CH2MHILL
Applied Sciences Laboratory

ANALYTICAL REPORT

For:

OMI - Farmington - Animas River - Post Gold King Mine Spill

ASL Report #: P3063

Project ID: 402544.A6.16.00.00

Attn: Monica Peterson/FAR

cc:
Ron Rosen/FAR

Authorized and Released By:

Laboratory Project Manager
Doug Hardy
(541) 758-0235 ext.23107

September 10, 2015

All analyses performed by CH2M HILL are clearly indicated. Any subcontracted analyses are included as appended reports as received from the subcontracted laboratory. The results included in this report only relate to the samples listed on the following Sample Cross-Reference page. This report shall not be reproduced except in full, without the written approval of the laboratory.

Any unusual difficulties encountered during the analysis of your samples are discussed in the attached case narratives.

Accredited in accordance with NELAP:
Oregon (100022)
Louisiana (05031)

ASL Report #: P3063

Sample Receipt Comments

We certify that the test results meet all NELAP requirements.

Sample Cross-Reference

ASL Sample ID	Client Sample ID	Date/Time Collected	Date Received
P306301	APS#2 - 20150908-3	09/08/15 10:54	09/09/15
P306302	APS#2 - 20150908-4	09/08/15 10:58	09/09/15
P306303	APS#2 - 20150908-2	09/08/15 10:50	09/09/15
P306304	Farmers Ditch 20150908-3	09/08/15 11:34	09/09/15
P306305	Farmers Ditch 20150908-2	09/08/15 11:30	09/09/15

CH2MHILL
Applied Sciences Laboratory (ASL)

1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330
Tel 541-768-3120 Fax 541-752-0276

CASE NARRATIVE
METALS ANALYSIS

Lab Name: CH2M HILL ASL **ASL SDG#:** P3063

Project: OMI - Farmington **Project #:** 402544.A6.16.00.00

With the exceptions noted as flags, footnotes, or detailed in the section below; standard operating procedures were followed in the analysis of the samples and no problems were encountered or anomalies observed.

All laboratory quality control samples were within established control limits, with any exceptions noted below, or in the associated QC summary forms.

Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. For diluted samples, the reporting limits are adjusted for the dilution required.

Calculations are performed before rounding to minimize errors in calculated values.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the section below, or in the sample receipt documentation.

Method(s):
E200.8: E200.2, FLDFLT
E245.1: FLDFLT

Matrix Spike/Matrix Spike Duplicate(s):
E200.8: MS/MSD recovery of antimony (49%/50%) in sample APS#2 - 20150908-3 (P306301) did not meet acceptance criteria of 70-130%.

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: APS#2 - 20150908-3

Project Name: OMI - Farmington
Sample Date: 09/08/15
Sample Time: 10:54
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: P306301

Date Received: 09/09/15
Report Revision No: 0

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Metals									
Antimony	1	0.031	0.50	0.36	J	ug/L	E200.8	E200.2	09/09/15
Arsenic	1	0.030	0.50	1.87		ug/L	E200.8	E200.2	09/09/15
Barium	1	0.25	2.00	121		ug/L	E200.8	E200.2	09/09/15
Beryllium	1	0.025	0.50	0.20	J	ug/L	E200.8	E200.2	09/09/15
Cadmium	1	0.030	0.50	0.50	U	ug/L	E200.8	E200.2	09/09/15
Chromium	1	0.10	1.00	1.74		ug/L	E200.8	E200.2	09/09/15
Copper	1	0.50	2.00	6.44		ug/L	E200.8	E200.2	09/09/15
Lead	1	0.041	0.50	6.96		ug/L	E200.8	E200.2	09/09/15
Mercury	1	0.045	0.10	0.10	U	ug/L	E245.1	METHOD	09/10/15
Selenium	1	0.069	0.50	1.0		ug/L	E200.8	E200.2	09/09/15
Thallium	1	0.025	0.20	0.070	J	ug/L	E200.8	E200.2	09/09/15

U=Not detected at specified reporting limit
J=Estimated value below reporting limit
E=Estimated value above calibration range
*=See case narrative

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: APS#2 - 20150908-4

Project Name: OMI - Farmington
Sample Date: 09/08/15
Sample Time: 10:58
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: P306302F

Date Received: 09/09/15
Report Revision No: 0

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Dissolved Metals									
Antimony	1	0.031	0.50	0.30	J	ug/L	E200.8	FLDFLT	09/09/15
Arsenic	1	0.030	0.50	1.11		ug/L	E200.8	FLDFLT	09/09/15
Barium	1	0.25	2.00	77.3		ug/L	E200.8	FLDFLT	09/09/15
Beryllium	1	0.025	0.50	0.50	U	ug/L	E200.8	FLDFLT	09/09/15
Cadmium	1	0.030	0.50	0.50	U	ug/L	E200.8	FLDFLT	09/09/15
Chromium	1	0.10	1.00	0.71	J	ug/L	E200.8	FLDFLT	09/09/15
Copper	1	0.50	2.00	3.12		ug/L	E200.8	FLDFLT	09/09/15
Lead	1	0.041	0.50	0.088	J	ug/L	E200.8	FLDFLT	09/09/15
Mercury	1	0.045	0.10	0.10	U	ug/L	E245.1	FLDFLT	09/10/15
Selenium	1	0.069	0.50	1.10		ug/L	E200.8	FLDFLT	09/09/15
Thallium	1	0.025	0.20	0.20	U	ug/L	E200.8	FLDFLT	09/09/15

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Client Sample ID: Farmers Ditch 20150908-3

Project Name: OMI - Farmington
Sample Date: 09/08/15
Sample Time: 11:34
Type: Grab
Matrix: Water

Lab Information

Lab Sample ID: P306304

Date Received: 09/09/15
Report Revision No: 0

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Metals									
Antimony	1	0.031	0.50	0.28	J	ug/L	E200.8	E200.2	09/09/15
Arsenic	1	0.030	0.50	1.38		ug/L	E200.8	E200.2	09/09/15
Barium	1	0.25	2.00	148		ug/L	E200.8	E200.2	09/09/15
Beryllium	1	0.025	0.50	0.22	J	ug/L	E200.8	E200.2	09/09/15
Cadmium	1	0.030	0.50	0.50	U	ug/L	E200.8	E200.2	09/09/15
Chromium	1	0.10	1.00	1.62		ug/L	E200.8	E200.2	09/09/15
Copper	1	0.50	2.00	3.76		ug/L	E200.8	E200.2	09/09/15
Lead	1	0.041	0.50	6.64		ug/L	E200.8	E200.2	09/09/15
Mercury	1	0.045	0.10	0.10	U	ug/L	E245.1	METHOD	09/10/15
Selenium	1	0.069	0.50	0.69		ug/L	E200.8	E200.2	09/09/15
Thallium	1	0.025	0.20	0.072	J	ug/L	E200.8