-004
R = 0.9998
DL = 0.0247 ppb
BEC = 0.1125 ppb

Weight: <None>
Min Conc: <None>

previously validated 10607650



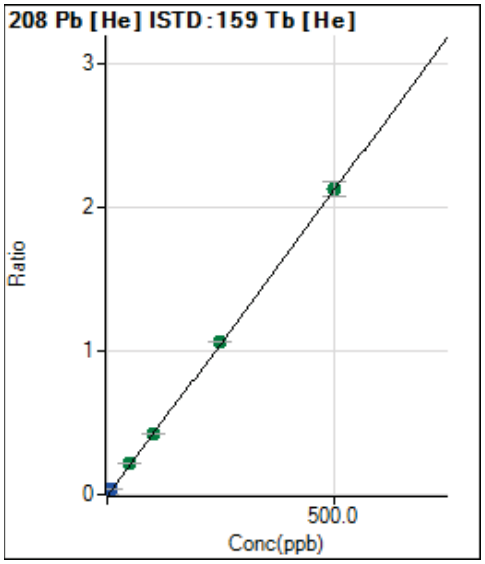
	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	493.68	0.0004	P	4.0	
2	☐	0.500	0.479	2638.36	0.0021	P	2.1	-4.1
3	☐	10.000	9.729	44488.14	0.0346	P	1.0	-2.7
4	☐	50.000	47.131	216207.14	0.1661	P	0.8	-5.7
5	☐	100.000	94.566	424814.04	0.3329	P	0.5	-5.4
6	☐	250.000	236.470	1071689.79	0.8319	P	0.8	-5.4
7	☐	500.000	508.144	2165326.08	1.7873	A	4.5	1.6
8	☐			1171.54	0.0009	P	5.1	

y = 0.0035 * x + 3.9201E-004
R = 0.9994 ✓
DL = 0.01343 ppb
BEC = 0.1115 ppb

Weight: <None>
Min Conc: <None>

previously validated 10607650

Calibration for 242SMPL.d



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	3300.19	0.0001	P	5.9	
2	☐	0.500	0.514	64912.90	0.0023	P	1.0	2.9
3	☐	10.000	10.324	1232695.85	0.0441	P	1.1	3.2
4	☐	50.000	50.478	5965584.50	0.2154	A	0.9	1.0
5	☐	100.000	99.672	11781721.91	0.4252	A	1.4	-0.3
6	☐	250.000	250.065	29027456.65	1.0666	A	0.9	0.0
7	☐	500.000	499.979	56005941.25	2.1324	A	5.0	0.0
8	☐			51270.31	0.0019	P	2.0	

y = 0.0043 * x + 1.1837E-004

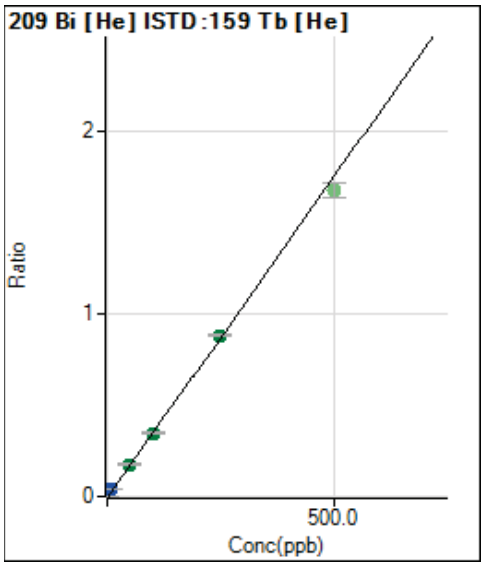
R = 1.0000

DL = 0.004881 ppb

BEC = 0.02776 ppb

Weight: <None>

Min Conc: <None>



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	3260.40	0.0001	P	1.8	
2	☐	0.500	0.510	53613.83	0.0019	P	0.4	2.0
3	☐	10.000	10.323	1017070.79	0.0364	P	0.6	3.2
4	☐	50.000	50.091	4882723.47	0.1763	A	0.6	0.2
5	☐	100.000	98.628	9615224.23	0.3470	A	1.5	-1.4
6	☐	250.000	250.518	23983114.64	0.8812	A	0.9	0.2
7	☑	500.000		44001219.34	1.6751	A	4.6	
8	☐			5024.22	0.0002	P	9.5	

y = 0.0035 * x + 1.1689E-004

R = 1.0000

DL = 0.001761 ppb

BEC = 0.03323 ppb

Weight: <None>

Min Conc: <None>

FORM XV INORGANIC-1

INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Instrument ID: 10ICM8 Start Date: 05/12/2022 13:38 End Date: 05/13/2022 03:03

Sample Name	Time	GE-72	Ge-72-IS1	In-115	Ir-193-IS	Sc-45-IS	Sc-45-IS1	Tb-159
29967222CAL0	13:38	100.0	100.0	100.0	100.0	100.0	100.0	100.0
29967223CAL1	13:42	100.8	92.0	100.7	99.9	100.2	92.1	100.6
29967224CAL2	13:46	102.1	99.6	100.7	99.4	99.4	99.3	100.1
29967225CAL4	13:54	101.3	98.5	98.2	96.9	98.2	97.8	99.4
29967226CAL3	13:57	103.3	99.8	99.3	99.7	99.2	98.5	99.3
29967227CAL5	14:01	102.3	98.1	97.9	95.7	99.1	97.6	97.6
29967228CAL6	14:05	96.3	97.4	92.5	90.6	96.8	97.4	94.3
29967229CAL7	14:09	100.5	99.2	94.6	91.5	101.5	98.0	97.2
29967230ICV	14:12	104.0	101.0	102.1	100.8	101.6	99.6	102.3
29967231ICB	14:20	103.0	102.3	102.7	102.6	102.1	101.1	102.5
29967232CRDL	14:23	103.2	101.6	102.1	102.1	102.4	100.0	102.1
29967233ICSA	14:27	99.6	97.9	96.7	95.4	100.1	96.7	97.9
29967234ICSAB	14:30	101.9	98.7	97.9	95.6	101.8	98.1	100.6
29967235CCV	14:34	105.3	99.8	100.8	100.7	100.8	98.2	102.2
29967236CCB	14:38	100.3	100.9	100.4	99.8	97.7	99.0	99.9
29967263CCV	21:35	88.4	83.6	86.7	84.1	83.1	79.3	87.4
29967264CCB	21:39	87.1	85.1	87.9	86.8	83.7	81.0	88.2
29967265CRDL	21:42	86.8	84.3	87.6	86.2	83.9	79.7	87.9
29967312CCV	22:11	86.8	81.4	85.1	82.6	82.1	76.9	85.3
29967313CCB	22:14	81.4	81.1	81.9	80.3	78.9	76.2	82.0
29967329CCV	00:37	84.5	79.7	83.2	78.7	80.4	75.0	81.7
29967330CCB	00:41	82.7	79.3	83.6	79.9	80.0	75.0	82.1
4317652	00:45	81.1	79.3	83.1	80.1	79.8	76.1	82.3
4317653	00:48	80.7	78.2	79.9	77.4	76.7	74.5	79.5
S-0016-D-FM-01-	00:52	80.1	78.1	81.1	78.8	77.7	74.2	80.3
S-0016-D-FM-03-	00:59	81.7	78.5	82.4	81.1	79.3	74.5	82.5
S-0016-D-FM-03D-	01:02	79.6	78.7	80.2	78.8	77.2	73.9	80.1
S-0016-D-FM-04-	01:06	82.0	78.5	82.1	79.6	78.7	74.1	81.4
10607647001	01:09	82.6	79.3	82.2	79.5	79.4	74.6	82.5
4319035	01:17	83.4	79.7	84.4	81.3	80.1	74.9	82.9
29967331CCV	01:20	85.2	79.7	83.7	80.0	80.6	74.6	83.5
29967332CCB	01:24	81.7	73.6	82.9	80.2	79.2	68.9	82.4
4317656	01:27	82.8	79.4	82.9	79.0	79.3	74.1	82.5
4317654	01:31	83.3	73.7	82.0	79.8	79.4	68.9	81.7
4317655	01:34	84.0	80.1	83.8	80.5	80.3	75.4	82.7
29967333CCV	01:56	84.2	78.6	82.9	79.0	79.3	73.2	82.0
29967334CCB	01:59	79.4	79.1	80.9	77.7	76.8	74.0	79.4
29967335CCV	02:28	81.1	82.2	79.0	76.3	76.6	76.8	78.9
29967336CCB	02:31	201.6	124.6	202.7	209.0	191.2	109.9	209.1
29967337CRDL	02:35	81.5	78.2	82.3	80.2	78.7	73.3	82.2

05/18/2022 09:52

FORM XV INORGANIC-2

INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Instrument ID: 10ICM8 Start Date: 05/12/2022 13:38 End Date: 05/13/2022 03:03

Sample Name	Time	GE-72 ✓	Ge-72-IS1	In-115	Ir-193-IS	Sc-45-IS	Sc-45-IS1	Tb-159 ✓
29967338CCV	03:00	83.3	78.6	81.8	79.5	79.4	73.2	82.2
29967339CCB	03:03	81.2	78.8	82.4	80.9	78.3	73.7	82.3

US EPA 200.8/6020 Tune Check Report

Acq/Data Batch	C:\Agilent\ICPMH\1\DATA\051322.b
Report Comment	10ICM8 PW
Instrument Name	G3281A JP13142395

[He]

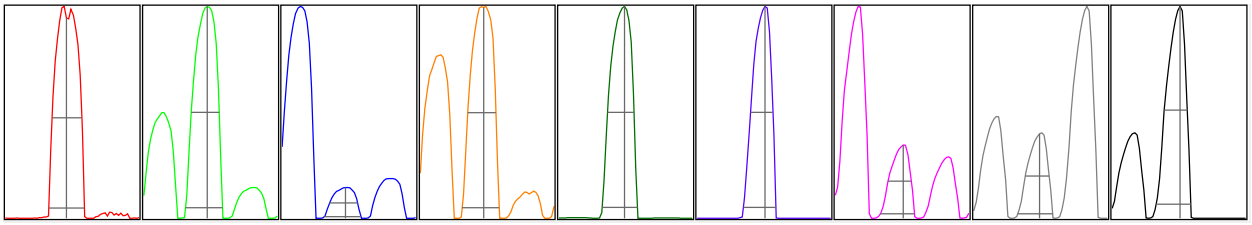
Sensitivity

Mass	Count	RSD%	RSD%(Rqd)	RSD%(Flag)
9	114	4.077	5.000	
24	1320	2.086	5.000	
25	193	2.126	5.000	
26	251	1.523	5.000	
59	23186	1.093	5.000	
115	31935	1.569	5.000	
206	14820	1.697	5.000	
207	12726	2.229	5.000	
208	30653	3.131	5.000	

Rep#1 Count	Rep#2 Count	Rep#3 Count	Rep#4 Count	Rep#5 Count
108	115	113	114	121
1318	1301	1291	1328	1362
200	190	190	192	192
254	246	256	251	250
23150	22878	23125	23196	23582
31406	31470	32030	32168	32602
14622	14542	14870	14886	15180
12609	12406	12727	12709	13179
29369	30393	30482	31025	31995

Integration Time [sec] 0.1

Resolution/Axis



Mass	Peak Height	Axis	Axis (Required)	Axis (Flag)	W-5%	W-5% (Required)	W-5% (Flag)
9	176.21	8.90	8.90 - 9.10		0.789	0.900	
24	2249.31	23.95	23.90 - 24.10		0.819	0.900	
25	324.18	24.95	24.90 - 25.10		0.807	0.900	
26	420.66	25.95	25.90 - 26.10		0.820	0.900	
59	41797.20	59.00	58.90 - 59.10		0.782	0.900	
115	65327.35	115.05	114.90 - 115.10		0.719	0.900	
206	29824.07	206.05	205.90 - 206.10		0.754	0.900	
207	24708.98	207.00	206.90 - 207.10		0.773	0.900	
208	62048.56	208.05	207.90 - 208.10		0.767	0.900	

Integration Time [sec] 0.1 Acquisition Time [sec] 212.5 Y Axis Linear

Tune Parameters

Plasma Parameters

Plasma Mode	---	Nebulizer Gas	0.70 L/min	Dilution Gas	0.35 L/min
RF Power	1550 W	Option Gas	---	Auxiliary Gas	0.90 L/min
RF Matching	1.80 V	Nebulizer Pump	0.10 rps	Plasma Gas	15.0 L/min
Sample Depth	8.0 mm	S/C Temp	2 °C		

Lens Parameters

Extract 1	0.0 V	Omega Lens	5.0 V	Deflect	-1.2 V
Extract 2	-130.0 V	Cell Entrance	-40 V	Plate Bias	-60 V
Omega Bias	-70 V	Cell Exit	-60 V		

Cell Parameters

Use Gas	Yes	3rd Gas Flow	---	Energy Discrimination	3.0 V
He Flow	4.5 mL/min	OctP Bias	-18.0 V		
H2 Flow	0.0 mL/min	OctP RF	170 V		

US EPA 200.8/6020 Tune Check Report

Acq/Data Batch	C:\Agilent\ICPMH\1\DATA\051322.b
Report Comment	10ICM8 PW
Instrument Name	G3281A JP13142395

[H2]

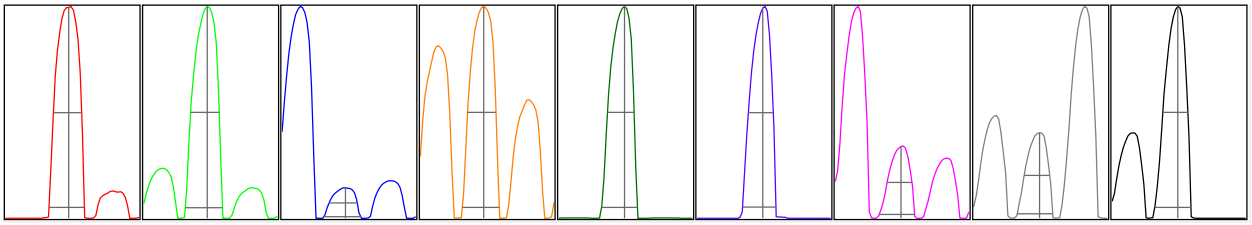
Sensitivity

Mass	Count	RSD%	RSD%(Rqd)	RSD%(Flag)
9	951	3.067	5.000	
24	13105	1.993	5.000	
25	1894	1.954	5.000	
26	2335	2.733	5.000	
59	25168	1.349	5.000	
115	74760	1.527	5.000	
206	16018	2.008	5.000	
207	13931	2.061	5.000	
208	33502	1.868	5.000	

Rep#1 Count	Rep#2 Count	Rep#3 Count	Rep#4 Count	Rep#5 Count
978	979	948	937	910
13427	13230	13109	13040	12718
1934	1907	1911	1883	1837
2394	2352	2358	2344	2226
25450	25337	25370	25064	24619
73493	73878	74898	76395	75134
15515	16010	15971	16341	16251
13471	13882	14025	14035	14242
32619	33091	33733	34017	34050

Integration Time [sec] 0.1

Resolution/Axis



Mass	Peak Height	Axis	Axis (Required)	Axis (Flag)	W-5%	W-5% (Required)	W-5% (Flag)
9	1582.99	8.95	8.90 - 9.10		0.784	0.900	
24	22092.43	23.95	23.90 - 24.10		0.825	0.900	
25	3180.68	24.95	24.90 - 25.10		0.815	0.900	
26	3909.04	25.95	25.90 - 26.10		0.820	0.900	
59	45167.74	59.00	58.90 - 59.10		0.796	0.900	
115	140314.11	115.00	114.90 - 115.10		0.738	0.900	
206	30121.44	206.00	205.90 - 206.10		0.786	0.900	
207	25241.69	207.00	206.90 - 207.10		0.786	0.900	
208	62531.44	208.00	207.90 - 208.10		0.802	0.900	

Integration Time [sec] 0.1 Acquisition Time [sec] 212.5 Y Axis Linear

Tune Parameters

Plasma Parameters

Plasma Mode	---	Nebulizer Gas	0.70 L/min	Dilution Gas	0.35 L/min
RF Power	1550 W	Option Gas	---	Auxiliary Gas	0.90 L/min
RF Matching	1.80 V	Nebulizer Pump	0.10 rps	Plasma Gas	15.0 L/min
Sample Depth	8.0 mm	S/C Temp	2 °C		

Lens Parameters

Extract 1	0.0 V	Omega Lens	5.0 V	Deflect	-2.2 V
Extract 2	-130.0 V	Cell Entrance	-40 V	Plate Bias	-60 V
Omega Bias	-70 V	Cell Exit	-60 V		

Cell Parameters

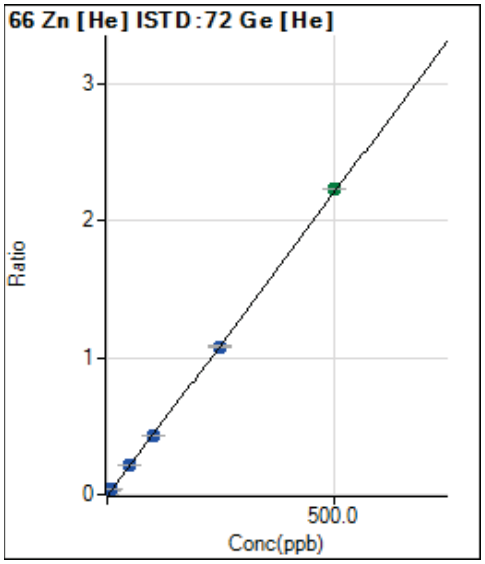
Use Gas	Yes	3rd Gas Flow	---	Energy Discrimination	2.0 V
He Flow	0.0 mL/min	OctP Bias	-18.0 V		
H2 Flow	4.0 mL/min	OctP RF	170 V		

Calibration for 191SMPL.d

Batch Folder: C:\Agilent\ICPMH\1\DATA\051322.b\
Analysis File: 051322.batch.bin
DA Date-Time: 5/16/2022 08:15:55
Calibration Title:
Calibration Method: External Calibration
VIS Interpolation Fit:

Level	Standard Data File	Sample Name	Acq. Date-Time
1	004CALB.d	CAL 0	5/13/2022 09:23:44
2	005CALS.d	CAL 1	5/13/2022 09:27:37
3	006CALS.d	CAL 2	5/13/2022 09:31:27
4	007CALS.d	CAL 3	5/13/2022 09:35:18
5	008CALS.d	CAL 4	5/13/2022 09:39:08
6	010CALS.d	CAL 5	5/13/2022 09:46:35
7	011CALS.d	CAL 6	5/13/2022 09:50:16
8	012CALS.d	CAL 7	5/13/2022 09:53:58

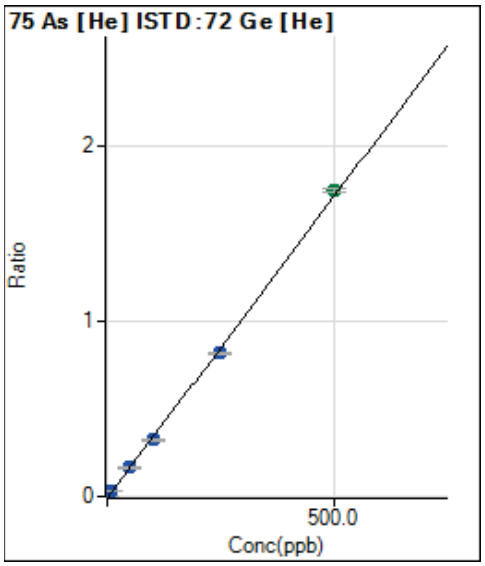
Calibration for 191SMPL.d



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	590.01	0.0006	P	1.8	
2	☐	5.000	5.043	23974.71	0.0229	P	0.8	0.9
3	☐	10.000	10.049	47689.81	0.0451	P	1.1	0.5
4	☐	50.000	49.321	232110.15	0.2192	P	0.5	-1.4
5	☐	100.000	96.959	457477.15	0.4304	P	2.7	-3.0
6	☐	250.000	243.466	1170451.46	1.0798	P	0.9	-2.6
7	☐	500.000	503.941	2374591.67	2.2344	A	0.6	0.8
8	☐			3715.73	0.0035	P	3.9	

y = 0.0044 * x + 5.6902E-004
R = 0.9999
DL = 0.006938 ppb
BEC = 0.1284 ppb

Weight: <None>
Min Conc: <None>



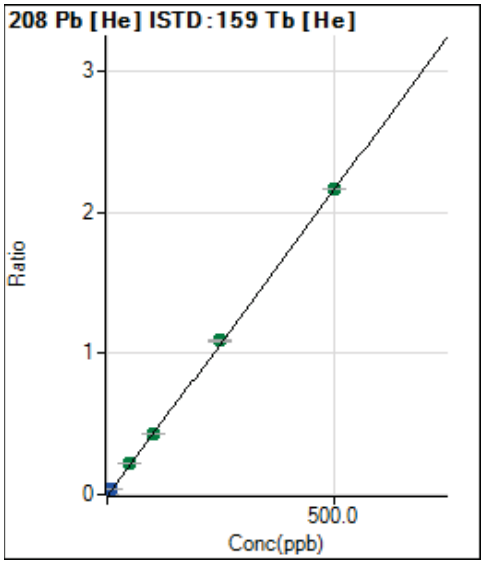
	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	290.17	0.0003	P	5.0	
2	☐	0.500	0.473	1992.78	0.0019	P	2.1	-5.3
3	☐	10.000	9.682	35444.34	0.0335	P	0.9	-3.2
4	☐	50.000	47.512	173087.20	0.1635	P	1.3	-5.0
5	☐	100.000	93.317	341018.01	0.3208	P	2.3	-6.7
6	☐	250.000	237.555	884702.25	0.8162	P	1.1	-5.0
7	☐	500.000	507.815	1853853.58	1.7444	A	1.0	1.6
8	☐			852.35	0.0008	P	4.4	

y = 0.0034 * x + 2.7988E-004
R = 0.9995
DL = 0.0123 ppb
BEC = 0.08149 ppb

Weight: <None>
Min Conc: <None>

Previously validated 10607650

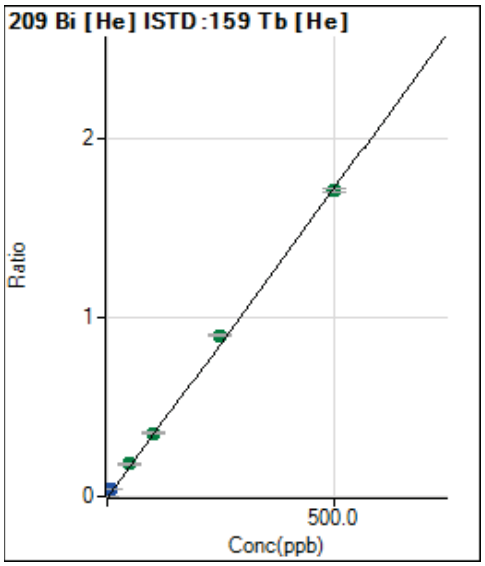
Calibration for 191SMPL.d



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	2191.77	0.0001	P	1.5	
2	☐	0.500	0.523	56954.41	0.0024	P	0.6	4.6
3	☐	10.000	10.403	1099646.40	0.0452	P	1.2	4.0
4	☐	50.000	50.894	5280585.52	0.2207	A	0.7	1.8
5	☐	100.000	99.003	10411020.89	0.4293	A	2.0	-1.0
6	☐	250.000	251.473	26089947.53	1.0903	A	0.7	0.6
7	☐	500.000	499.366	52544173.80	2.1651	A	0.4	-0.1
8	☐			44096.83	0.0018	P	0.5	

y = 0.0043 * x + 9.0441E-005
R = 1.0000
DL = 0.0009614 ppb
BEC = 0.02086 ppb

Weight: <None>
Min Conc: <None>



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	2556.92	0.0001	P	6.3	
2	☐	0.500	0.516	45689.09	0.0019	P	2.8	3.1
3	☐	10.000	10.839	916217.90	0.0377	P	1.4	8.4
4	☐	50.000	52.413	4345814.52	0.1817	A	1.9	4.8
5	☐	100.000	102.256	8593750.71	0.3543	A	1.2	2.3
6	☐	250.000	259.471	21510585.51	0.8990	A	1.0	3.8
7	☐	500.000	494.555	41581071.05	1.7133	A	0.6	-1.1
8	☐			3490.46	0.0001	P	6.8	

y = 0.0035 * x + 1.0549E-004
R = 0.9997
DL = 0.005711 ppb
BEC = 0.03045 ppb

Weight: <None>
Min Conc: <None>

Previously validated 10607650

FORM XV INORGANIC-1

INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Instrument ID: 10ICM8 Start Date: 05/13/2022 09:23 End Date: 05/13/2022 12:49

Sample Name	Time	GE-72	Ge-72-IS1	In-115	Ir-193-IS	Sc-45-IS	Sc-45-IS1	Tb-159
29983523CAL0	09:23	100.0	100.0	100.0	100.0	100.0	100.0	100.0
29983524CAL1	09:27	100.9	98.9	99.1	99.3	99.5	98.6	99.7
29983525CAL2	09:31	102.0	98.9	99.9	99.7	99.3	98.8	100.4
29983526CAL3	09:35	102.1	98.0	97.6	98.6	97.4	96.9	98.7
29983527CAL4	09:39	102.6	98.3	99.3	100.0	99.6	97.9	100.1
29983528CAL5	09:46	104.6	102.0	98.3	98.7	100.7	100.8	98.7
29983529CAL6	09:50	102.5	98.1	96.4	96.2	102.2	95.0	100.1
29983530CAL7	09:53	103.0	96.6	95.9	93.4	104.0	92.7	99.2
29983531ICV	09:57	105.7	102.3	100.7	99.7	101.8	100.9	101.9
29983532ICB	10:01	104.3	102.5	101.9	103.2	101.5	101.5	102.9
29983533CRDL	10:04	110.8	104.0	107.9	108.6	109.3	101.9	108.8
29983534ICSA	10:08	106.1	99.9	100.0	101.4	106.2	96.8	104.7
29983535ICSAB	10:12	98.8	99.4	92.8	93.6	97.9	96.5	96.8
29983536CCV	10:15	106.3	103.1	100.6	100.7	101.1	100.5	102.9
29983537CCB	10:19	103.5	102.7	101.3	103.9	101.4	100.4	102.7
29983540CCV	11:20	99.4	99.7	92.9	92.7	95.3	94.5	94.6
29983541CCB	11:23	99.7	102.8	95.5	96.0	96.2	98.5	95.4
S-0016-D-EB-02-	11:27	98.7	102.3	96.5	96.7	97.4	99.9	96.5
29983542CCV	12:02	101.3	99.7	95.7	94.2	96.6	95.5	95.5
29983543CCB	12:06	100.8	102.0	98.0	96.2	98.7	97.9	97.5
29983544CRDL	12:09	101.1	102.5	97.7	95.9	99.2	98.5	97.4
29983545CCV	12:45	101.1	100.8	95.5	94.3	97.8	97.0	96.5
29983546CCB	12:49	101.0	102.1	98.0	96.4	99.6	98.3	98.0

Prep Log Report

Batch Information: MPRP 814465 6020BS

Template Version: ENV-EPL-MIN4-0015-Rev.00 (13Dec2020)

Prep Method	EPA 3050B	Analysis Method	EPA 6020B	Prepared By	BT	Instrument	10BALU
Block ID	10MET04	Thermometer ID	210354350	Correction Factor (C)	-0.6	Block Temp (C)	94.7
Corrected Temp. (C)	94.10	Digestion Start Date/Time	05/11/2022 12:27:09:185	Digestion End Date/Time	05/11/2022 14:38:22:127	Block End Temp (C)	94.4
Corrected End Temp. (C)	93.80	Digestion Vessel	364641	Resin Pellets Solid Matrix	344615	Metals Pipette 1	Q765
Metals Pipette 2		Bottle Disp. 1	Q791	Bottle Disp. 2	Q814	Bottle Disp. 3	Q452
Reviewed By	HTV	Reviewed By Date	05/11/2022 17:23	Batch Notes	Weighed by DJM.		

Sample Information:

QC Rule	Sample Type	Lab Sample ID	Matrix	Initial Weight (g)	Conc. HNO3 (mL)	H2O2 (mL)	Conc. HCL (mL)	Final Volume (mL)	Sample Notes	Hg-SPK (mL)	METALS-STK1 (mL)	METALS-STK2 (mL)
6020BS_P	BLANK	**4317652**	Solid	1.06	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	LCS	**4317653**	Solid	1.07	364107 (7.5)	332176 (2.5)	363604 (5)	50	✓	363145 (.25)	343315 (.5)	343316 (.5)
6020BS_P	PS	**10607644001**	Solid	1.02	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607644002**	Solid	1.05	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607644003**	Solid	1.08	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607644004**	Solid	1.04	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607644005**	Solid	1.07	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	RQS	**10607647001**	Solid	1.03	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	DUP	**4317656**	Solid	1.03	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	MS	**4317654**	Solid	1.03	364107 (7.5)	332176 (2.5)	363604 (5)	50		363145 (.25)	343315 (.5)	343316 (.5)
6020BS_P	MSD	**4317655**	Solid	1.03	364107 (7.5)	332176 (2.5)	363604 (5)	50		363145 (.25)	343315 (.5)	343316 (.5)
6020BS_P	PS	**10607647002**	Solid	1.04	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607647003**	Solid	1.01	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607648001**	Solid	1.08	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607649001**	Solid	1.08	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607649002**	Solid	1.01	364107 (7.5)	332176 (2.5)	363604 (5)	50				

Prep Log Report

QC Rule	Sample Type	Lab Sample ID	Matrix	Initial Weight (g)	Conc. HNO3 (mL)	H2O2 (mL)	Conc. HCL (mL)	Final Volume (mL)	Sample Notes	Hg-SPK (mL)	METALS-STK1 (mL)	METALS-STK2 (mL)
6020BS_P	PS	**10607649003**	Solid	0.06741	364107 (7.5)	332176 (2.5)	363604 (5)	50	1*			
6020BS_P	PS	**10607650001**	Solid	1.03	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607650002**	Solid	1.03	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607650003**	Solid	1	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607650004**	Solid	1.07	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607650005**	Solid	1	364107 (7.5)	332176 (2.5)	363604 (5)	50				
6020BS_P	PS	**10607650006**	Solid	1.1	364107 (7.5)	332176 (2.5)	363604 (5)	50				

Sample Notes:

1*: limited sample volume

Standard Notes:

343315: ZPACEMN-116 (MIX 1) **343316: ZPACEMN-106** **363145: Intermediate Spike for ICPMS Soil**

SAMPLE NO.

S-0016-D-FM-01-20220505

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Lab Sample ID: 10607644001 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7439-97-6	Mercury	0.036	J	mg/kg	1	05/17/2022 10:30

SAMPLE NO.

S-0016-D-EB-02-20220505

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Lab Sample ID: 10607644002 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7439-97-6	Mercury	<0.025	U	mg/kg	1	05/17/2022 10:31

SAMPLE NO.

S-0016-D-FM-03-20220505

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Lab Sample ID: 10607644003 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7439-97-6	Mercury	0.061		mg/kg	1	05/17/2022 10:33

SAMPLE NO.

S-0016-D-FM-03D-20220505

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Lab Sample ID: 10607644004 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7439-97-6	Mercury	0.048	J	mg/kg	1	05/17/2022 10:35

SAMPLE NO.

S-0016-D-FM-04-20220505

FORM I INORGANIC-1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Lab Sample ID: 10607644005 Percent Moisture:

CAS No.	Analyte	Concentration	Q	Units	DF	Analysis Date/Time
7439-97-6	Mercury	0.050	J	mg/kg	1	05/17/2022 10:36

FORM II INORGANIC-1

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source: 366428

Continuing Calibration Verification Source: 366428

Concentration Units: ug/L Instrument ID: 10HG09

	Initial Calibration Verification				Continuing Calibration Verification						
	05/17/2022 09:13 ✓				05/17/2022 09:46 ✓			05/17/2022 10:02 ✓			
Analyte	True	Found	%R	Control Limit	True	Found	%R	True	Found	%R	Control Limit
Mercury	5.0	4.8	97.0	90-110	5.0	4.8	96.6	5.0	4.8	96.4	90-110

FORM II INORGANIC-2

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source:

Continuing Calibration Verification Source: 366428

Concentration Units: ug/L Instrument ID: 10HG09

	Continuing Calibration Verification									
	05/17/2022 10:23 ✓			05/17/2022 10:40 ✓			05/17/2022 10:57 ✓			Control Limit
Analyte	True	Found	%R	True	Found	%R	True	Found	%R	
Mercury	5.0	4.9	98.4	5.0	4.6	92.4	5.0	4.9	98.4	90-110

FORM II INORGANIC-3

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source:

Continuing Calibration Verification Source: 366428

Concentration Units: ug/L Instrument ID: 10HG09

	Continuing Calibration Verification			
	05/17/2022 11:17 ✓			Control Limit
Analyte	True	Found	%R	
Mercury	5.0	4.9	97.8	90-110

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 366423,366489 Analysis Date/Time: 05/17/2022 09:16

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Mercury	0.2	0.21	105.0	70-130

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 366423,366489 Analysis Date/Time: 05/17/2022 10:22

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Mercury	0.2	0.19	95.0	70-130

FORM II INORGANIC-1

CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 366423,366489 Analysis Date/Time: 05/17/2022 11:15

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Mercury	0.2	0.18	90.0	70-130

FORM III INORGANIC-1

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract : 0643586 RMAP Interior School

Method Blank Matrix: Solid Instrument ID: 10HG09

Method Blank Concentration Units: mg/kg

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Method Blank	
	05/17/2022 09:15 ✓	C	05/17/2022 09:48 ✓	C	05/17/2022 10:04 ✓	C	05/17/2022 10:25 ✓	C	4317663 ✓	C
Mercury	0.087	U	0.087	U	0.087	U	0.087	U	<0.0081	U

FORM III INORGANIC-2

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract : 0643586 RMAP Interior School

Method Blank Matrix: Instrument ID: 10HG09

Method Blank Concentration Units:

Analyte	Initial Calibration Blank		Continuing Calibration Blank (ug/L)					
		C	05/17/2022 10:43	C	05/17/2022 10:59	C	05/17/2022 11:18	C
Mercury			0.087	U	0.087	U	0.087	U

SAMPLE NO.

4317666MS ✓

FORM V INORGANIC-1

MATRIX SPIKE SAMPLE RECOVERY

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Matrix: Solid Basis: Wet Parent Sample ID: 10607647001

Percent Moisture:

Analyte	Units	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R ✓
Mercury	mg/kg	80-120	1.4	0.035J	1.4	101

SAMPLE NO.

4317667MSD ✓

FORM V INORGANIC-2

MATRIX SPIKE SAMPLE RECOVERY

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Matrix: Solid Basis: Wet Parent Sample ID: 10607647001

Percent Moisture:

Analyte	Units	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R
Mercury	mg/kg	80-120	1.4	0.035J	1.4	101 ✓

SAMPLE NO.

4317665DUP

FORM VI INORGANIC-1
DUPLICATES

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Matrix: Solid Concentration Units: mg/kg

Percent Moisture: _____ Basis: Wet

Analyte	RPD Control Limit	Sample	Duplicate	RPD
Mercury	20	0.035J	0.038J	

SAMPLE NO.

4317667MSD

FORM VI INORGANIC-2
DUPLICATES

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Matrix: Solid Concentration Units: mg/kg

Percent Moisture: _____ Basis: Wet

Analyte	RPD Control Limit	Sample	Duplicate	RPD
Mercury	20	1.4	1.4	0

SAMPLE NO.

4317664LCS

FORM VII INORGANIC-1
LABORATORY CONTROL SAMPLE

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior

Matrix: Solid

Analyte	Units	True	Found	%R	Limits	
Mercury	mg/kg	0.43	0.45	105	80	120

FORM IX INORGANIC-1
INSTRUMENT DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Preparation Method: None Instrument ID: 10HG09

Concentration Units: ug/L

Analyte	PQL	IDL	IDL Date
Mercury	0.20	0.087	03/30/2021

FORM IX INORGANIC-2
METHOD DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Preparation Method: EPA 7471B Instrument ID: 10HG09

Concentration Units: mg/kg

Analyte	PQL	MDL	MDL Date
Mercury	0.020	0.0087	03/30/2021

FORM XII INORGANIC-1
PREPARATION LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Preparation Method: EPA 7471B Batch: MERP 37185

Lab Sample ID	Sample Name	Preparation Date	Initial Weight (g)	Final Volume (mL)
4317663	4317663	05/11/2022	0.322	30
4317664	4317664	05/11/2022	0.352	30
4317665	4317665	05/11/2022	0.102	30
4317666	4317666	05/11/2022	0.11	30
4317667	4317667	05/11/2022	0.109	30
10607644001	S-0016-D-FM-01-20220505	05/11/2022	0.107	30
10607644002	S-0016-D-EB-02-20220505	05/11/2022	0.103	30
10607644003	S-0016-D-FM-03-20220505	05/11/2022	0.103	30
10607644004	S-0016-D-FM-03D-20220505	05/11/2022	0.106	30
10607644005	S-0016-D-FM-04-20220505	05/11/2022	0.103	30

FORM XIII INORGANIC-1
ANALYSIS RUN LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10607644 Contract: 0643586 RMAP Interior School

Instrument ID: 10HG09 Analysis Method: EPA 7471B

Start Date: 05/17/2022 09:02 End Date: 05/17/2022 11:18

Sample Name	Lab Sample ID	D/F	Date	Time	Hg
29997389CAL0	29997389CAL0	1	05/17/2022	09:02	X
29997390CAL1	29997390CAL1	1	05/17/2022	09:04	X
29997391CAL2	29997391CAL2	1	05/17/2022	09:05	X
29997392CAL3	29997392CAL3	1	05/17/2022	09:07	X
29997393CAL4	29997393CAL4	1	05/17/2022	09:09	X
29997394CAL5	29997394CAL5	1	05/17/2022	09:10	X
29997395ICV	29997395ICV	1	05/17/2022	09:13	X
29997396ICB	29997396ICB	1	05/17/2022	09:15	X
29997397CRDL	29997397CRDL	1	05/17/2022	09:16	X
29997398CCV	29997398CCV	1	05/17/2022	09:46	X
29997399CCB	29997399CCB	1	05/17/2022	09:48	X
29997400CCV	29997400CCV	1	05/17/2022	10:02	X
29997401CCB	29997401CCB	1	05/17/2022	10:04	X
29997402CRDL	29997402CRDL	1	05/17/2022	10:22	X
29997403CCV	29997403CCV	1	05/17/2022	10:23	X
29997404CCB	29997404CCB	1	05/17/2022	10:25	X
4317663BLANK	4317663	1	05/17/2022	10:27	X
4317664LCS	4317664	1	05/17/2022	10:28	X
S-0016-D-FM-01-20220505	10607644001	1	05/17/2022	10:30	X
S-0016-D-EB-02-20220505	10607644002	1	05/17/2022	10:31	X
S-0016-D-FM-03-20220505	10607644003	1	05/17/2022	10:33	X
S-0016-D-FM-03D-20220505	10607644004	1	05/17/2022	10:35	X
S-0016-D-FM-04-20220505	10607644005	1	05/17/2022	10:36	X
10607647001	10607647001	1	05/17/2022	10:38	X
29997405CCV	29997405CCV	1	05/17/2022	10:40	X
29997406CCB	29997406CCB	1	05/17/2022	10:43	X
4317665DUP	4317665	1	05/17/2022	10:52	X
4317666MS	4317666	1	05/17/2022	10:54	X
4317667MSD	4317667	1	05/17/2022	10:56	X
29997407CCV	29997407CCV	1	05/17/2022	10:57	X
29997409CCB	29997409CCB	1	05/17/2022	10:59	X
29997410CRDL	29997410CRDL	1	05/17/2022	11:15	X
29997411CCV	29997411CCV	1	05/17/2022	11:17	X
29997412CCB	29997412CCB	1	05/17/2022	11:18	X

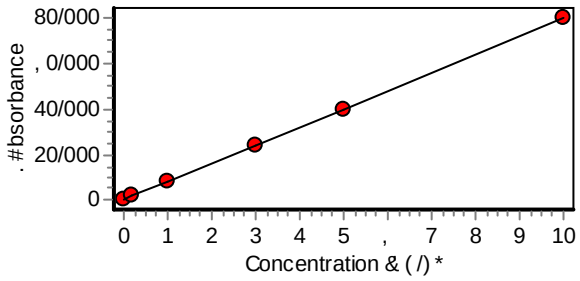
Report Generated By Teledyne Leeman QuickTrace
Analyst: 10metalsuser,LENA WIGER
Worksheet file: S:\DATA\Metals\10HG09\17MAY22S LIDS10HG09!" s#$
Creation Date: %&17&2022 ' :%1:%9 AM
Comment: E(A 7) 71&7) 71*

Results

Sample Name	Type	Date/Time	Conc (ug/L)	µAbs	%RSD	Residual	Flags	DF	% Reco e!y
Calibration Blank	S !	05/17/22 09:02:38 am	0.00	352	1.88			1.0000	" /#
Replicates	352.0	358.8	354.3	343.0					
Stanar %1 &0.2 ' (/) *	S !	05/17/22 09:04:15 am	0.20	1920	2.33	4.82+		1.0000	" /#
Replicates	1978.0	1933.2	1882.2	1887.9					
Stanar %2 &1 ' (/) *	S !	05/17/22 09:05:52 am	1.00	8229	0.21	-0.01+		1.0000	" /#
Replicates	8217.,	8223.1	8221.3	8255.,					
Stanar %3 &3 ' (/) *	S !	05/17/22 09:07:30 am	3.00	24030	0.38	-0., 9+		1.0000	" /#
Replicates	23910.,	24013.3	24070.,	2412, .8					
Stanar %4 &5 ' (/) *	S !	05/17/22 09:09:08 am	5.00	4003,	0.07	-0.32+		1.0000	" /#
Replicates	40049.1	4002, .1	40004.,	400, 4.8					
Stanar %5 &10 ' (/) *	S !	05/17/22 09:10:4, am	10.00	80192	0.40	0.14+		1.0000	" /#
Replicates	79779.9	80110.3	803, 2.3	80514.5					

Calibration
01' ation: #bs 3 7983.3004 5 24, .7, 1
R2: 0.99998 RS0: 2.82+
S00: 135.4244
2la(s:

Previously Validated 10607650



6C7	6C7	05/17/22 09:13:22 am	4.85	38998	1.32			1.0000	97.08
Replicates	39445.4	39381.2	38794.4	383, 9.2					
6CB	6CB	05/17/22 09:15:01 am	0.01	345	5.15			1.0000	" /#
Replicates	347.0	339.1	343.1	350.8					
CR!)	CR!)	05/17/22 09:1, :38 am	0.21	1929	1.00			1.0000	105.38
Replicates	1928.7	1928.5	1909.5	1950.5					
431, 083843, 79	9" :	05/17/22 09:19:18 am	-0.04	-110	2.25			1.0000	" /#
Replicates	-112.4	-108.4	-119.2	-99.9					
431, 084843, 79	9" :	05/17/22 09:20:55 am	5.0,	40, 55	0.30			1.0000	" /#
Replicates	40500.7	40, 32.4	40705.9	40781.9					
10, 0, 995001843, 79	9" :	05/17/22 09:22:31 am	23.70	18947,	0.47		;	1.0000	" /#
Replicates	188195.5	189525.1	190055.9	190125.9					
431, 087843, 79	9" :	05/17/22 09:24:08 am	23.59	1885, 2	2.54		;	1.0000	" /#
Replicates	1822, 3.1	187505.2	191, 38.0	192840.7					

Prep Log Report

Batch Information: MERP 814468 7471BS

Template Version: ENV-EPL-MIN4-0028-Rev.00 (13Dec2020)

Prep Method	EPA 7471B	Analysis Method	EPA 7471B	Prepared By	NJ1	Instrument	10BALT
Block ID	10MET54	Thermometer ID	210354363	Correction Factor (C)	0.8	Block Temp (C)	93.4
Corrected Temp. (C)	94.20	Digestion Start Date/Time	05/11/2022 15:25:32:727	Digestion End Date/Time	05/11/2022 16:18:17:385	Block End Temp (C)	95.7
Corrected End Temp. (C)	96.50	Digestion Vessel	360406	Resin Pellets Solid Matrix	344615	Metals Pipette 1	Q473
Metals Pipette 2	Q810	Bottle Disp. 1	Q791	Bottle Disp. 2	Q452	Bottle Disp. 3	Q814
Bottle Disp. 4	Q671	Bottle Disp. 5		Reviewed By	HTV	Reviewed By Date	05/11/2022 17:29
Batch Notes	Weighed by DJM.						

Sample Information:

QC Rule	Sample Type	Lab Sample ID	Matrix	Initial Weight (g)	Aqua Regia (mL)	5% KMnO4 (mL)	12% NH2OH*HCL (mL)	Final Volume (mL)	Sample Notes	MERCURY-SPK (mL)
7471B S_P	LCS	**4317664**	Solid	0.352	365482 (3)	362590 (9)	365429 (3.6)	30		350870 (.15)
7471B S_P	BLANK	**4317663**	Solid	0.322	365482 (3)	362590 (9)	365429 (3.6)	30		
7471B S_P	PS	**10607644001**	Solid	0.107	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	PS	**10607644002**	Solid	0.103	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	PS	**10607644003**	Solid	0.103	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	PS	**10607644004**	Solid	0.106	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	PS	**10607644005**	Solid	0.103	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	RQS	**10607647001**	Solid	0.102	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	DUP	**4317665**	Solid	0.102	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	MS	**4317666**	Solid	0.11	365482 (3)	362590 (9)	365429 (3.6)	30	1*	350870 (.15)
7471B S_P	MSD	**4317667**	Solid	0.109	365482 (3)	362590 (9)	365429 (3.6)	30	1*	350870 (.15)
7471B S_P	PS	**10607647002**	Solid	0.104	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	PS	**10607647003**	Solid	0.102	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	PS	**10607648001**	Solid	0.109	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	PS	**10607649001**	Solid	0.101	365482 (3)	362590 (9)	365429 (3.6)	30	1*	

Prep Log Report

QC Rule	Sample Type	Lab Sample ID	Matrix	Initial Weight (g)	Aqua Regia (mL)	5% KMnO4 (mL)	12% NH2OH*HCL (mL)	Final Volume (mL)	Sample Notes	MERCURY-SPK (mL)
7471B S_P	PS	**10607649002**	Solid	0.107	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	PS	**10607650001**	Solid	0.104	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	PS	**10607650002**	Solid	0.104	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	PS	**10607650004**	Solid	0.101	365482 (3)	362590 (9)	365429 (3.6)	30	1*	
7471B S_P	PS	**10607650006**	Solid	0.102	365482 (3)	362590 (9)	365429 (3.6)	30	1*	

Sample Notes:

1*: Sample is Attic Dust

Standard Notes:

350870: LCS, MS, MSD Spike Solution

SECTION 5

LABORATORY CASE NARRATIVE AND

CHAIN-OF-CUSTODY RECORD

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

REVISION

SAMPLE SUMMARY

Project: 0643586 RMAP Interior School-Revised Report
Pace Project No.: 10607644

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10607644001	**S-0016-D-FM-01-20220505**	Solid	05/05/22 09:54	05/10/22 08:50
10607644002	**S-0016-D-EB-02-20220505**	Solid	05/05/22 10:22	05/10/22 08:50
10607644003	**S-0016-D-FM-03-20220505**	Solid	05/05/22 10:48	05/10/22 08:50
10607644004	**S-0016-D-FM-03D-20220505**	Solid	05/05/22 11:01	05/10/22 08:50
10607644005	**S-0016-D-FM-04-20220505**	Solid	05/05/22 11:40	05/10/22 08:50

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Method: **EPA 6020B**
Description: 6020B MET ICPMS
Client: BP-ERM-MT
Date: May 17, 2022

General Information:
5 samples were analyzed for EPA 6020B by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3050B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 0643586 RMAP Interior School
Pace Project No.: 10607644

Method: **EPA 7471B**
Description: 7471B Mercury
Client: BP-ERM-MT
Date: May 17, 2022

General Information:
5 samples were analyzed for EPA 7471B by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 7471B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

bp rm

Laboratory Management Program (LaMP) Chain of Custody Record

Soil, Sediment and Groundwater Samples

BP/RM Facility No: MT_Butte Priority Soils

Lab Work Order Number:

Turn Around Time (Days): 5

Chain of Custody: 20220505-0134-PACE_MPLS-S-0016

Lab Name: PACE, INC., MINNEAPOLIS, MN	BP/ARC Facility Address:	Consultant/Contractor: ERM
Lab Address: 1700 Elm Street SE	City, State, ZIP Code: Butte, MT,	Consultant/Contractor Project No: 0643586
Lab PM:	Lead Regulatory Agency:	Address: 1 9th St Island Dr, Livingston, MT 59047
Lab Phone: 612-607-6398	California Global ID No.:	Consultant/Contractor PM: Christopher Berg
Lab Shipping Accnt:	Accounting Information:	Phone: 9167699050 Email: Christopher.Berg@erm.com
Lab Bottle Order No:		Send/Submit EDD to: mcanumc@bp.com; Christopher.Berg@erm.com
Other Info:		Invoice To: mcanumc@bp.com; Christopher.Berg@erm.com
BP/RM PM: Mike Mc Anulty/mcanumc@bp.com	PM Phone: PM Email:	**Report Type & QC Level:**

WO# : 10607644

10607644

Lab No.	Sample Description	Date	Time	Field Matrix	Start Depth	End Depth	Depth Unit	Grab (G) or Composite (C)	Total Number of Containers	Filt	Pres	Analysis	SW6020B (arsenic and lead)	SW7471B (mercury)	
										N		N			
1	S-0016-D-FM-01-20220505	05/05/2022	09:54	SDU				G					X	X	WO1
2	S-0016-D-EB-02-20220505	05/05/2022	10:22	WQ				G					X	X	WO2
3	S-0016-D-FM-03-20220505	05/05/2022	10:48	SDU				G					X	X	WO3
4	S-0016-D-FM-03D-20220505	05/05/2022	11:01	SDU				G					X	X	WO4
5	S-0016-D-FM-04-20220505	05/05/2022	11:40	SDU				G					X	X	WO5

	Relinquished By / Affiliation	Date / Time	Accepted By / Affiliation	Date / Time
Sampler's Name: Rhowe Stefanski, Joe Kmetz				
Sampler's Company: ERM	Rhowe Stefanski / ERM	5/5/2022 1:35:00 PM		5/10/22 850
Ship Method: Overnight Ship Date: 5/5/2022 1:34:00 PM				
Shipment Tracking No: 5150 1597 8836				

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: (Yes) / No | Temp Blank: (Yes) / No | Cooler Temp on Receipt: 0.9 °F/C | Trip Blank: Yes / (No) | MS/MSD Sample Submitted: Yes / (No)

Pace ANALYTICAL SERVICES	**DC#_Title: ENV-FRM-MIN4-0149 v03_Sample Condition Upon Receipt (SCUR) - ESI**
	Effective Date: 04/12/2022

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: bp-ERM

Project #: **WO#: 10607644**

PM: JMA **Due Date: 05/19/22**

CLIENT: BP-ERM-MT

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ SpeeDee ☐ Commercial

Tracking Number: 5150 1597 8836 See Exceptions ☐ ENV-FRM-MIN4-0142

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other: _____ **Temp Blank?** ☒ Yes ☐ No

Thermometer: ☐ T1(0461) ☒ T2(1336) ☐ T3(0459) ☐ T4(0254) ☐ T5(0489) ☐ T6(0235) ☐ T7(0042) **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Dry ☐ Melted

Temp should be above freezing to 6°C **Cooler Temp Read w/temp blank:** 0.9 °C

Correction Factor: TNC **Cooler Temp Corrected w/temp blank:** 0.9 °C

Average Corrected Temp (no temp blank only): _____ °C ☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

USDA Regulated Soil: ☒ N/A, water sample/Other: (SL) **Date/Initials of Person Examining Contents:** MK 5-10-22

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present and Filled Out?	☒ Yes	☐ No		1.
Chain of Custody Relinquished?	☒ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	3.
Samples Arrived within Hold Time?	☒ Yes	☐ No		4.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E coli ☐ BOD/cBOD ☐ Hex Chrome ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other
Rush Turn Around Time Requested?	☒ Yes	☐ No		6.
Sufficient Sample Volume?	☒ Yes	☐ No		
Triple Volume Provided for MS/MSD (if more than 10 samples)?	☐ Yes	☐ No	☒ N/A	7.
Correct Containers Used?	☒ Yes	☐ No		8.
-Pace Containers Used?	☒ Yes	☐ No		
Containers Intact?	☒ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☒ Yes	☐ No		11. If no, write ID/ Date/Time on Container Below: See Exception ☐ ENV-FRM-MIN4-0142
Matrix: ☐ Water ☐ Soil ☐ Oil ☒ Other SL				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☒ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☒ N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS *If adding preservative to a container it must be added to associated field and equipment blanks (verify with PM first)	☐ Yes	☐ No	☒ N/A	Positive for Res. Chlorine? ☐ Yes ☐ No pH Paper Lot# See Exception ☐ ENV-FRM-MIN4-0142
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☒ N/A	13. See Exception ☐ ENV-FRM-MIN4-0140
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☒ N/A	
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	14.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	Pace Trip Blank Lot # (if purchased):

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins					
Opened Time: 1320	Temp: 0.9	Corrected Temp: 0.9	**CLIENT NOTIFICATION/RESOLUTION**	**Field Data Required?** ☐ Yes ☐ No	
Time: 1340	put in cooler		Person Contacted:	Date/Time:	
Time:	Temp:	Corrected Temp:	Comments/Resolution:		

Project Manager Review: [signature] **Date:** 05/10/2022

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: MK 2

BP/RM Facility No: MT_Butte Priority Soils

Lab Work Order Number:

Turn Around Time (Days): **5**

SECTION 6

PROJECT CORRESPONDENCE

From: Jennifer Anderson
To: Amanda Whitney
Cc: Elsie.King@erm.com; AR_Deliverables; Lester Dupes; Connor Firor; Joe Kraycik; Robiana Beegle Renna
Subject: RE: Lab Request: Highland View Christian School (10607644)
Date: Tuesday, May 24, 2022 10:29:10 AM

This sender is trusted.

Good Morning Amanda,

The revised level 2 report and EDD are now posted on PacePort with this correction. The level 4 also completed this morning, it is in the process of loading and will be available on PacePort shortly.

I just loaded the EDD file also and this should be available in the database this morning.

Thank you,
Jennifer

Jennifer Anderson, PMP
Project Manager
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
D: 612.607.6436 | M: 612.248.4446 | pacelabs.com

Pace will be closed on Monday, May 30th in observance of Memorial Day. Please work with your Project Manager to schedule any rush or short hold analyses around this date.

From: Jennifer Anderson
Sent: Monday, May 23, 2022 3:18 PM
To: Amanda Whitney <awhitney@envstd.com>
Cc: Elsie.King@erm.com; AR_Deliverables <AR_Deliverables@envstd.com>; ldupes <ldupes@envstd.com>; Connor Firor <cfiror@envstd.com>; Joe Kraycik <jkraycik@envstd.com>; Robiana Beegle Renna <rbeeglerenna@envstd.com>
Subject: RE: Lab Request: Highland View Christian School (10607644)

Hi Amanda,

I am working on getting these revised.

Thanks!
Jennifer

Jennifer Anderson, PMP
Project Manager
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
D: 612.607.6436 | M: 612.248.4446 | pacelabs.com

Pace will be closed on Monday, May 30th in observance of Memorial Day. Please work with your Project Manager to schedule any rush or short hold analyses around this date.

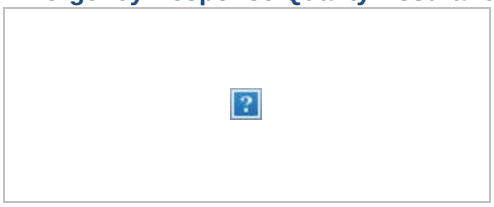
From: Amanda Whitney <awhitney@envstd.com>
Sent: Monday, May 23, 2022 11:38 AM
To: Jennifer Anderson <Jennifer.Anderson@pacelabs.com>
Cc: Elsie.King@erm.com; AR_Deliverables <AR_Deliverables@envstd.com>; ldupes <ldupes@envstd.com>; Connor Firor <cfiror@envstd.com>; Joe Kraycik <jkraycik@envstd.com>; Robiana Beegle Renna <rbeeglerenna@envstd.com>
Subject: Lab Request: Highland View Christian School (10607644)

Good afternoon Jennifer,

In Work Order 10607644, please update the sample collection time to 9:54 AM for sample 10607644001 (S-0016-D-FM-20220505) to match the COC and provide revised deliverables. Thanks!

Amanda Whitney (Harvey)
Quality Assurance Chemist
Environmental Standards, Inc.
1140 Valley Forge Road • PO Box 810 • Valley Forge, PA 19482
610.935.5577 x438 • www.envstd.com • aharvey@envstd.com

Emergency Response Quality Assurance Hotline: 855.374.7272



ENVIRONMENTAL® STANDARDS

Setting the Standards for Innovative Environmental Solutions

LEVEL A/B FIELD DOCUMENTATION SCREENING REVIEW

SILVER BOW CREEK/BUTTE AREA NATIONAL PRIORITIES LIST SITE, BUTTE PRIORITY SOILS OPERABLE UNIT, RESIDENTIAL METALS ABATEMENT PROGRAM PROJECT

DUST SAMPLES COLLECTED ON

MAY 5, 2021

RESIDENT IDENTIFICATION: S-0016

SAMPLE DELIVERY GROUPS: 10607644

MAY 25, 2022

Prepared for:

ATLANTIC RICHFIELD COMPANY
317 Anaconda Road
Butte, MT 59701

Prepared by:

ENVIRONMENTAL STANDARDS, INC.
1140 Valley Forge Road
P.O. Box 810
Valley Forge, PA 19482-0810

INTRODUCTION

This quality assurance (QA) review of field documents is based upon an examination of the data generated during the collection of the field samples on May 5, 2022, as part of the Silver Bow Creek/Butte Area National Priorities List (NPL) Site, Butte Priority Soils Operable Unit, Residential Metals Abatement Program (RMAP) sampling event. This review was performed using guidance from the RMAP Quality Assurance Project Plan Non-Residential Parcels – Indoor Dust (dated February 28, 2022), (QAPP; February 2022), Section 5.1.2.1 Field Data Verification.

The Level A/B review is documented on the checklist below as described in the CFRSSI Data Management/Data Validation (DV/DM) Plan (ARCO, 1992a) and the CFRSSI DM/DV Plan Addendum (AERL, 2000), and will be used in the verification process for field documentation related to samples collected for laboratory analyses.

Data that meet the Level A and Level B criteria and are not qualified as estimated or rejected during the analytical data validation process are assessed as enforcement quality data and can be used for all Superfund purposes and activities. Data that meet only the Level A criteria and are not rejected during the data validation process can be assessed as screening quality data. Screening quality data can be used only for certain activities, which include engineering studies and design. Data that do not meet the Level A and/or B criteria and/or are rejected during the data validation process are designated as unusable. The determination of enforcement quality data and screening quality data will be made in conjunction with the data validation report and qualified based on the requirements of Section 5.3 of the QAPP. Identification of enforcement, screening or unusable data will be added to the electronic data deliverables.

SECTION 1 LEVEL A/B FIELD DOCUMENTATION SCREENING REVIEW

1. General Information

Site: Highland View Christian School (S-0016)
Project: Residential Metals Abatement Program
Client: Atlantic Richfield Company
Sample Matrix: Dust

2. Screening Result

Data are:

Unusable ☐
Level A ☒
Level B ☒

3. Level A Criteria: The following must be fully documented

Criteria		Comments
Sampling date	Yes ☒ No ☐	Recorded in Logbook ☒ COC ☒ Bottle Labels ☒
Sampling team or leader name	Yes ☒ No ☐	Recorded in Logbook ☒ COC ☒
Physical description of sampling location	Yes ☒ No ☐	Recorded in Logbook ☒ Field Forms ☒ Photo Log ☒
Sample collection depth (soils)	Yes ☐ No ☐ N/A ☒	Recorded in Logbook ☐ Field Forms ☐
Sample collection technique	Yes ☒ No ☐	Collected in accordance with the SOPs in Appendix B of QAPP Yes ☒ No ☐
Field preparation technique	Yes ☒ No ☐	Collected in accordance with the SOPs in Appendix B of QAPP Yes ☒ No ☐
Sample preservation technique	Yes ☒ No ☐	Dust samples for arsenic, lead and mercury analysis submitted on ice? Yes ☒ No ☐
Sample shipping records	Yes ☒ No ☐	Did sample arrive at < 6°C but not frozen (mercury analysis)? Yes ☒ No ☐ 0.9°F Reported (corrected) temperature

4. Level B Criteria – The following must be fully documented.

Criteria		Comments
Field instrumentation methods and standardization complete.	Yes ☒ No ☐	Field equipment calibrated if used? Yes ☒ No ☐
Sample container preparation	Yes ☒ No ☐	Air sampling cassettes provided by ERM. Unpreserved bottles provided by laboratory and lot number tracked? Yes ☒ No ☐
Collection of field duplicates (1/20 minimum)	Yes ☒ No ☐	.
Sampling equipment decontamination	Yes ☒ No ☐	Dedicated sampling equipment decontaminated per QAPP Yes ☒ No ☐
Field custody documentation	Yes ☒ No ☐	COC complete and signed (performed during SCUR review) Yes ☒ No ☐
Shipping custody documentation	Yes ☒ No ☐	Custody Seals applied to sample shipment cooler (performed during SCUR review) Yes ☒ No ☐ Custody Seals intact (performed during SCUR review) Yes ☒ No ☐
Traceable sample designation number	Yes ☒ No ☐	Sample IDs in Logbook match COC? Yes ☒ No ☐
Field logbook(s), custody records in secure repository	Yes ☒ No ☐	All notes are complete in a PDF Yes ☒ No ☐ Secure repository under RMAP protocols
Completed field forms	Yes ☒ No ☐	Are field forms, complete, legible, and signed? Yes ☒ No ☐

5. Authorization of Field Documentation Screening Review

Report prepared by: Connor Firor, Staff Geoscientist III
Report reviewed by: Lester J. Dupes, CEAC Senior Quality Assurance Chemist
Report approved by: Lester J. Dupes, CEAC, Senior Quality Assurance Chemist
Report approved by: Rock J. Vitale, CEAC, Technical Director of Chemistry/Principal
Date: 5/25/2022

SECTION 2 ENFORCEMENT/SCREENING DEFINITIONS

E Enforcement quality. No qualifiers, U qualifier or J qualifier (see note below) and meets Level A and B criteria.

S Screening quality. J or UJ qualifier and/or meets only Level A criteria.

R Unusable. R qualifier and/or does not meet Level A or B requirements.

Enforcement/Screening Designation

	Meets Level A and B	Meets Level A	Does not meet Level A or B
No qualifier, A, U, or laboratory results reported between the MDL and RL with a J qualifier	E	S	R
J, J+, J-, or UJ	S	S	R
R	R	R	R

Note: It is appropriate to note that sample results qualified as estimated "J" by the laboratory because the reported result is between the MDL and RL, values are considered enforcement data if no other qualifiers were required during validation.

SECTION 3

ERM FIELD DATA SUPPORT DOCUMENTATION

RMAP FIELD SAMPLE DATA SHEET (FSDS) FOR HVS3 FLOOR DUST

Project Name/Number: Butte RMAP Indoor Dust / 0643586
Location: Butte, Montana
School: HIGHLAND VIEW CHRISTIAN SCHOOL
Group #: 1

Sampling Date: 05-MAY-2022
Field Logbook No: 1
Page No: 11-12

Sampling Team: (ERM) Other _____ Name(s): JOSEPH KMETZ & RHOWE STEFANSKI

Data Item	1	2	3
Sample ID	S-0016-D-FM-01-20220505	S-0016-D-EB-02-20220505	S-0016-D-FM-03-20220505
Bottle Lot #	032221-1KM	032221-1KM	032221-1KM
Sample Category (circle)	(FS-(Field Sample)) FD-(Field Duplicate) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))	FS-(Field Sample) FD-(Field Duplicate) FB-(Field Blank) (EB-(Equipment Blank)) MS/MSD-(Matix Spike/(duplicate))	(FS-(Field Sample)) FD-(Field Duplicate) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))
Sample Parent ID (if a duplicate sample)	N/A	N/A	N/A
Location Description (e.g., room number, etc.)	DECISION UNIT 1 SOUTH-EAST ACCESS DOOR	N/A	DECISION UNIT 1 SOUTH-WEST ACCESS DOOR
Location Floor (circle)	Basement, (Ground/Main Floor,) 1st Floor, 2nd Floor, 3rd Floor Other_____	Basement, Ground/Main Floor, 1st Floor, 2nd Floor, 3rd Floor Other N/A	Basement, (Ground/Main Floor,) 1st Floor, 2nd Floor, 3rd Floor Other_____
Floor Type (circle)	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, (Floor Mat) Other: _____	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, Floor Mat Other: N/A	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, (Floor Mat) Other: _____
Approximate Sample Area (include units)	15 SF	N/A	15 SF
Date Last Vacuumed/ Cleaned	NOT CLEANED SINCE INSTALLED	N/A	NOT CLEANED SINCE INSTALLED
Photo ID	0007, 0008	0009	0010
HVS3 Vacuum ID No.	VAC B SN 2006	VAC B SN 2006	VAC B SN 2006
Leak Check? (circle)	(Yes) No	N/A Yes No	(Yes) No
20 sec cleaning @ end? (circle)	(Yes) No	N/A Yes No	(Yes) No
Total Sample Time	9.5 4K 5/5/22 minutes	N/A minutes	8 minutes
Flow Drop	5 inches of water	N/A inches of water	5 inches of water
Nozzle Drop	10 inches of water	N/A inches of water	10 inches of water
Final Weight	128.85 grams	131.32 grams	137.18 grams
Tare Weight	126.46 grams	126.24 grams	124.93 grams
Net Weight (Final - Tare)	2.39 grams	5.08 grams	(*) 6.04 ~~42.25~~ grams 4K 5/5/22
Decon Time	09:30	10:12	10:12 / 10:28 (CYCLONE)
Comments	SAMPLE COLLECTION TIME = 09:54	COLLECTED EB BY POURING GLASS BEADS THROUGH VAC B CYCLONE @ 10:22	SAMPLE COLLECTED @ 10:48 (*) TRANSFERRED 6.21 g TO FIELD DUPLICATE

Lab: Pace Analytical Container: HVS3 Catch Bottle = 250 mL LDPE; Transfer to 4 oz. glass jar

For Field Team Completion (Initials)	Completed by: QC by: RS

RMAP FIELD SAMPLE DATA SHEET (FSDS) FOR HVS3 FLOOR DUST

Project Name/Number: Butte RMAP Indoor Dust / 0643586
Location: Butte, Montana
School: HIGHLAND VIEW CHRISTIAN SCHOOL
Group #: 1

Sampling Date: 05-MAY-2022
Field Logbook No: 1
Page No: 12

Sampling Team: (ERM) Other _____ Name(s): JOE KMETZ & RHOWE STEFANSKI

Data Item	1	2	3
Sample ID	S-0016-D-FM-03D-20220505	S-0016-D-FM-04-20220505	
Bottle Lot #	022122-1KM	032221-1KM	
Sample Category (circle)	FS-(Field Sample) (FD-(Field Duplicate)) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))	(FS-(Field Sample)) FD-(Field Duplicate) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))	FS-(Field Sample) FD-(Field Duplicate) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))
Sample Parent ID (if a duplicate sample)	S-0016-D-FM-03 20220505	N/A	
Location Description (e.g., room number, etc.)	DECISION UNIT 1 SOUTH-WEST ACCESS DOOR	Decision Unit 1 North access door	
Location Floor (circle)	Basement, (Ground/Main Floor,) 1st Floor, 2nd Floor, 3rd Floor Other_____	Basement, (Ground/Main Floor,) 1st Floor, 2nd Floor, 3rd Floor Other_____	Basement, Ground/Main Floor, 1st Floor, 2nd Floor, 3rd Floor Other_____
Floor Type (circle)	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, (Floor Mat) Other: _____	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, (Floor Mat) Other: _____	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, Floor Mat Other: _____
Approximate Sample Area (include units)	15 SF	15 SF	
Date Last Vacuumed/ Cleaned	NOT CLEANED SINCE INSTALLED	Not cleaned since Installed	
Photo ID	0010	0011	
HVS3 Vacuum ID No.	VAC B SN 2006	Vac B SN 2006	
Leak Check? (circle)	(Yes) No	(Yes) No	Yes No
20 sec cleaning @ end? (circle)	(Yes) No	(Yes) No	Yes No
Total Sample Time	8 minutes	3 minutes	_____ minutes
Flow Drop	5 inches of water	5 inches of water	_____ inches of water
Nozzle Drop	10 inches of water	10 inches of water	_____ inches of water
Final Weight	134.26 grams	131.62 grams	_____ grams
Tare Weight	128.05 grams	125.74 grams	_____ grams
Net Weight (Final - Tare)	6.21 grams	5.88 grams	_____ grams
Decon Time	10:12/10:28 (CYCLONE)	11:15/H:~~40~~ SHAKES CYCLONE	
Comments	SAMPLE TIME= 11:01	Sample time 11:40	

Lab: Pace Analytical Container: HVS3 Catch Bottle = 250 mL LDPE; Transfer to 4 oz. glass jar

For Field Team Completion (Initials) Completed by: JK RS QC by: RS

INCH

1

2

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2022

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Projects BUTTE RMAP
PN: 0643586

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BUTTE RMAP (10) J. KMETZ / R. STEFANSKI
04-MAY-2022 40°F / SUNNY

THROUGH VAC B CYCLONE
(S-0020-D-EB-03-20220504)

1657 DECONNED VAC B CYCLONE

1708 LEAK TESTED VAC-B
RESULT 0.01 in H_2O

1712 COLLECTED FLOOR MAT
SAMPLE @ NORTH ACCESS DOOR
(S-0020-D-FM-04-20220504)
ONLY GOT 0.10 grams

1735 LEFT SMALL WORLD DAY CARE

1750 ARRIVED @ HOTEL
ADDED ICE TO SAMPLES, COPIED
NOTES & DATA SHEETS &
DOWNLOADED PHOTOS

04-MAY 2022

Scale: 1 square = 2/2

5/4/22

BUTTE RMAP (11) J. KMETZ / R. STEFANSKI
05-MAY-2022 40°F / SUNNY

0730 HELD FIELD SAFETY MTG
AND DISCUSSED LOGISTICS

0830 DROPPED OFF EXTRA EQUIP
@ U-HAUL STORAGE
UNIT: AA1036P
LOCK COMBO: PORK

0925 ARRIVED @ HIGHLAND VIEW CHRISTIAN SCHOOL

0930 DECONNED VAC B SN 2006

0951 LEAK TESTED VAC B
RESULT 0.00 in H_2O

0954 COLLECTED FLOOR MAT SAMPLE
@ SOUTH-EAST ACCESS DOOR
(S-0016-D-FM-01-20220505)

1012 DECONNED VAC B

~~LEAK TESTED VAC B~~ ~~RESULT 1" H_2O~~ 5/5/22

1022 COLLECTED EQUIPMENT BLANK
THROUGH VAC B CYCLONE
(S-0016-D-EB-02-20220505)

1028 DECONNED VAC B CYCLONE

1035 LEAK TESTED VAC B
RESULT 0.00 in H_2O

1048 COLLECTED FLOOR MAT SAMPLE @
SOUTH-WEST ACCESS DOOR →

Scale: 1 square

5/5/22

Rite in the Rain

BUTTE RMAP (12) J.KMETZ/R.STEFANSKI
05-MAY-2022 60°F/PC

(CONT'D) SOUTH-WEST ACCESS DOOR
FLOOR MAT SAMPLE
(S-0016-D-FM-03-20220505)
SINCE WE HAD 12.25 grams WE
TRANSFERRED 6.21 grams TO
ANOTHER BOTTLE AS A FIELD DUP

1101 FIELD DUPLICATE OF FLOOR
MAT SAMPLE S-0016-D-FM-03-20220505
(S-0016-D-FM-03D-20220505)

1115 DECONNED VAC B
LEAK TESTED VAC B
RESULT 0.00 in H_2O

1140 Collected floor mat sample @
North door. (S-0016-D-FM-04-20220505)

1200 ~~5/4/22~~ 5/4/22 as Left site after collecting all
samples.

5/5/22

Scale: 1 square = 5/5/22

BUTTE RMAP (13) J.KMETZ/R.STEFANSKI
05-MAY-2022 60°F/OVERCAST

1500 ARRIVED @ SWARE EARLY HEAD START
1510 DECONNED VAC B
1530 LEAK TESTED VAC B
RESULT 0.00 in H_2O
1535 COLLECTED FLOOR MAT SAMPLE
@ NORTH ACCESS DOOR
(S-0019-D-FM-01-20220505)
SINCE WE COLLECTED 6.38gms
WILL USE AS MS/MSD
1550 DECONNED VAC B
1613 LEAK TESTED VAC B
RESULT 0.00 in H_2O
1615 COLLECTED FLOOR MAT SAMPLE
@ WEST ACCESS DOOR
(S-0019-D-FM-02-20220505)
1627 DECONNED VAC B
1651 LEAK TESTED VAC B
RESULT 0.00 in H_2O
1656 COLLECTED FLOOR MAT SAMPLE
@ EAST ACCESS DOOR
(S-0019-D-FM-03-20220505)
* NIC PISCIOTTA FROM CDM SMITH
WAS AT THE SCHOOL FOR ALL OF
THE SAMPLING
1730 LEFT SCHOOL; PUT SAMPLES ON ICE

Scale: 1 square = 5/5/22

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INCH

1

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3

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5

6

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Email joseph.kmetz@erm.com

Projects BUTTE RMAP
PN: 0643586

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BUTTE RMAP (6) J.KMETZ/C.BERG
26-APR-2022 50°F/M CLOUDY

SMALL WORLD DAY CARE

PHOTO	DESC
0005	SOUTH ACCESS DOOR
0006	NORTH " "

1030 LEFT SITE

1039 ARRIVED @ HIGHLAND VIEW CHRISTIAN SCHOOL @ MET WITH DIANE

1050 PLACED FLOOR MATS @
(1) SOUTH-EAST ACCESS DOOR
(2) " WEST ACCESS DOOR
(3) NORTH ACCESS DOOR

PHOTO	DESC
0007	SOUTH-EAST ACCESS DOOR
0008	" -WEST " "
0009	NORTH ACCESS DOOR

DIANE SAID LUNCHTIME (12:00) OR AFTER 3:00 WORKS FOR SAMPLING BUT ASKED THAT WE CONTACT HER TO COORDINATE

1115 LEFT SITE AND WENT TO EAT LUNCH AND RESEARCH STORAGE FACILITIES FOR FIELD EQUIPT

4/26/22

4/26/22

2/4 scale: 1 square = _____

BUTTE RMAP (7) J.KMETZ/C.BERG
26-APR-2022 50°F/M.CLOUDY

1335 ARRIVED @ SILVER BOW MONTESSORI AND MET WITH BRIANNA PEET

1345 PLACED FLOORMATS @
(1) NORTH BLDG SOUTH DOOR
(2) WEST CLASSROOM SOUTH-WEST DOOR
(3) " " "-EAST "
(4) CLASSROOM NORTH-EAST DOOR
(5) " " -WEST "

BASED ON DISCUSSION WITH BRIANNA, WE RELOCATED THE FLOOR MAT LOCATION FROM THE EAST SIDE OF THE MAIN CLASSROOM TO THE NORTH-WEST ENTRANCE SINCE THEY DO NOT USE THE EAST ENTRANCE BUT KIDS USE THE NW ENTRANCE TO ACCESS BATHROOM FROM PLAYGROUND

PHOTO	DESC
0010	NORTH BLDG SOUTH DOOR
0011	WEST CLASSROOM SW DOOR
0012	" " SE "
0013	CLASSROOM NE DOOR

3/4 scale: 1 square = _____

4/26/22


PLEASE DO NOT CLEAN FLOOR MAT - THANKS
PLEASE DO NOT CLEAN FLOOR MAT - THANKS
2022. 5. 5 10:00


Classroom 102
Fellowship Hall
Library
Classroom 101
Kitchen
Mens
Womens
Vestibule
Storage
Stairs
Closet
Janitor
SW ACCESS DOOR
SERVICE DOOR
NORTH
Legend
Floor Surface Sample
Floor Mat Sample
Inaccessible Area
Decision Unit 1
Notes
Room ID's reflect verbiage used on site maps provided by Butte School District
N
0
10
20
Feet
Figure 4
Highland View Christian School
Site Map
2500 Grand Ave
Butte, MT 59701
Environmental Resources Management
www.erm.com
ERM

2022. 5. 5 10:13

2022. 5. 5 10:27

PLEASE DO NOT CLEAN FLOOR MAT

PLEASE DO NOT CLEAN FLOOR MAT

PLEASE DO NOT CLEAN FLOOR MAT - THANKS

EASE DO NOT CLEAN FLOOR MAT - THANKS

2022. 5. 5 11:39

HIGHLAND VIEW CHRISTIAN SCHOOL
DECISION UNIT 1
SOUTH-EAST
ACCESS DOOR
26-APR-2022

PLEASE DO NOT CLEAN FLOOR MAT THANKS

PLEASE DO NOT CLEAN FLOOR MAT - THANKS

2022.4.26 10:58


CHOICES
SCHOOL
DECISION UNIT 1
SOUTH-WEST
ACCESS DOOR
26-APR-2022
PLEASE DO NOT CLEAN FLOOR MAT
PLEASE DO NOT CLEAN FLOOR MAT
2022. 4. 26 11:04

HIGHLAND VIEW CHRISTIAN SCHOOL
DECISION UNIT 1
NORTH
ACCESS DOOR
26-APR-2022

PLEASE DO NOT CLEAN FLOOR MAT - THANKS

PLEASE DO NOT- CLEAN FLOOR MAT - THANKS

2022.
4.26 11:14

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STAGE 2B QUALITY ASSURANCE REVIEW

SILVER BOW CREEK/BUTTE AREA NATIONAL PRIORITIES LIST SITE, BUTTE PRIORITY SOILS OPERABLE UNIT, RESIDENTIAL METALS ABATEMENT PROGRAM PROJECT

DUST SAMPLES COLLECTED ON

JUNE 22, 2022

RESIDENT IDENTIFICATION: S-0016

SAMPLE DELIVERY GROUP: 10614861

August 25, 2022

Prepared for:

ATLANTIC RICHFIELD COMPANY
317 Anaconda Road
Butte, MT 59701

Prepared by:

ENVIRONMENTAL STANDARDS, INC.
1140 Valley Forge Road
P.O. Box 810
Valley Forge, PA 19482-0810

TABLE OF CONTENTS

INTRODUCTION

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the samples collected on June 22, 2022, as part of the Silver Bow Creek/Butte Area National Priorities List (NPL) Site, Butte Priority Soils Operable Unit, Residential Metals Abatement Program (RMAP) sampling event. The samples that have undergone a rigorous QA review are listed on Table 1. Table 1 also presents the laboratory sample number, collection date, matrix, parameter(s) examined, and the review level for each sample. Stage 2B review includes an evaluation of data package completeness and review of the summary forms provided (raw data are not reviewed).

This review was performed with guidance from the RMAP Quality Assurance Project Plan Non-Residential Parcels – Indoor Dust (QAPP; February 28, 2022); the "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use," (US EPA, January 2009); and the "National Functional Guidelines for Inorganic Superfund Methods Data Review," (US EPA, January 2020). The National Functional Guidelines validation guidance documents specifically address analyses performed in accordance with the Contract Laboratory Program (CLP) analytical methods and are not completely applicable to the type of analyses and analytical protocols performed for the SW-846 methods utilized by the laboratory for these samples. Environmental Standards, Inc. (Environmental Standards) used professional judgment to determine the usability of the analytical results and compliance relative to the methods utilized by the laboratory.

The reported analytical results are presented as qualified electronic data deliverables (EDDs). Any required data validation qualifications have been annotated on the associated EDDs. Data were examined to determine the usability of the analytical results and compliance relative to the method requirements specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition" (SW-846) Methods 6020B and 7471B. This report was prepared to provide a critical review of the laboratory analyses and reported analytical results. Rigorous QA reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories. The data qualifications allow the data end-user to best understand the usability of the analytical results. Data not qualified in this report should be considered valid based on the quality control (QC) criteria that have been reviewed and be considered enforcement quality if the data also passed Level A and Level B field documentation quality assessment as detailed in the QAPP. Details of this QA review are presented in Section 1 of this report.

TABLE 1

SAMPLES INCLUDED IN THIS QUALITY ASSURANCE REVIEW

Field Sample Name	Laboratory Sample Number	Sample Delivery Group	Collection Date	Parameters Examined
S-0016-D-F-01-20220622	10614861001	10614861	6/22/22	M, Hg
S-0016-D-F-01D-20220622 (Field Duplicate of S-0016-D-F-01-20220622)	10614861002	10614861	6/22/22	M, Hg
S-0016-D-EB-01-20220622 (Equipment Blank)	10614861003	10614861	6/22/22	M, Hg

NOTES:

M - Total Lead and Arsenic by SW-846 Method 6020B.
Hg - Total Mercury by SW-846 Method 7471B.

SECTION 1 QUALITY ASSURANCE REVIEW

The dust samples were collected on June 22, 2022, as part of the Silver Bow Creek/Butte Area NPL Site, Butte Priority Soils Operable Unit, RMAP sampling event. The samples were collectively shipped in iced coolers to Pace of Minneapolis, Minnesota and analyzed for lead and arsenic by inductively coupled plasma/mass spectrometry (ICP/MS) for digestion and analysis by SW-846 Method 6020B. The dust samples were also analyzed for mercury by Cold Vapor Atomic Absorption (CVAA), for wet digestion and analysis by SW-846 Method 7471B. The specific samples and analyses reviewed are identified on Table 1.

The findings in this QA review are based upon a review of sample holding times, condition of samples upon laboratory receipt, blank analysis results, laboratory matrix spike sample (LMS) results, laboratory control sample (LCS) results, laboratory and field duplicate results, initial and continuing calibrations, sample preparation, reporting limit (RL) standard results, interference check sample results, post-digestion spike results, serial dilution results, internal standard performance, instrument sensitivity, analytical sequence. Any required data validation qualifications are annotated in the qualified EDD as defined in Section 3.

Issues are typically presented in two categories – deliverable issues and procedural issues. Deliverable issues are data issues that can easily be corrected and that may or may not impact the usability of the reported results. Procedural issues are issues that cannot be corrected and address method compliance issues; these issues may or may not impact the usability of the reported results. Comments address issues for which the data reviewer has provided information in order to clarify issues relating to the data; comments do not typically impact the usability of the reported results. The data reviewer has edited the laboratory-reported data and QC summary forms based on the issues and comments in this QA review. Furthermore, the data reviewer has included copies of all relevant raw data, QC forms, and other documentation needed to support these edits in the Inorganic Data Support Documentation (Section 4) of this report.

Deliverable Review

- Deliverable issues were not observed for the data in this QA review.

Procedural Review

- Procedural issues were not observed for the data in this QA review.

Comments

- Comments were not observed for the data in this QA review.

With regard to data usability, the principal areas of concern are field duplicate imprecision. Based upon a complete review of the data package provided, the following qualifiers are offered. The following data usability issues represent an interpretation of the QC results obtained for the project samples. Quite often, data qualifications address issues relating to

sample matrix problems. Similarly, the data validation guidelines routinely specify areas of the data that require qualification, yet the methods used for analysis may not require corrective action by the laboratory. Accordingly, the following data usability issues should not be construed as an indication of laboratory performance.

SECTION 2 DATA VALIDATION CHECKLIST FOR METALS SAMPLE ANALYSIS

1. Holding Times

Analyte	Laboratory	Matrix	Method	Holding Times*	Collection Date	Batch	Analysis Date	Holding Time Met (Y/N)	Affected Data Flagged (Y/N)
Lead and Arsenic	Pace – Minneapolis, MN	Dust	SW-846 Method 6020B	6 months from sample collection	6/22/22	826243	7/11/22	Y	N/A
Mercury	Pace – Minneapolis, MN	Dust	SW-846 Method 7471B	28 days from sample collection	6/22/22	826328	7/6/22	Y	N/A

*Reference for Holding Times – Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition" (SW-846) Methods 6020B and 7471B and Chapter 3

Were any data flagged because of holding time? Yes ☐ No ☒
Were any data flagged because of preservation problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

2. Instrument Calibration

Was the Tune analysis performed? Yes ☒ No ☐
Were the peak widths and resolution of the masses within the required control limits? Yes ☒ No ☐
Was the percent relative standard deviation ≤ 5% for all analytes in the Tune solutions? Yes ☒ No ☐
Was the Instrument successfully calibrated at the correct frequency? Yes ☒ No ☐
Was the Instrument calibrated with appropriate standards and blanks? Yes ☒ No ☐
Were Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples analyzed? Yes ☒ No ☐
Were ICV and CCV results within the control window? Yes ☒ No ☐
Were any data flagged because of calibration problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

3. Blanks

Were Initial and Continuing Calibration Blanks (ICB and CCBs) analyzed? Yes ☒ No ☐
Were ICBs and CCBs within the control window? Yes ☒ No ☐
Were Method Blanks (MBs) analyzed at the frequency of 1 per analytical batch? Yes ☒ No ☐
Were MBs within the control window? Yes ☒ No ☐
Were any data flagged because of blank problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

4. Interference Check Samples

Were ICP/MS Interference Check Samples (ICS) within the control limits? Yes ☒ No ☐
Were any data flagged because of ICS problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Information provided in the data package(s) was insufficient to permit assessment of the potential for molecular or other interferences or the adequacy of corrections for such interferences. The fact that the analysis was performed with an instrument that includes collision cell technology reduces the likelihood of significant interference if one or more of the potentially interfering elements were present. The data user should consider this information when determining the ultimate use of the reported results.

5. Laboratory Control Samples

Were Laboratory Control Samples (LCS) analyzed at the frequency of 1 per batch?
Yes ☒ No ☐
What was the source of the LCS?
Metals: 342946 and 336132
Mercury: 370133
Were LCS results within the control window? Yes ☒ No ☐
Were any data flagged because of LCS problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

6. Duplicate Sample Results

Were Laboratory Duplicate Samples (LDS) analyzed at the frequency of 1 per batch?
Yes ☒ No ☐

Were LDS results within the control window? Yes ☒ No ☐
Were any data flagged because of LDS problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

7. Matrix Spike/Matrix Spike Duplicate/Post Digestion Spike Sample Results

Were LMS analyzed at the frequency of 1 per batch? Yes ☒ No ☐
Were LMS percent recovery (%R) results within the control window? Yes ☒ No ☐ N/A ☐
Were any data flagged because of LMS problems? Yes ☐ No ☒ N/A ☐
Was a Post Digestion Spike (PDS) performed? Yes ☒ No ☐
Were PDS percent recovery (%R) results within the control window? Yes ☒ No ☐
Were any data flagged because of PDS problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

8. ICP/MS Serial Dilutions

Were ICP/MS Serial Dilutions (SD) analyzed at the frequency of 1 per batch? Yes ☒ No ☐
Were SD percent differences (%D) results within the control window? Yes ☒ No ☐
Were any data flagged because of SD problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

9. Internal Standards

Were internal standards added to each sample in the analytical batch? Yes ☒ No ☐
Were the percent relative recoveries (%RI) within the control window? Yes ☒ No ☐
Were any data flagged because of internal standard problems? Yes ☐ No ☒

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

10. Field Blanks

Were field blanks submitted as specified in the Sampling Analysis Plan (SAP)?

Yes ☒ No ☐ N/A ☐
Were field blanks within the control window? Yes ☒ No ☐ N/A ☐
Were any data qualified because of field blank problems? Yes ☐ No ☒ N/A ☐

Describe Any Actions Taken: No actions were required.

Comments: Qualification of data was not warranted.

A field blank was not submitted with this data set; however, an equipment blank had been collected on June 22, 2022. Section 10 was completed in regard to the equipment blank.

11. Field Duplicates

Were field duplicates submitted as specified in the Sampling Analysis Plan (SAP)?
Yes ☒ No ☐ N/A ☐
Were the field duplicates within the control window? Yes ☐ No ☒ N/A ☐
Were any data qualified because of field duplicate problems? Yes ☒ No ☐ N/A ☐

Describe Any Actions Taken:

Analyte	SDG	Samples with Estimated Results ("J")
mercury	10614861	S-0016-D-F-01-20220622 and S-0016-D-F-01D-20220622

Comments: The reported positive results for mercury in the samples listed above should be considered estimated and have been flagged "J" in the qualified EDD. Field duplicate imprecision (the difference between results was > 2× the RL when at least one result was < 5× the RL) was observed in the associated field duplicate analysis.

12. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Yes ☐ No ☒

Comments:

- Data that meet the Level A and Level B criteria in the field documentation quality assessment as detailed in the QAPP, and not qualified as estimated or rejected during the data validation process, are considered enforcement-quality data and can be used for all Superfund purposes and activities. Data that meet only the Level A criteria and are not rejected during the data validation process can be considered screening-quality data in accordance with Section 5.3 of the QAPP. Level A and Level B acceptance of these data are documented in a separate report.

Complete support documentation for this inorganic QA review is presented in Section 4 of this report. The cover sheet for this section is a checklist of all QA procedures required by the

protocol and examined in this data review.

The analytical data completeness (defined as the percentage of usable data) for the samples included in this QA review is 100%.

13. Authorization of Data Validation

Report prepared by: Alyssa M. Reed, Senior Quality Assurance Chemist
Report reviewed by: Andrew L. Piasecki, Senior Quality Assurance Chemist
Report approved by: Lester J. Dupes, CEAC, Senior Quality Assurance Chemist
Report approved by: Rock J. Vitale, CEAC, Technical Director of Chemistry/Principal
Date: 8/25/22

SECTION 3 DATA VALIDATION QUALIFIER DEFINITIONS

U	The result is qualified as non-detect due to the detection of the analyte in an associated QC blank.
J	The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample. This will also include results reported between the MDL and RL.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was not detected above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
No Flag	Result accepted without qualification.

RMAP REASON CODES

1	Holding time violation
2	Method blank contamination
3	Surrogate recovery
4	Matrix spike/matrix spike duplicate recovery
5	Matrix spike/matrix spike duplicate precision outside limits
6	Laboratory control sample recovery
7	Field blank contamination
8	Field duplicate precision outside limits
9	Other deficiencies (including cooler temperature)
A	Absence of supporting QC
S	ICV, CCV, or column performance check problem
Y	Initial and continuing calibration blank problem
M	Interference check samples problem
O	Post-digestion spike outside of 75-125%
F	MSA correlation coefficient < 0.995, or MSA not done
G	Serial dilution problem
K	DFTPP or BFB tuning problem
Q	Initial calibration problem
X	Internal standard recovery problem
V	Second-source standard calibration verification problem
L	Low bias
Z	Retention time problem
N	Counting time error (radionuclide chemistry)
W	Detector instability (radionuclide chemistry)
C	Co-elution of compounds
E	Value exceeds linear calibration range
I	Interferences present during analysis
T	Trace-level compound, poor quantitation
P	1C/2C precision outside of limits
B	LCS/LCSD precision outside limits
D	Lab Dup/Rep precision outside limits
H	High Bias

SECTION 4

INORGANIC DATA SUPPORT DOCUMENTATION

ENVIRONMENTAL STANDARDS

INORGANIC ANALYSIS SUPPORT DOCUMENTATION

Client Name:	Atlantic Richfield	EnvStd Project Manager:	Lester Dupes
Site/Project Name:	2022 RMAP DV and DM	Reviewed by:	Alyssa Reed
Job Number/Task/Subtask:	20229825.A000	Approved by:	Andrew Piasecki
Laboratory/Location:	Pace Minneapolis	Completion Date:	8/2022
SDG:	10614861	Validation Level:	2B
Sample Collection Dates:	6/22/22		

The following table indicates criteria that were examined, the identified problems, and support documentation attachments.

Criteria Examined in Detail **Note:** All items examined have been included in the Support Document unless otherwise noted.	**Problems Identified**

Check (√) if Yes or Footnote Letter for Comments Below

Parameter/ Method	Metals	Mercury						Metals	Mercury					
Condition upon Receipt	√	√												
Sample Preservation	√	√												
Holding Times	√	√												
Blank Analysis Results	√	√												
Laboratory Control Sample	√	√												
Matrix Spike (Pre-Digestion Spike)	√	√												
Laboratory Duplicate	√	√												
Field Duplicate	√	√							√					
Total *vs.* Dissolved Results Comparison														
Sample Preparation	√	√												
Mass Tuning	√													
Initial Calibrations	√	√												
Continuing Calibrations	√	√												
Detection Limit/Reporting Limit Standards	√	√												
Negative Bias														
Interference Checks	√													
Post-Digestion Spike	√													
Serial Dilution	√													
Analytical Sequence	√	√												
Linear Range Analysis	√	√												
Interelement Correction Factors														
Detection Limit/Sensitivity	√	√												
Dilutions	√													
Internal Standard Performance	√													
Quantitation of Results														
Multiple Exposures %RSD														
Percent Solids														
Deliverable was Complete	√	√												
Others:														

Comments: Quantitation of Results and Multiple Exposures are not included in the Support Documentation unless a problem was identified.

BLANK ANALYSIS RESULTS FOR INORGANIC PARAMETERS

	Blank Type									
	Method									
Matrix (Aq., S.)	ICB	CCB	Prep.	Trip	Equip	Field	Blank Sample Number	Contaminant	Concentration (µg/L, mg/L, µg/kg, mg/kg)	Qualification limit (5×)
								< MDL; no contaminants		

Aq = Aqueous; S = Solid

Notes:

ENVIRONMENTAL STANDARDS, INC.
EVALUATION OF DUPLICATE RESULTS

Matrix: ○ Aqueous ◉ Non-aq.
Reporting Level: ◉ MDL ○ QL
Units: mg/kg

PRECISION OBJECTIVES:
If Both Results ≥ 5 × Their QL, RPD ≤: 35
If Either Result < 5 × Its QL, Dif. ≤: 2 **× Highest QL**

Sample ID:	S-0016-D-F-01-20220622				**Duplicate Sample ID:**	S-0016-D-F-01D-20220622					
Analyte	**Sample Concentration**	**Qual**	**QL**	**MDL**	**Duplicate Concentration**	**Qual**	**QL**	**MDL**	**Difference**	**RPD**	**Flag**
Arsenic	21.2		2.3	0.51	20.1		2.3	0.51	NA	5%	
Lead	62.6		2.3	0.14	57.1		2.3	0.14	NA	9%	
Mercury	0.036		0.020	0.0085	0.085		0.019	0.0080	0.049	NA	J

NOTES:

Qual: Qualifier(s) based on evaluation(s) other than Total/ vs. Dissolved comparison, if applicable (J, U, U* or B)
RPD: Relative Percent Difference
QL: Quantitation Limit
MDL: Method Detection Limit
RL: Reporting Limit. RL = QL for QL reporting and MDL for MDL reporting
J: The analyte concentration should be considered estimated
U: The analyte was not detected in the sample at or above the RL indicated. The RL will be used for comparison purposes.
UJ: The analyte was not detected in the sample at or above the Reporting Limit Indicated. The RL is approximate.
R: The analyte was analyzed for and detected, but sample results are unreliable. The presence or absence of the analyte cannot be verified.
UR: The analyte was analyzed for and not detected, but the determination that the analyte was not present in the sample is unreliable. The presence or absence of the analyte cannot be verified.
U* The result was blank qualified. The RL will be used for comparison purposes.
NA: The MDL (for QL reporting), RPD or Difference is not applicable

Comments:

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Sample: S-0016-D-F-01-20220622 **Lab ID: 10614861001** Collected: 06/22/22 15:53 Received: 06/29/22 08:50 Matrix: Solid
Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**21.2**	mg/kg	2.3	0.51	5	07/05/22 12:36	07/11/22 20:12	7440-38-2	
Lead	**62.6**	mg/kg	2.3	0.14	5	07/05/22 12:36	07/11/22 20:12	7439-92-1	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.036**	mg/kg	0.020	0.0085	1	07/06/22 10:52	07/06/22 18:32	7439-97-6	M1

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Sample: S-0016-D-F-01D-20220622 **Lab ID: 10614861002** Collected: 06/22/22 15:53 Received: 06/29/22 08:50 Matrix: Solid
Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**20.1**	mg/kg	2.3	0.51	5	07/05/22 12:36	07/11/22 20:34	7440-38-2	
Lead	**57.1**	mg/kg	2.3	0.14	5	07/05/22 12:36	07/11/22 20:34	7439-92-1	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.085**	mg/kg	0.019	0.0080	1	07/06/22 10:52	07/06/22 18:39	7439-97-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Sample: S-0016-D-EB-01-20220622 **Lab ID: 10614861003** Collected: 06/22/22 16:02 Received: 06/29/22 08:50 Matrix: Solid
Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**<0.10**	mg/kg	0.48	0.10	1	07/05/22 12:36	07/11/22 20:37	7440-38-2	
Lead	**<0.028**	mg/kg	0.48	0.028	1	07/05/22 12:36	07/11/22 20:37	7439-92-1	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**<0.0081**	mg/kg	0.019	0.0081	1	07/06/22 10:52	07/06/22 18:40	7439-97-6	

REPORT OF LABORATORY ANALYSIS

FORM II INORGANIC-1

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source: 375462

Continuing Calibration Verification Source: 375462

Concentration Units: ug/L Instrument ID: 10ICM8

	Initial Calibration Verification				Continuing Calibration Verification						
	07/11/2022 11:56				07/11/2022 12:14			07/11/2022 17:17			Control Limit
Analyte	True	Found	%R	Control Limit	True	Found	%R	True	Found	%R	
Arsenic	80	78.2	97.7	90-110	80	78.5	98.1	80	78.0	97.5	90-110
Lead	80	82.4	103.0	90-110	80	82.1	102.7	80	82.6	103.3	90-110

FORM II INORGANIC-2

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source:

Continuing Calibration Verification Source: 375462

Concentration Units: ug/L Instrument ID: 10ICM8

	Continuing Calibration Verification									
	07/11/2022 18:00			07/11/2022 19:58			07/11/2022 20:41			Control Limit
Analyte	True	Found	%R	True	Found	%R	True	Found	%R	
Arsenic	80	75.9	94.9	80	75.4	94.3	80	75.6	94.6	90-110
Lead	80	81.7	102.1	80	81.8	102.2	80	81.2	101.5	90-110

FORM II INORGANIC-3

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source:

Continuing Calibration Verification Source: 375462

Concentration Units: ug/L Instrument ID: 10ICM8

	Continuing Calibration Verification			
	07/11/2022 21:24			Control Limit
Analyte	True	Found	%R	
Arsenic	80	76.5	95.7	90-110
Lead	80	82.4	103.0	90-110

FORM II INORGANIC-1
CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 375461 Analysis Date/Time: 07/11/2022 12:03

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Arsenic	0.5	0.50	99.0	80-120
Lead	0.5	0.49	97.8	80-120

FORM II INORGANIC-1
CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 375461 Analysis Date/Time: 07/11/2022 17:24

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Arsenic	0.5	0.46	92.8	80-120
Lead	0.5	0.48	96.0	80-120

FORM II INORGANIC-1
CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 375461 Analysis Date/Time: 07/11/2022 20:48

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Arsenic	0.5	0.48	96.0	80-120
Lead	0.5	0.49	98.0	80-120

FORM III INORGANIC-1

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract : 0643586 RMAP Interior School

Method Blank Matrix: Solid Instrument ID: 10ICM8

Method Blank Concentration Units: mg/kg

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Method Blank	
	07/11/2022 12:00	C	07/11/2022 12:18	C	07/11/2022 17:20	C	07/11/2022 18:04	C	4373117	C
Arsenic	0.11	U	0.11	U	0.11	U	0.11	U	<0.11	U
Lead	0.029	U	0.029	U	0.029	U	0.029	U	<0.029	U

FORM III INORGANIC-2

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract : 0643586 RMAP Interior School

Method Blank Matrix: Instrument ID: 10ICM8

Method Blank Concentration Units:

Analyte	Initial Calibration Blank		Continuing Calibration Blank (ug/L)					
		C	07/11/2022 20:01	C	07/11/2022 20:44	C	07/11/2022 21:27	C
Arsenic			0.11	U	0.11	U	0.11	U
Lead			0.029	U	0.029	U	0.029	U

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
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QUALITY CONTROL DATA

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

QC Batch: 825608
QC Batch Method: EPA 3050B
Analysis Method: EPA 6020B
Analysis Description: 6020B Solids UPD5
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10614861001, 10614861002, 10614861003

METHOD BLANK: 4373117 Matrix: Solid
Associated Lab Samples: 10614861001, 10614861002, 10614861003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	<0.11	0.50	0.11	07/11/22 20:05	
Lead	mg/kg	<0.029	0.50	0.029	07/11/22 20:05	

LABORATORY CONTROL SAMPLE: 4373118

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	48.8	48.8	100	80-120	
Lead	mg/kg	48.8	53.2	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4373120 4373121

Parameter	Units	10614861001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	21.2	46.7	47	67.1	70.6	98	105	75-125	5	20	
Lead	mg/kg	62.6	46.7	47	107	120	96	122	75-125	11	20	

SAMPLE DUPLICATE: 4373119

Parameter	Units	10614861001 Result	Dup Result	RPD	Max RPD	Qualifiers
Arsenic	mg/kg	21.2	21.1	0	20	
Lead	mg/kg	62.6	64.8	3	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

FORM IV INORGANIC-1
INTERFERENCE CHECK SAMPLE

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Instrument ID: 10ICM8 Solution A Run Date: 07/11/2022 12:07

ICS Source: 375460,375459 Solution AB Run Date: 07/11/2022 12:10

Concentration Units: ug/L

Analyte	True		Found				
	Sol. A	Sol. AB	Sol. A	%R	Sol. AB	%R	Limits
Aluminum	25000	27500	24523.999	98.1	27081.282	98.5	80-120
Arsenic		100	0.037		98.805	98.8	80-120
Calcium	25000	27500	24412.619	97.7	27366.309	99.5	80-120
Iron	25000	26250	24574.454	98.3	25896.523	98.7	80-120
Lead		100	0.006		96.43	96.4	80-120
Magnesium	25000	27500	24267.977	97.1	27311.072	99.3	80-120
Molybdenum	500	600	504.582	100.9	612.057	102	80-120
Potassium	25000	27500	24625.095	98.5	27161.433	98.8	80-120
Sodium	25000	27500	25107.074	100.4	27585.929	100.3	80-120
Titanium	500	600	478.352	95.7	585.69	97.6	80-120

SAMPLE NO.

4376652PDS

FORM V INORGANIC-1

POST-DIGESTION SPIKE SAMPLE RECOVERY

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Matrix: Solid Parent Sample ID: S-0016-D-F-01-20220622

Analyte	Units	Control Limit %R	DF	Spiked Sample Result (SSR)	DF	Sample Result (SR)	Spike Added (SA)	%R
Arsenic	ug/L	80-120	5	86.5	5	4.5J	80	102.4
Lead	ug/L	80-120	5	98.8	5	13.4	80	106.7

SAMPLE NO.

4376653SD

FORM VIII INORGANIC-1
SERIAL DILUTIONS

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Matrix: Solid Parent Sample ID: S-0016-D-F-01-20220622

Analyte	Units	Initial Sample Result	Serial Dilution Result	% Difference	Control Limit %D
Arsenic	ug/L	4.5J	10.9U		10
Lead	ug/L	13.4	12.7J	4.6	10

* Indicates that the % Difference exceeds the control limit.
No difference is calculated if either result is a non-detect.

FORM IX INORGANIC-1
INSTRUMENT DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Preparation Method: None Instrument ID: 10ICM8

Concentration Units: ug/L

Analyte	PQL	IDL	IDL Date
Arsenic	0.50	0.11	06/20/2022
Lead	0.50	0.029	06/20/2022

FORM IX INORGANIC-2
METHOD DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Preparation Method: EPA 3050B Instrument ID: 10ICM8

Concentration Units: mg/kg

Analyte	PQL	MDL	MDL Date
Arsenic	0.50	0.11	07/19/2021
Lead	0.50	0.029	07/19/2021

FORM XI - INORGANIC-1
LINEAR DYNAMIC RANGES

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract : 0643586 RMAP Interior

Instrument ID: 10ICM8 Effective Date:09/12/2021

Analyte	Concentration (ug/L)
Arsenic	450
Lead	450

FORM XII INORGANIC-1
PREPARATION LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Preparation Method: EPA 3050B Batch: MPRP 125816

Lab Sample ID	Sample Name	Preparation Date	Initial Weight (g)	Final Volume (mL)
4373117	4373117	07/05/2022	1.009	50
4373118	4373118	07/05/2022	1.025	50
4373119	4373119	07/05/2022	1.067	50
4373120	4373120	07/05/2022	1.07	50
4373121	4373121	07/05/2022	1.064	50
10614861001	S-0016-D-F-01-20220622	07/05/2022	1.067	50
10614861002	S-0016-D-F-01D-20220622	07/05/2022	1.066	50
10614861003	S-0016-D-EB-01-20220622	07/05/2022	1.047	50

FORM XIII INORGANIC-1
ANALYSIS RUN LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Instrument ID: 10ICM8 Analysis Method: EPA 6020B

Start Date: 07/11/2022 11:26 End Date: 07/11/2022 21:27

Sample Name	Lab Sample ID	D/F	Date	Time	As	Pb
30461875CAL0	30461875CAL0	1	07/11/2022	11:26	X	X
30461876CAL1	30461876CAL1	1	07/11/2022	11:30	X	X
30461877CAL2	30461877CAL2	1	07/11/2022	11:34	X	X
30461878CAL3	30461878CAL3	1	07/11/2022	11:37	X	X
30461879CAL4	30461879CAL4	1	07/11/2022	11:41	X	X
30461880CAL5	30461880CAL5	1	07/11/2022	11:45	X	X
30461881CAL6	30461881CAL6	1	07/11/2022	11:49	X	X
30461882CAL7	30461882CAL7	1	07/11/2022	11:52	X	X
30461883ICV	30461883ICV	1	07/11/2022	11:56	X	X
30461884ICB	30461884ICB	1	07/11/2022	12:00	X	X
30461885CRDL	30461885CRDL	1	07/11/2022	12:03	X	X
30461886ICSA	30461886ICSA	1	07/11/2022	12:07	X	X
30461887ICSAB	30461887ICSAB	1	07/11/2022	12:10	X	X
30461888CCV	30461888CCV	1	07/11/2022	12:14	X	X
30461889CCB	30461889CCB	1	07/11/2022	12:18	X	X
30461914CCV	30461914CCV	1	07/11/2022	17:17	X	X
30461915CCB	30461915CCB	1	07/11/2022	17:20	X	X
30461916CRDL	30461916CRDL	1	07/11/2022	17:24	X	X
30461917CCV	30461917CCV	1	07/11/2022	18:00	X	X
30461921CCB	30461921CCB	1	07/11/2022	18:04	X	X
30461926CCV	30461926CCV	1	07/11/2022	19:58	X	X
30461927CCB	30461927CCB	1	07/11/2022	20:01	X	X
4373117BLANK	4373117	1	07/11/2022	20:05	X	X
4373118LCS	4373118	1	07/11/2022	20:09	X	X
S-0016-D-F-01-20220622	10614861001	5	07/11/2022	20:12	X	X
4376653SD	4376653	25	07/11/2022	20:19	X	X
4373119DUP	4373119	5	07/11/2022	20:23	X	X
4373120MS	4373120	5	07/11/2022	20:26	X	X
4373121MSD	4373121	5	07/11/2022	20:30	X	X
S-0016-D-F-01D-20220622	10614861002	5	07/11/2022	20:34	X	X
S-0016-D-EB-01-20220622	10614861003	1	07/11/2022	20:37	X	X
30461928CCV	30461928CCV	1	07/11/2022	20:41	X	X
30461929CCB	30461929CCB	1	07/11/2022	20:44	X	X
30461937CRDL	30461937CRDL	1	07/11/2022	20:48	X	X
30461938CCV	30461938CCV	1	07/11/2022	21:24	X	X
30461939CCB	30461939CCB	1	07/11/2022	21:27	X	X

US EPA 200.8/6020 Tune Check Report

Acq/Data Batch	C:\Agilent\ICPMH\1\DATA\071122.b
Report Comment	10ICM8 PW
Instrument Name	G3281A JP13142395

[He]

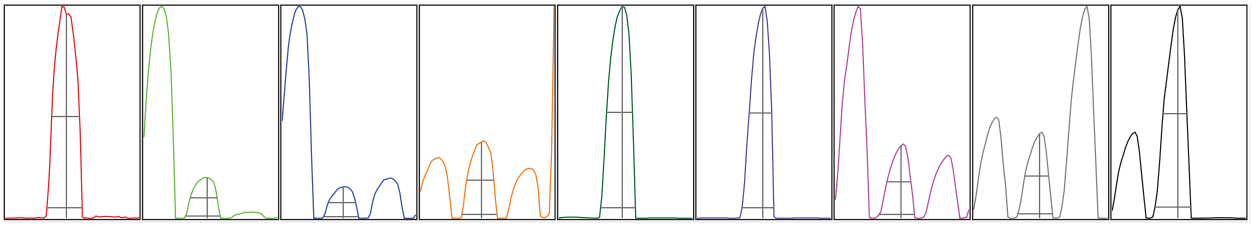
Sensitivity

Mass	Count	RSD%	RSD%(Rqd)	RSD%(Flag)
9	134	4.077	5.000	
24	2066	2.410	5.000	
25	311	2.520	5.000	
26	390	2.660	5.000	
59	27037	3.290	5.000	
115	24716	3.625	5.000	
206	6951	1.726	5.000	
207	5906	2.478	5.000	
208	14396	0.870	5.000	

Rep#1 Count	Rep#2 Count	Rep#3 Count	Rep#4 Count	Rep#5 Count
125	134	138	137	135
1981	2103	2063	2094	2089
301	313	308	312	322
382	396	375	398	397
25584	26841	27322	27743	27697
23222	24776	24761	25342	25478
6813	7007	6835	7013	7086
5714	5954	5826	5929	6105
14195	14454	14528	14426	14374

Integration Time [sec] 0.1

Resolution/Axis



Mass	Peak Height	Axis	Axis (Required)	Axis (Flag)	W-5%	W-5% (Required)	W-5% (Flag)
9	227.92	8.90	8.90 - 9.10		0.781	0.900	
24	3672.60	23.95	23.90 - 24.10		0.771	0.900	
25	542.44	24.90	24.90 - 25.10		0.776	0.900	
26	685.54	25.90	25.90 - 26.10		0.779	0.900	
59	49836.93	58.95	58.90 - 59.10		0.770	0.900	
115	50995.88	115.00	114.90 - 115.10		0.701	0.900	
206	13528.69	206.00	205.90 - 206.10		0.786	0.900	
207	11527.04	207.00	206.90 - 207.10		0.768	0.900	
208	28473.35	208.00	207.90 - 208.10		0.791	0.900	

Integration Time [sec] 0.1 Acquisition Time [sec] 212.5 Y Axis Linear

Tune Parameters

Plasma Parameters

Plasma Mode	---	Nebulizer Gas	0.70 L/min	Dilution Gas	0.35 L/min
RF Power	1550 W	Option Gas	---	Auxiliary Gas	0.90 L/min
RF Matching	1.80 V	Nebulizer Pump	0.10 rps	Plasma Gas	15.0 L/min
Sample Depth	8.0 mm	S/C Temp	2 °C		

Lens Parameters

Extract 1	0.0 V	Omega Lens	5.0 V	Deflect	-1.2 V
Extract 2	-130.0 V	Cell Entrance	-40 V	Plate Bias	-60 V
Omega Bias	-70 V	Cell Exit	-60 V		

Cell Parameters

Use Gas	Yes	3rd Gas Flow	---	Energy Discrimination	3.0 V
He Flow	4.5 mL/min	OctP Bias	-18.0 V		
H2 Flow	0.0 mL/min	OctP RF	170 V		

US EPA 200.8/6020 Tune Check Report

Acq/Data Batch	C:\Agilent\ICPMH\1\DATA\071122.b
Report Comment	10ICM8 PW
Instrument Name	G3281A JP13142395

[H2]

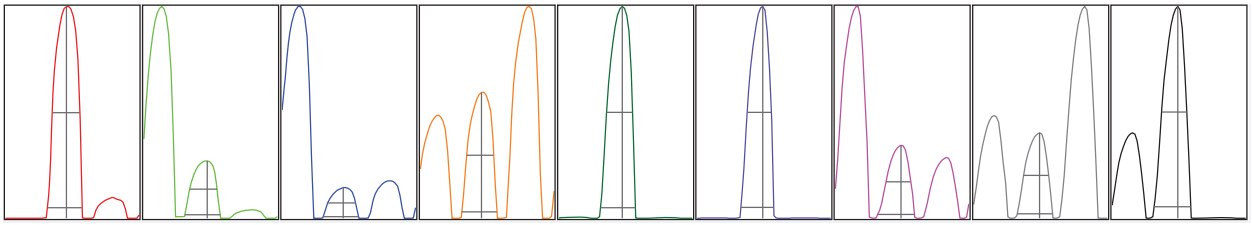
Sensitivity

Mass	Count	RSD%	RSD%(Rqd)	RSD%(Flag)
9	1319	3.315	5.000	
24	19645	2.525	5.000	
25	2887	2.440	5.000	
26	3519	3.002	5.000	
59	30956	3.135	5.000	
115	60134	3.974	5.000	
206	8791	4.897	5.000	
207	7463	4.163	5.000	
208	18148	4.183	5.000	

Rep#1 Count	Rep#2 Count	Rep#3 Count	Rep#4 Count	Rep#5 Count
1247	1319	1328	1337	1365
18973	19494	19488	20080	20189
2812	2841	2872	2920	2991
3361	3520	3505	3552	3655
29784	30136	31108	31866	31888
57366	58258	60067	61968	63013
8150	8742	8758	8971	9334
7036	7357	7397	7695	7830
17256	17584	18079	18810	19013

Integration Time [sec] ✓ 0.1

Resolution/Axis



Mass	Peak Height	Axis	Axis (Required)	Axis (Flag)	W-5%	W-5% (Required)	W-5% (Flag)
9	2277.79	8.90	8.90 - 9.10		0.771	0.900	
24	34554.88	23.95	23.90 - 24.10		0.782	0.900	
25	4984.95	24.90	24.90 - 25.10		0.783	0.900	
26	6106.65	25.90	25.90 - 26.10		0.779	0.900	
59	56924.29	58.95	58.90 - 59.10		0.773	0.900	
115	117626.04	115.00	114.90 - 115.10		0.728	0.900	
206	16495.29	206.00	205.90 - 206.10		0.811	0.900	
207	13752.52	207.00	206.90 - 207.10		0.782	0.900	
208	34071.28	208.00	207.90 - 208.10		0.813	0.900	

Integration Time [sec] 0.1 ✓ Acquisition Time [sec] 212.5 ✓ Y Axis Linear

Tune Parameters

Plasma Parameters

Plasma Mode	---	Nebulizer Gas	0.70 L/min	Dilution Gas	0.35 L/min
RF Power	1550 W	Option Gas	---	Auxiliary Gas	0.90 L/min
RF Matching	1.80 V	Nebulizer Pump	0.10 rps	Plasma Gas	15.0 L/min
Sample Depth	8.0 mm	S/C Temp	2 °C		

Lens Parameters

Extract 1	0.0 V	Omega Lens	5.0 V	Deflect	-2.2 V
Extract 2	-130.0 V	Cell Entrance	-40 V	Plate Bias	-60 V
Omega Bias	-70 V	Cell Exit	-60 V		

Cell Parameters

Use Gas	Yes	3rd Gas Flow	---	Energy Discrimination	2.0 V
He Flow	0.0 mL/min	OctP Bias	-18.0 V		
H2 Flow	4.0 mL/min	OctP RF	170 V		

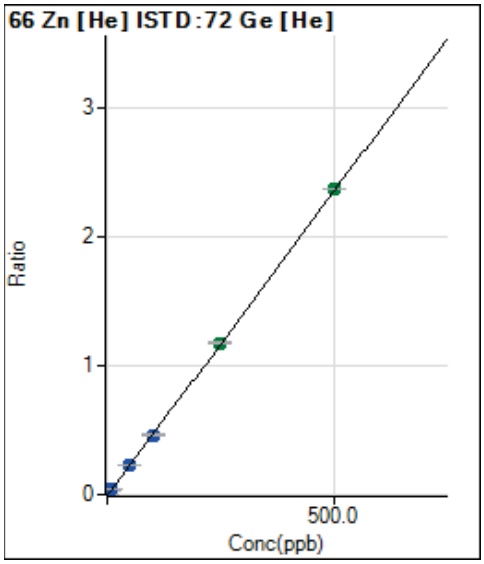
FORM XV INORGANIC-1

INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Instrument ID: 10ICM8 Start Date: 07/11/2022 11:26 End Date: 07/11/2022 21:27

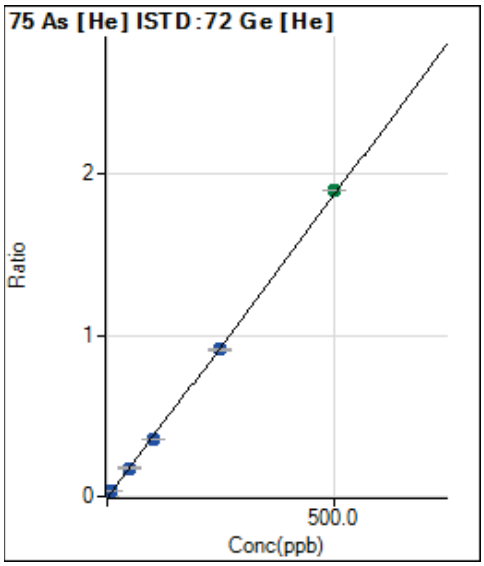
Sample Name	Time	GE-72	Ge-72-IS1	In-115	Ir-193-IS	Sc-45-IS	Sc-45-IS1	Tb-159
30461875CAL0	11:26	100.0	100.0	100.0	100.0	100.0	100.0	100.0
30461876CAL1	11:30	99.8	100.7	101.5	102.0	101.1	101.1	100.1
30461877CAL2	11:34	100.3	100.5	101.1	100.3	101.4	100.3	99.6
30461878CAL3	11:37	101.5	101.5	99.3	98.2	102.5	101.8	98.3
30461879CAL4	11:41	101.3	101.9	98.7	97.3	102.7	101.3	98.2
30461880CAL5	11:45	101.1	102.2	99.5	93.8	102.6	102.3	96.1
30461881CAL6	11:49	98.8	101.7	97.2	95.2	103.6	103.1	98.0
30461882CAL7	11:52	99.9	102.1	94.9	88.7	104.6	106.2	95.1
30461883ICV	11:56	105.4	105.6	100.5	95.8	107.4	105.9	99.2
30461884ICB	12:00	103.4	106.4	101.6	98.2	106.3	106.1	98.3
30461885CRDL	12:03	104.4	106.8	101.0	97.5	107.2	106.1	98.7
30461886ICSA	12:07	103.2	104.5	98.1	90.8	108.4	107.3	95.9
30461887ICSAB	12:10	102.7	105.3	97.6	92.6	108.4	107.2	96.5
30461888CCV	12:14	106.6	109.1	100.8	94.8	110.0	108.2	96.7
30461889CCB	12:18	105.2	109.0	102.3	99.7	108.5	108.5	100.2
30461914CCV	17:17	104.8	109.0	101.2	94.4	109.0	108.0	98.7
30461915CCB	17:20	103.2	108.9	102.0	98.9	105.3	107.5	99.4
30461916CRDL	17:24	105.0	108.6	103.3	101.1	108.4	107.5	100.5
30461917CCV	18:00	114.9	119.0	103.2	93.2	121.4	120.7	96.3
30461921CCB	18:04	112.8	116.6	105.7	97.4	118.6	117.7	98.5
30461926CCV	19:58	113.4	115.5	101.4	91.3	120.7	117.6	94.6
30461927CCB	20:01	110.4	115.7	103.8	93.1	116.6	117.1	96.6
4373117	20:05	111.1	115.9	104.1	93.9	118.4	118.1	96.1
4373118	20:09	113.0	116.2	102.8	90.2	120.2	117.9	91.7
S-0016-D-F-01-	20:12	113.1	117.7	105.6	94.6	120.2	119.3	97.3
4376653	20:19	114.7	119.0	106.4	94.3	119.7	120.8	99.5
4373119	20:23	113.6	117.7	105.4	93.0	120.9	119.2	97.8
4373120	20:26	112.9	117.2	105.5	93.8	120.2	119.1	97.7
4373121	20:30	113.3	117.0	104.9	93.2	120.7	119.1	97.4
S-0016-D-F-01D-	20:34	113.4	117.9	105.4	94.3	120.7	119.7	97.9
S-0016-D-EB-01-	20:37	112.3	118.7	105.5	93.8	119.5	121.5	97.2
30461928CCV	20:41	114.6	117.3	103.4	89.9	124.7	119.2	94.9
30461929CCB	20:44	114.8	119.2	106.4	93.8	122.0	120.3	96.5
30461937CRDL	20:48	113.7	118.1	104.9	92.9	120.6	121.1	95.9
30461938CCV	21:24	111.9	118.7	103.1	91.7	120.0	119.9	97.4
30461939CCB	21:27	111.8	114.9	104.6	96.5	117.4	114.5	99.1



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	3189.63	0.0024	P	7.5	
2	☐	5.000	5.024	34940.64	0.0262	P	0.6	0.5
3	☐	10.000	9.837	65690.41	0.0489	P	1.0	-1.6
4	☐	50.000	48.566	315287.63	0.2321	P	1.0	-2.9
5	☐	100.000	97.450	628273.71	0.4634	P	1.8	-2.5
6	☐	250.000	248.566	1595255.79	1.1783	A	1.1	-0.6
7	☐	500.000	501.373	3140248.33	2.3742	A	0.4	0.3
8	☐			5640.91	0.0042	P	4.4	

y = 0.0047 * x + 0.0024
R = 1.0000
DL = 0.1139 ppb
BEC = 0.5038 ppb

Weight: <None>
Min Conc: <None>

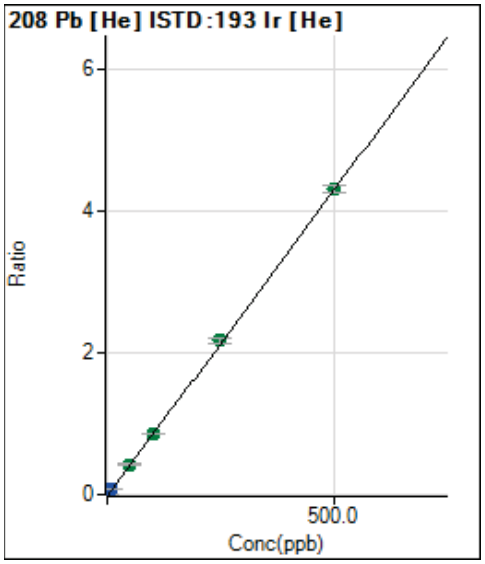


	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	448.51	0.0003	P	2.9	
2	☐	0.500	0.484	2878.07	0.0022	P	1.3	-3.2
3	☐	10.000	9.519	48465.34	0.0361	P	2.1	-4.8
4	☐	50.000	46.782	239114.33	0.1761	P	2.2	-6.4
5	☐	100.000	94.385	481169.75	0.3549	P	1.1	-5.6
6	☐	250.000	242.188	1232127.66	0.9101	P	0.4	-3.1
7	☐	500.000	505.360	2511271.75	1.8987	A	0.2	1.1
8	☐			1159.37	0.0009	P	6.0	

y = 0.0038 * x + 3.3503E-004
R = 0.9998
DL = 0.007634 ppb
BEC = 0.08919 ppb

Weight: <None>
Min Conc: <None>

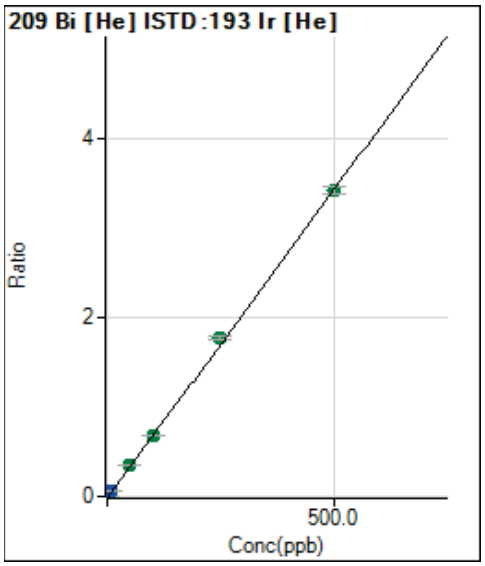
Calibration for 012_ICV.d



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	1991.74	0.0003	P	2.4	
2	☐	0.500	0.491	31478.67	0.0045	P	0.4	-1.8
3	☐	10.000	9.528	563759.63	0.0826	P	1.9	-4.7
4	☐	50.000	49.285	2848634.61	0.4258	A	2.5	-1.4
5	☐	100.000	98.637	5647034.16	0.8518	A	1.1	-1.4
6	☐	250.000	251.834	13890469.38	2.1744	A	3.3	0.7
7	☐	500.000	499.437	27966941.67	4.3119	A	1.9	-0.1
8	☐			13787.37	0.0023	P	1.4	

y = 0.0086 * x + 2.9235E-004
R = 1.0000
DL = 0.002389 ppb
BEC = 0.03387 ppb

Weight: <None>
Min Conc: <None>



	Rjct	Conc.	Calc Conc.	CPS	Ratio	Det.	RSD	%RE
1	☐	0.000	0.000	2043.51	0.0003	P	13.5	
2	☐	0.500	0.492	25597.81	0.0037	P	4.4	-1.5
3	☐	10.000	9.446	445653.65	0.0653	P	1.6	-5.5
4	☐	50.000	49.652	2286387.78	0.3417	A	0.8	-0.7
5	☐	100.000	99.634	4543436.81	0.6854	A	1.0	-0.4
6	☐	250.000	256.927	11289629.00	1.7670	A	2.6	2.8
7	☐	500.000	496.656	22149999.67	3.4155	A	2.7	-0.7
8	☐			2616.95	0.0004	P	4.0	

y = 0.0069 * x + 3.0020E-004
R = 0.9999
DL = 0.01764 ppb
BEC = 0.04366 ppb

Weight: <None>
Min Conc: <None>

Prep Log Report

Batch Information: MPRP 825608 6020BS

Template Version: ENV-EPL-MIN4-0015-Rev.00 (13Dec2020)

Prep Method	EPA 3050B	Analysis Method	EPA 6020B	Prepared By	HTV	Instrument	10BALT
Block ID	10MET50	Thermometer ID	210354356	Correction Factor (C)	+0.3	Block Temp (C)	90.7
Corrected Temp. (C)	91.00	Digestion Start Date/Time	07/05/2022 12:36:43:943	Digestion End Date/Time	07/05/2022 15:14:45:483	Block End Temp (C)	91.7
Corrected End Temp. (C)	92.00	Digestion Vessel	371540	Resin Pellets Solid Matrix	368356	Metals Pipette 1	Q765
Metals Pipette 2		Bottle Disp. 1		Bottle Disp. 2	Q452	Bottle Disp. 3	
Reviewed By	NJ1	Reviewed By Date	07/05/2022 17:20	Batch Notes	Q-854, Q-852. WEIGHED BY RMF		

Sample Information:

QC Rule	Sample Type	Lab Sample ID	Matrix	Initial Weight (g)	Conc. HNO3 (mL)	H2O2 (mL)	Conc. HCL (mL)	Final Volume (mL)	Sample Notes	Hg-SPK (mL)	METALS-STK1 (mL)	METALS-STK2 (mL)
6020BS_P	BLANK	**4373117**	Solid	1.009	367837 (7.5)	369698 (2.5)	363604 (5)	50				
6020BS_P	LCS	**4373118**	Solid	1.025	367837 (7.5)	369698 (2.5)	363604 (5)	50		371468 (.25)	342946 (.5)	336132 (.5)
6020BS_P	PS	**10614861001**	Solid	1.067	367837 (7.5)	369698 (2.5)	363604 (5)	50				
6020BS_P	DUP	**4373119**	Solid	1.067	367837 (7.5)	369698 (2.5)	363604 (5)	50				
6020BS_P	MS	**4373120**	Solid	1.07	367837 (7.5)	369698 (2.5)	363604 (5)	50		371468 (.25)	342946 (.5)	336132 (.5)
6020BS_P	MSD	**4373121**	Solid	1.064	367837 (7.5)	369698 (2.5)	363604 (5)	50		371468 (.25)	342946 (.5)	336132 (.5)
6020BS_P	PS	**10614861002**	Solid	1.066	367837 (7.5)	369698 (2.5)	363604 (5)	50				
6020BS_P	PS	**10614861003**	Solid	1.047	367837 (7.5)	369698 (2.5)	363604 (5)	50				

Standard Notes:

336132: ZPACEMN-106

342946: ZPACEMN-116 (MIX 1)

371468: Intermediate Spike for ICPMS Soil

FORM II INORGANIC-1

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source: 374711

Continuing Calibration Verification Source: 374711

Concentration Units: ug/L Instrument ID: 10HG09

	Initial Calibration Verification				Continuing Calibration Verification						
	07/06/2022 11:39				07/06/2022 12:10			07/06/2022 18:08			
Analyte	True	Found	%R	Control Limit	True	Found	%R	True	Found	%R	Control Limit
Mercury	5.0	5.4	108.6	90-110	5.0	5.1	102.6	5.0	4.8	97.0	90-110

FORM II INORGANIC-2

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Initial Calibration Verification Source:

Continuing Calibration Verification Source: 374711

Concentration Units: ug/L Instrument ID: 10HG09

	Continuing Calibration Verification						
	07/06/2022 18:26			07/06/2022 18:44			Control Limit
Analyte	True	Found	%R	True	Found	%R	
Mercury	5.0	4.8	97.0	5.0	4.8	96.4	90-110

FORM II INORGANIC-1
CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 374706,374754 Analysis Date/Time: 07/06/2022 11:43

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Mercury	0.2	0.18	90.0	70-130

FORM II INORGANIC-1
CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 374706,374754 Analysis Date/Time: 07/06/2022 18:24

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Mercury	0.2	0.16	80.0	70-130

FORM II INORGANIC-1
CRDL CHECK STANDARD

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

CRDL Check Standard Source: 374706,374754 Analysis Date/Time: 07/06/2022 18:42

Concentration Units: ug/L

Analyte	CRDL Check Standard			
	True	Found	%R	Control Limit %R
Mercury	0.2	0.17	85.0	70-130

FORM III INORGANIC-1

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract : 0643586 RMAP Interior School

Method Blank Matrix: Solid Instrument ID: 10HG09

Method Blank Concentration Units: mg/kg

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Method Blank	
	07/06/2022 11:41	C	07/06/2022 12:11	C	07/06/2022 18:09	C	07/06/2022 18:27	C	4373140	C
Mercury	0.087	U	0.087	U	0.087	U	0.087	U	<0.0081	U

FORM III INORGANIC-2

BLANKS

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract : 0643586 RMAP Interior School

Method Blank Matrix: Instrument ID: 10HG09

Method Blank Concentration Units:

Analyte	Initial Calibration Blank		Continuing Calibration Blank (ug/L)					
		C	07/06/2022 18:45	C		C		C
Mercury			0.087	U				

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

QC Batch: 825614
QC Batch Method: EPA 7471B
Analysis Method: EPA 7471B
Analysis Description: 7471B Mercury Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10614861001, 10614861002, 10614861003

METHOD BLANK: 4373140 Matrix: Solid
Associated Lab Samples: 10614861001, 10614861002, 10614861003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/kg	<0.0081	0.019	0.0081	07/06/22 18:29	

LABORATORY CONTROL SAMPLE: 4373141

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.45	0.39	88	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4373143 4373144

Parameter	Units	10614861001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.036	0.49	0.49	0.45	0.42	85	79	80-120	6	20	M1

75-125%

SAMPLE DUPLICATE: 4373142

Parameter	Units	10614861001 Result	Dup Result	RPD	Max RPD	Qualifiers
Mercury	mg/kg	0.036	0.036	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

FORM IX INORGANIC-1
INSTRUMENT DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Preparation Method: None Instrument ID: 10HG09

Concentration Units: ug/L

Analyte	PQL	IDL	IDL Date
Mercury	0.20	0.087	03/30/2021

FORM IX INORGANIC-2
METHOD DETECTION LIMITS

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Preparation Method: EPA 7471B Instrument ID: 10HG09

Concentration Units: mg/kg

Analyte	PQL	MDL	MDL Date
Mercury	0.020	0.0087	03/30/2021

FORM XII INORGANIC-1
PREPARATION LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Preparation Method: EPA 7471B Batch: MERP 37766

Lab Sample ID	Sample Name	Preparation Date	Initial Weight (g)	Final Volume (mL)
4373140	4373140	07/06/2022	0.323	30
4373141	4373141	07/06/2022	0.337	30
4373142	4373142	07/06/2022	0.305	30
4373143	4373143	07/06/2022	0.305	30
4373144	4373144	07/06/2022	0.305	30
10614861001	S-0016-D-F-01-20220622	07/06/2022	0.305	30
10614861002	S-0016-D-F-01D-20220622	07/06/2022	0.324	30
10614861003	S-0016-D-EB-01-20220622	07/06/2022	0.323	30

FORM XIII INORGANIC-1
ANALYSIS RUN LOG

Lab Name: Pace Analytical - Minnesota SDG No. : 10614861 Contract: 0643586 RMAP Interior School

Instrument ID: 10HG09 Analysis Method: EPA 7471B

Start Date: 07/06/2022 11:29 End Date: 07/06/2022 18:45

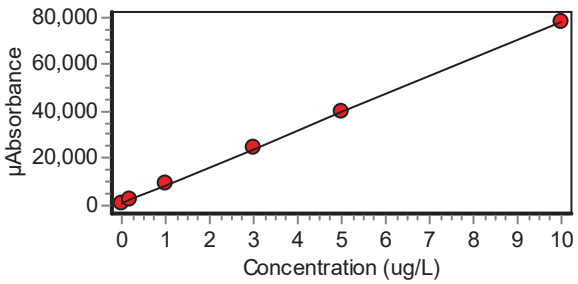
Sample Name	Lab Sample ID	D/F	Date	Time	Hg
30422889CAL0	30422889CAL0	1	07/06/2022	11:29	X
30422890CAL1	30422890CAL1	1	07/06/2022	11:31	X
30422891CAL2	30422891CAL2	1	07/06/2022	11:33	X
30422892CAL3	30422892CAL3	1	07/06/2022	11:34	X
30422893CAL4	30422893CAL4	1	07/06/2022	11:36	X
30422894CAL5	30422894CAL5	1	07/06/2022	11:38	X
30422895ICV	30422895ICV	1	07/06/2022	11:39	X
30422896ICB	30422896ICB	1	07/06/2022	11:41	X
30422897CRDL	30422897CRDL	1	07/06/2022	11:43	X
30422898CCV	30422898CCV	1	07/06/2022	12:10	X
30422899CCB	30422899CCB	1	07/06/2022	12:11	X
30422942CCV	30422942CCV	1	07/06/2022	18:08	X
30422943CCB	30422943CCB	1	07/06/2022	18:09	X
30422944CRDL	30422944CRDL	1	07/06/2022	18:24	X
30422945CCV	30422945CCV	1	07/06/2022	18:26	X
30422946CCB	30422946CCB	1	07/06/2022	18:27	X
4373140BLANK	4373140	1	07/06/2022	18:29	X
4373141LCS	4373141	1	07/06/2022	18:31	X
S-0016-D-F-01-20220622	10614861001	1	07/06/2022	18:32	X
4373142DUP	4373142	1	07/06/2022	18:34	X
4373143MS	4373143	1	07/06/2022	18:35	X
4373144MSD	4373144	1	07/06/2022	18:37	X
S-0016-D-F-01D-20220622	10614861002	1	07/06/2022	18:39	X
S-0016-D-EB-01-20220622	10614861003	1	07/06/2022	18:40	X
30422947CRDL	30422947CRDL	1	07/06/2022	18:42	X
30422948CCV	30422948CCV	1	07/06/2022	18:44	X
30422949CCB	30422949CCB	1	07/06/2022	18:45	X

Report Generated By Teledyne Leeman QuickTrace
Analyst: 10metalsuser,LENA WIGER
Worksheet file: S:\DATA\Metals\10HG09\06JUL22SOOLIDS10HG09.wszf
Creation Date: 7/6/2022 11:20:22 AM
Comment: EPA 7471/7471B

Results

Sample Name	Type	Date/Time	Conc (ug/L)	µAbs	%RSD	Residual	Flags	DF	% Recovery
Calibration Blank	STD	07/06/22 11:29:54 am	0.00	597	0.94			1.0000	N/A
Replicates	596.3	605.2	594.2	592.7					
Standard #1 (0.2 ug/L)	STD	07/06/22 11:31:31 am	0.20	2157	0.95	-12.76%		1.0000	N/A
Replicates	2127.3	2160.9	2169.6	2171.6					
Standard #2 (1 ug/L)	STD	07/06/22 11:33:09 am	1.00	8942	0.84	5.47%		1.0000	N/A
Replicates	8949.8	9011.0	8970.5	8836.5					
Standard #3 (3 ug/L)	STD	07/06/22 11:34:46 am	3.00	23957	0.71	0.09%		1.0000	N/A
Replicates	23730.6	24004.5	24137.5	23954.0					
Standard #4 (5 ug/L)	STD	07/06/22 11:36:24 am	5.00	39383	0.77	0.08%		1.0000	N/A
Replicates	38966.0	39463.3	39694.8	39408.1					
Standard #5 (10 ug/L)	STD	07/06/22 11:38:03 am	10.00	77835	0.82	-0.08%		1.0000	N/A
Replicates	76954.6	77820.5	78444.5	78120.7					

Calibration
Equation: Abs = 7708.174x + 812.377
R2: 0.99994 ✓ RSE: 8.01%
SEE: 258.5337
Flags:



ICV	ICV	07/06/22 11:39:50 am	5.43	42635	0.80			1.0000	108.52
Replicates	42363.8	42873.4	42971.9	42332.6					
ICB	ICB	07/06/22 11:41:28 am	-0.03	592	3.92			1.0000	N/A
Replicates	584.7	604.2	587.7	589.7					
CRDL	CRDL	07/06/22 11:43:05 am	0.18	2192	1.17			1.0000	89.49
Replicates	2188.4	2195.6	2211.1	2172.4					
4370027_44293	UNK	07/06/22 11:47:48 am	-0.04	480	3.65			1.0000	N/A
Replicates	468.1	487.3	472.5	493.8					
4370028_44293	UNK	07/06/22 11:49:24 am	5.06	39799	0.79			1.0000	N/A
Replicates	39353.8	39843.7	40013.4	39986.4					
10614556002_44293	UNK	07/06/22 11:51:01 am	51.99	401533	0.62		O	1.0000	N/A
Replicates	398359.7	402956.9	404011.4	400804.1					
10614556002Dx10_44293	UNK	07/06/22 11:57:33 am	6.83	53469	0.56			1.0000	N/A
Replicates	53062.5	53647.8	53712.0	53454.0					

Prep Log Report

Batch Information: MERP 825614 7471BS

Template Version: ENV-EPL-MIN4-0028-Rev.00 (13Dec2020)

Prep Method	EPA 7471B	Analysis Method	EPA 7471B	Prepared By	HTV	Instrument	10BALT
Block ID	10MET54	Thermometer ID		Correction Factor (C)	-0.3	Block Temp (C)	94.7
Corrected Temp. (C)	94.40	Digestion Start Date/Time	07/06/2022 10:52:53:826	Digestion End Date/Time	07/06/2022 11:45:03:458	Block End Temp (C)	95.4
Corrected End Temp. (C)	95.10	Digestion Vessel	371540	Resin Pellets Solid Matrix	368356	Metals Pipette 1	Q473
Metals Pipette 2		Bottle Disp. 1		Bottle Disp. 2	Q452	Bottle Disp. 3	
Bottle Disp. 4		Bottle Disp. 5		Reviewed By	NJ1	Reviewed By Date	07/06/2022 13:47
Batch Notes	Therm ID; 210354360. Weighed by RMF. Q-854, Q-852, Q-851.						

Sample Information:

QC Rule	Sample Type	Lab Sample ID	Matrix	Initial Weight (g)	Aqua Regia (mL)	5% KMnO4 (mL)	12% NH2OH*HCL (mL)	Final Volume (mL)	Sample Notes	MERCURY-SPK (mL)
7471B S_P	BLANK	**4373140**	Solid	0.323	374641 (3)	374025 (9)	373236 (3.6)	30		
7471B S_P	LCS	**4373141**	Solid	0.337	374641 (3)	374025 (9)	373236 (3.6)	30		370133 (.15)
7471B S_P	PS	**10614861001**	Solid	0.305	374641 (3)	374025 (9)	373236 (3.6)	30		
7471B S_P	DUP	**4373142**	Solid	0.305	374641 (3)	374025 (9)	373236 (3.6)	30		
7471B S_P	MS	**4373143**	Solid	0.305	374641 (3)	374025 (9)	373236 (3.6)	30		370133 (.15)
7471B S_P	MSD	**4373144**	Solid	0.305	374641 (3)	374025 (9)	373236 (3.6)	30		370133 (.15)
7471B S_P	PS	**10614861002**	Solid	0.324	374641 (3)	374025 (9)	373236 (3.6)	30		
7471B S_P	PS	**10614861003**	Solid	0.323	374641 (3)	374025 (9)	373236 (3.6)	30		

Standard Notes:

370133: LCS, MS, MSD Spike Solution

SECTION 5

LABORATORY CASE NARRATIVE AND

CHAIN-OF-CUSTODY RECORD

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10614861001	**S-0016-D-F-01-20220622**	Solid	06/22/22 15:53	06/29/22 08:50
10614861002	**S-0016-D-F-01D-20220622**	Solid	06/22/22 15:53	06/29/22 08:50
10614861003	**S-0016-D-EB-01-20220622**	Solid	06/22/22 16:02	06/29/22 08:50

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Method: **EPA 6020B**
Description: 6020B MET ICPMS
Client: BP-ERM-MT
Date: July 12, 2022

General Information:
3 samples were analyzed for EPA 6020B by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3050B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

Method: **EPA 7471B**
Description: 7471B Mercury
Client: BP-ERM-MT
Date: July 12, 2022

General Information:
3 samples were analyzed for EPA 7471B by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 7471B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 825614

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10614861001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery. ✓

- MSD (Lab ID: 4373144)
  - Mercury

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

bp rm

Laboratory Management Program (LaMP) Chain of Custody F

Soil, Sediment and Groundwater Samples

WO# : 10614861

10614861

BP/RM Facility No: MT_Butte Priority Soils

Lab Work Order Numbe

Time (Days): 5

Chain of Custody: 20220628-0200-PACE_MPLS-S-0016

Lab Name: PACE, INC., MINNEAPOLIS, MN	BP/ARC Facility Address:	Consultant/Contractor: ERM
Lab Address: 1700 Elm Street SE	City, State, ZIP Code: Butte, MT.	Consultant/Contractor Project No.: 0643586
Lab PM:	Lead Regulatory Agency:	Address: 1 9th St Island Dr, Livingston, MT 59047
Lab Phone: 612-607-6398	California Global ID No.:	Consultant/Contractor PM: Christopher Berg
Lab Shipping Accnt:	Accounting Information:	Phone: 9167699050 Email: Christopher.Berg@erm.com
Lab Bottle Order No:		Send/Submit EDD to: mcanumc@bp.com; Christopher.Berg@erm.com
Other Info:		Invoice To: mcanumc@bp.com; Christopher.Berg@erm.com
BP/RM PM: Mike Mc Anulty/mcanumc@bp.com	PM Phone: PM Email:	**Report Type & QC Level:**

Sample Details											Requested Analyses													Comments
Lab No.	Sample Description	Date	Time	Field Matrix	Start Depth	End Depth	Depth Unit	Grab (G) or Composite (C)	Total Number of Containers		Filt	N	N											
										Pres	Ambient	4°C												
										Analysis	SW6020B (arsenic and load)	SW7471B (mercury)												
1	S-0016-D-F-01-20220622	06/22/2022	15:53	SDU				G			X	X												01
2	S-0016-D-F-01D-20220622	06/22/2022	15:53	SDU				G			X	X												02
3	S-0016-D-EB-01-20220622	06/22/2022	16:02	SO				G			X	X												03

Sampler's Name: Tim Wilson	**Relinquished By / Affiliation**	**Date / Time**	**Accepted By / Affiliation** / **Date / Time**
Sampler's Company: ERM	ERM	6/28/2022 1:47:00 PM	6/29/22 850
Ship Method: Ship Date: 6/28/2022 2:00:00 PM			
Shipment Tracking No:			

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 2.5 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

	DC#_Title: ENV-FRM-MIN4-0149 v03_Sample Condition Upon Receipt (SCUR) - ESI
Pace ANALYTICAL SERVICES	Effective Date: 04/12/2022

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BP rm

Project

WO#: 10614861

PM: JMA Due Date: 07/07/22

CLIENT: BP-ERM-MT

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ SpeeDee ☐ Commercial

Tracking Number: 5405 1819 4960

See Exceptions ☐ ENV-FRM-MIN4-01

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No Seals Intact? ☑ Yes ☐ No Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: Temp Blank? ☑ Yes ☐ No

Thermometer: ☐ T1(0461) ☐ T2(1336) ☑ T3(0459) ☐ T4(0254) ☐ T5(0489) ☐ T6(0235) ☐ T7(0042) Type of Ice: ☑ Wet ☐ Blue ☐ None ☐ Dry ☐ Melted

Temp should be above freezing to 6°C Cooler Temp Read w/temp blank: 2.5 °C

Correction Factor: TWE Cooler Temp Corrected w/temp blank: 2.5 ✓ °C

Average Corrected Temp (no temp blank only): °C ☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

USDA Regulated Soil: (☑ N/A, water sample/Other: SOU + SG

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Date/Initials of Person Examining Contents: AH 6/29/22

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present and Filled Out?	☑ Yes	☐ No		1.
Chain of Custody Relinquished?	☑ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☑ N/A	3. JMA 6/29/22
Samples Arrived within Hold Time?	☑ Yes	☐ No		4.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E coli ☐ BOD/cBOD ☐ Hex Chrome ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other
Rush Turn Around Time Requested?	☑ Yes	☐ No		6.
Sufficient Sample Volume?	☑ Yes	☐ No		
Triple Volume Provided for MS/MSD (if more than 10 samples)?	☐ Yes	☐ No	☑ N/A	7.
Correct Containers Used?	☑ Yes	☐ No		8.
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☑ Yes	☐ No		11. If no, write ID/ Date/Time on Container Below: See Exception ☐ ENV-FRM-MIN4-0142
Matrix: ☐ Water ☐ Soil ☐ Oil ☑ Other SOU + SG				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☑ N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS *If adding preservative to a container it must be added to associated field and equipment blanks (verify with PM first)	☐ Yes	☐ No	☑ N/A	Positive for Res. Chlorine? ☐ Yes ☐ No pH Paper Lot# See Exception ☐ ENV-FRM-MIN4-0142
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☑ N/A	13. See Exception ☐ ENV-FRM-MIN4-0140
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☑ N/A	
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	Pace Trip Blank Lot # (if purchased):

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1237	Temp: 2.5	Corrected Temp: 2.5	
Time: 12:57	put in cooler		
Time: JMA 6/29/22	Temp:	Corrected Temp:	

CLIENT NOTIFICATION/RESOLUTION Field Data Required? ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: [signature] Date: 06/29/2022

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e., out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: AH 6/29

Qualtrax ID: 52738

Page 1 of 1

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 0643586 RMAP Interior School
Pace Project No.: 10614861

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

ENVIRONMENTAL® STANDARDS

Setting the Standards for Innovative Environmental Solutions

LEVEL A/B FIELD DOCUMENTATION SCREENING REVIEW

SILVER BOW CREEK/BUTTE AREA NATIONAL PRIORITIES LIST SITE, BUTTE PRIORITY SOILS OPERABLE UNIT, RESIDENTIAL METALS ABATEMENT PROGRAM PROJECT

DUST SAMPLES COLLECTED ON

JUNE 22, 2022

RESIDENT IDENTIFICATION: S-0016

SAMPLE DELIVERY GROUPS: 10614861

JULY 28, 2022

Prepared for:

ATLANTIC RICHFIELD COMPANY
317 Anaconda Road
Butte, MT 59701

Prepared by:

ENVIRONMENTAL STANDARDS, INC.
1140 Valley Forge Road
P.O. Box 810
Valley Forge, PA 19482-0810

INTRODUCTION

This quality assurance (QA) review of field documents is based upon an examination of the data generated during the collection of the field samples on June 22, 2022, as part of the Silver Bow Creek/Butte Area National Priorities List (NPL) Site, Butte Priority Soils Operable Unit, Residential Metals Abatement Program (RMAP) sampling event. This review was performed using guidance from the RMAP Quality Assurance Project Plan Non-Residential Parcels –Indoor Dust (QAPP; February 28, 2022), Section 5.1.2.1 Field Data Verification.

The Level A/B review is documented on the checklist below as described in the CFRSSI Data Management/Data Validation (DV/DM) Plan (ARCO, 1992a) and the CFRSSI DM/DV Plan Addendum (AERL, 2000), and will be used in the verification process for field documentation related to samples collected for laboratory analyses.

Data that meet the Level A and Level B criteria and are not qualified as estimated or rejected during the analytical data validation process are assessed as enforcement quality data and can be used for all Superfund purposes and activities. Data that meet only the Level A criteria and are not rejected during the data validation process can be assessed as screening quality data. Screening quality data can be used only for certain activities, which include engineering studies and design. Data that do not meet the Level A and/or B criteria and/or are rejected during the data validation process are designated as unusable. The determination of enforcement quality data and screening quality data will be made in conjunction with the data validation report and qualified based on the requirements of Section 5.3 of the QAPP. Identification of enforcement, screening or unusable data will be added to the electronic data deliverables.

SECTION 1 LEVEL A/B FIELD DOCUMENTATION SCREENING REVIEW

1. General Information

Site: Highland View Christian School (S-0016)
Project: Residential Metals Abatement Program
Client: Atlantic Richfield Company
Sample Matrix: Dust

2. Screening Result

Data are:
- Unusable ☐
- Level A ☒
- Level B ☒

3. Level A Criteria: The following must be fully documented

Criteria		Comments
Sampling date	Yes ☒ No ☐	Recorded in Logbook ☒ COC ☒ Bottle Labels ☒
Sampling team or leader name	Yes ☒ No ☐	Recorded in Logbook ☒ COC ☒
Physical description of sampling location	Yes ☒ No ☐	Recorded in Logbook ☒ Field Forms ☒ Photo Log ☒
Sample collection depth (soils)	Yes ☐ No ☐ NA ☒	Recorded in Logbook ☐ Field Forms ☐
Sample collection technique	Yes ☒ No ☐	Collected in accordance with the SOPs in Appendix B of QAPP Yes ☒ No ☐
Field preparation technique	Yes ☒ No ☐	Collected in accordance with the SOPs in Appendix B of QAPP Yes ☒ No ☐
Sample preservation technique	Yes ☒ No ☐	Dust samples for arsenic, lead and mercury analyses submitted on ice? Yes ☒ No ☐
Sample shipping records	Yes ☒ No ☐	Did sample arrive at < 6°C but not frozen (mercury analysis)? Yes ☒ No ☐ 2.5°C Reported (corrected) temperature

4. Level B Criteria – The following must be fully documented.

Criteria		Comments
Field instrumentation methods and standardization complete.	Yes ☒ No ☐	Field equipment calibrated if used? Yes ☒ No ☐
Sample container preparation	Yes ☒ No ☐	Unpreserved bottles provided by laboratory and lot number tracked? Yes ☒ No ☐
Collection of field duplicates (1/20 minimum)	Yes ☒ No ☐	
Sampling equipment decontamination	Yes ☒ No ☐	Dedicated sampling equipment decontaminated per QAPP Yes ☒ No ☐
Field custody documentation	Yes ☒ No ☐	COC complete and signed (performed during SCUR review) Yes ☒ No ☐
Shipping custody documentation	Yes ☒ No ☐	Custody Seals applied to sample shipment cooler (performed during SCUR review) Yes ☒ No ☐ Custody Seals intact (performed during SCUR review) Yes ☒ No ☐ Shipping method verified during SCUR review
Traceable sample designation number	Yes ☒ No ☐	Sample IDs in Logbook match COC? Yes ☒ No ☐
Field logbook(s), custody records in secure repository	Yes ☒ No ☐	All notes are complete in a PDF Yes ☒ No ☐ Secure repository under RMAP protocols
Completed field forms	Yes ☒ No ☐	Are field forms, complete, legible, and signed? Yes ☒ No ☐

5. Authorization of Field Documentation Screening Review

Report prepared by: Connor E. Firor, Staff Geoscientist III
Report reviewed by: Joseph P. Kraycik, Senior Consulting Geoscientist
Report approved by: Lester J. Dupes, CEAC, Senior Quality Assurance Chemist
Report approved by: Rock J. Vitale, CEAC, Technical Director of Chemistry/Principal
Date: 7/28/2022

SECTION 2 ENFORCEMENT/SCREENING DEFINITIONS

E Enforcement quality. No qualifiers, U qualifier or J qualifier (see note below) and meets Level A and B criteria.

S Screening quality. J or UJ qualifier and/or meets only Level A criteria.

R Unusable. R qualifier and/or does not meet Level A or B requirements.

Enforcement/Screening Designation

	Meets Level A and B	Meets Level A	Does not meet Level A or B
No qualifier, A, U, or laboratory results reported between the MDL and RL with a J qualifier	E	S	R
J, J+, J-, or UJ	S	S	R
R	R	R	R

Note: It is appropriate to note that sample results qualified as estimated "J" by the laboratory because the reported result is between the MDL and RL, values are considered enforcement data if no other qualifiers were required during validation.

SECTION 3

ERM FIELD DATA SUPPORT DOCUMENTATION

RMAP FIELD SAMPLE DATA SHEET (FSDS) FOR HVS3 FLOOR DUST

Project Name/Number: Butte RMAP Indoor Dust / 0643586
Location: Butte, Montana
School: Highland View Christian
Group #: 1

Sampling Date: 6/22/22
Field Logbook No: 2
Page No: 8

Sampling Team: (ERM) Other _____ Name(s): T. Wilson

Data Item	1	2	3
Sample ID	S-0016-D-F-01-20220622	S-0016-D-FD1D-20220622	S-0016-D-EB-01-20220622
Bottle Lot #	003851	00B1x59	003865
Sample Category (circle)	~~FS-(Field Sample)~~ FD-(Field Duplicate) FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))	FS-(Field Sample) ~~FD-(Field Duplicate)~~ FB-(Field Blank) EB-(Equipment Blank) MS/MSD-(Matix Spike/(duplicate))	FS-(Field Sample) FD-(Field Duplicate) FB-(Field Blank) ~~EB-(Equipment Blank)~~ MS/MSD-(Matix Spike/(duplicate))
Sample Parent ID (if a duplicate sample)	N/A	S-0016-D-F-01-20220622	N/A
Location Description (e.g., room number, etc.)	West wing of building	West wing of building	N/A
Location Floor (circle)	~~Basement~~, Ground/Main Floor, 1st Floor, 2nd Floor, 3rd Floor Other_____	Basement, Ground/Main Floor, 1st Floor, 2nd Floor, 3rd Floor Other_____	Basement, Ground/Main Floor, 1st Floor, 2nd Floor, 3rd Floor Other N/A
Floor Type (circle)	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, Floor Mat Other: _____	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, Floor Mat Other: _____	Bare Floor: Tile, Laminate, Wood Carpet: Plush, Level Loop, Multilevel, Shag, Floor Mat Other: N/A
Approximate Sample Area (include units)	75ft²	75ft²	N/A
Date Last Vacuumed/ Cleaned	UNKNOWN	UNKNOWN	N/A
Photo ID	160337 (phone)	160337 (phone)	N/A
HVS3 Vacuum ID No.	Vacuum A	Vacuum A	Vacuum A
Leak Check? (circle)	(Yes) No	(Yes) No	Yes (No) NA
20 sec cleaning @ end? (circle)	(Yes) No	(Yes) No	Yes (No) NA
Total Sample Time	10 minutes	10 minutes	2 minutes
Flow Drop	5 inches of water	5 inches of water	N/A inches of water
Nozzle Drop	10 inches of water	10 inches of water	N/A inches of water
Final Weight	133.97 grams	131.31 grams	142.80 grams
Tare Weight	127.81 grams	127.83 grams	127.80 grams
Net Weight (Final - Tare)	6.16 grams	3.48 grams	14.99 grams
Decon Time	1531	1531	1607 TW 6/23/22 1557
Time Sample Collected	1553	1553	1602
Comments	Sample location was moved to west wing		

Lab: Pace Analytical Container: HVS3 Catch Bottle = 250 mL LDPE; Transfer to 4 oz. glass jar

For Field Team Completion (Initials) Completed by: TW QC by: GB


MAGNAVOX
NORDIC
22 June 2022 15:30
Photo 160337 emk 07/27/22

6-22-22 (7) NC, TW, LB

West elementary

0700 Met up at Hotel Lobby, Logistics, Safety Meeting

~~0830~~ 0800 Arrived at West Elementary, Checked in at office, unload and set-up equipment, Calibrated Mini-VACs

0900 Started Mini VAC at S-11 (Class Room 101 Top of chalkboard)

0930 Sampled at S-11 S-0005-D-S-11-20220622

0945 Started Mini VAC at S-12 (Classroom 102, Top of Lights) and S-6 (~~Room~~ Main Office)

1015 Sampled S-12 S-0005-D-S-12-20220622

1020 Started Mini VAC at S-13 (Class Room 103, Top of Lights & Shelving)

1030 Sampled S-6 and S-13 S-0005-D-S-06-20220622 S-0005-D-13-20220622

1035 Started Mini VAC at S-14 (Class Room 106, Top of Lights and Shelving)

1050 Sampled S-14 S-0005-S-D-S14-20220622

1100 Started VAC at S-8 (Storage Room in Main Office)

1125 Sampled S-8 S-0005-S-D-S08-20220622

1130 Started VAC at S-17 (Girl's Restroom ~~Junior~~ Construction)

1145 Sampled at S-17 S-0005-S-D-S-17-20220622

1150 Started VAC at S-18 (Class Room 108, Top of Lights) LB 6/22/22

1210 Sampled S-18 S-0005-S-D-S-18-20220622

1150 Started VAC at S-6, But No Dust in Room

1215 Started VAC at S-19 (Class Room 109, Top of Lights) LB 6/22/22

1224 Sampled S-19 S-0005-S-D-S-19-20220622

1245 Started VAC at S-20 (Class Room 112, Top of Lights)

1302 Sampled ~~S-19~~ S-20, NC 6/22/22 Duplicate S-0005-D-S-20-20220622 S-0005-D-S-20D-20220622

1430 Started VAC at S-21 (~~Teacher~~ Class Room 111, Top of Lights) NC 6/22/22

Scale: 1 square = _____

Rite in the Rain

6-22-22 (8) NC, TW, LB

West Elementary

1440 SAMPLED AT S-21 S-0005-D-S-21-20220622

1507 STARTED VAC AT S-24 (TEACHER'S LOUNGE)

1518 SAMPLED AT S-24 S-0005-D-S-24-20220622

1550 STARTED VAC AT S-25 (CLASS Room 205, TOP OF LIGHTS)

1620 SAMPLED S-25 S-0005-D-S-25-20220622

NC ~~1430~~ 1630 STARTED VAC ~~AT~~ S-22 (CLASS Room 208, TOP OF LIGHTS)

NC ~~1644~~ 1644 SAMPLED S-22 S-0005-D-S-22-20220622

1656 STARTED VAC AT S-23 (SCIENCE LAB, TOP OF LIGHTS)

1728 SAMPLED S-23 S-0005-D-S-22-20220622

1440 T. Wilson off site

1450 T. Wilson arrived at Uhall, picked up gear

1505 Arrive at Highland Christian View

1514 speak with Dawn and unload gear

1531 Decon vacuum A, leak test

1543 Begin samplings F-01 S-0016-D-F-01-20220622

1553 Finish samplings F-01 (Duplicate) S-0016-D-F-01D-20220622

1557 Decon Vacuum A

1602 Take equipment Blank (EB01) S-0016-D-EB-01-20220622

1604 Pack up gear

1610 off-site

1640 T. Wilson at West Elementary

1720 STARTED VAC AT S-40 (Room 306, TOP OF LIGHTS)

1742 SAMPLED S-40 S-0005-D-S-40-20220622

1736 STARTED VAC AT S-42 (Room 310 TOP OF LIGHTS)

See FSDS Highland View 6/22/22 TW emk 06/28/22

emk 06/28/22

Scale: 1 square = _____

6-22-22 (9) NC, TW, LB

West elementary

1751 Sampled S-42 S-0005-D-S-42-20220622

1745 Started VAC at S-41 (Room 305, Top of Lights)

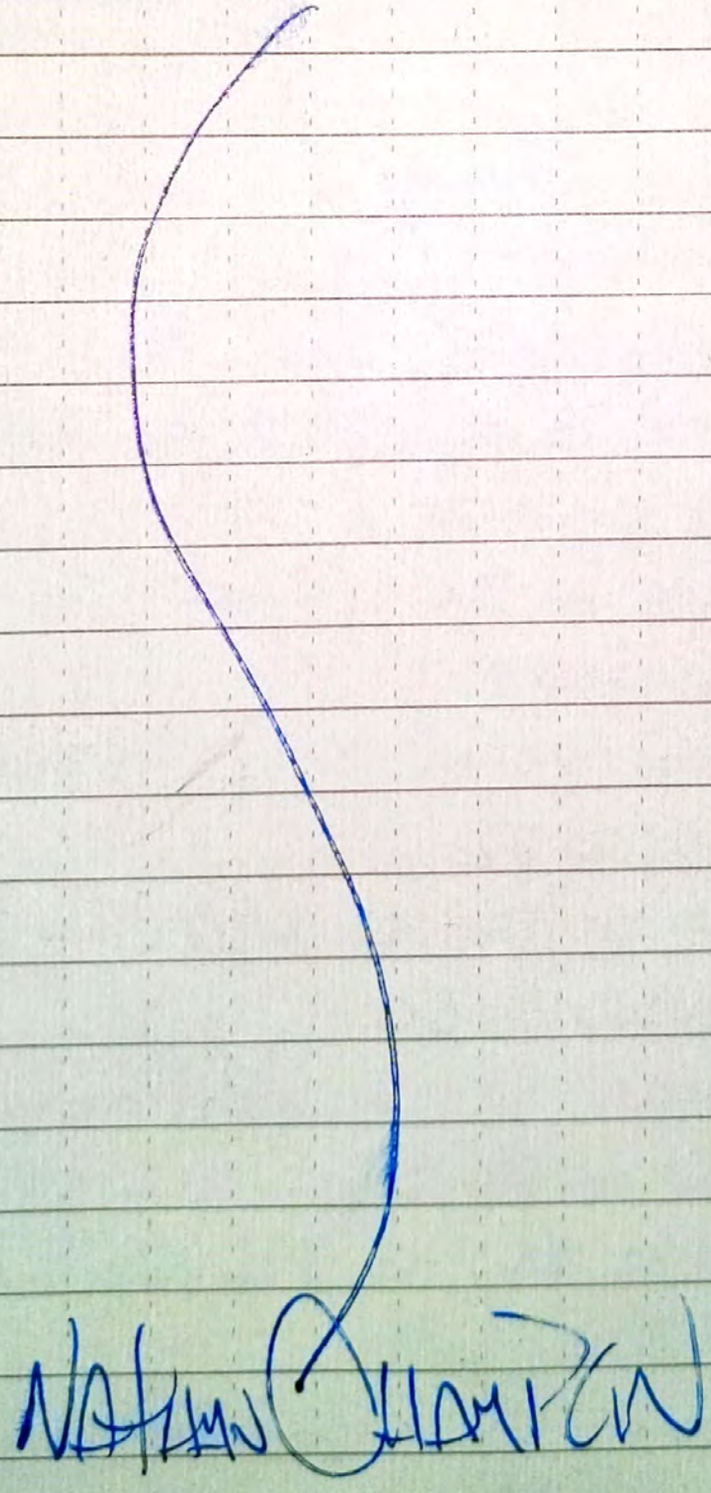
1810 Sampled S-41 S-0005-D-S-41-20220622

1800 Started VAC at S-43 (Room 309, Top of Lights)

1815 Sampled S-43 S-0005-D-S-43-20220622

1818 Pack up Equipment

1830 Depart West Elementary



Scale: 1 square = _____

Rite in the Rain

SECTION 4

PROJECT CORRESPONDENCE

From:	Elsie King
To:	Amanda Whitney
Cc:	AR_Deliverables; Joe Kraycik; Connor Firor; Lester Dupes; Rock J. Vitale
Subject:	RE: Field Documentation Review: Atlantic Richfield Indoor Dust- Highland View Christian School (Event 06222022)
Date:	Wednesday, July 27, 2022 1:36:00 PM
Attachments:	image002.png 0643586 Butte RMAP Sampling Photo 22-JUN-2022 Highland.pdf

Hi Amanda, Attached is the photo for the June 22, 2022 sample collected at Highland View.

Thanks,

Elsie King
Senior Consultant
ERM
900 E. Benson Blvd.| Suite 480 | Anchorage, AK | 99508
T +1 925 482 3792 | **M** +1 907 201 6785
E Elsie.King@erm.com | **W** www.erm.com

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From: Amanda Whitney <awhitney@envstd.com>
Sent: Wednesday, July 27, 2022 8:25 AM
To: Elsie King <Elsie.King@erm.com>
Cc: AR_Deliverables <AR_Deliverables@envstd.com>; Joe Kraycik <jkraycik@envstd.com>; Connor Firor <cfiror@envstd.com>; Lester Dupes <ldupes@envstd.com>; Rock J. Vitale <rvitale@envstd.com>
Subject: Field Documentation Review: Atlantic Richfield Indoor Dust- Highland View Christian School (Event 06222022)

Good afternoon Elsie,

Please provide the photo log associated with the indoor dust sampling for Highland View Christian School collected 6/22/2022 (SDG 10614861). Thanks!

Amanda Whitney (Harvey)
Quality Assurance Chemist
Environmental Standards, Inc.

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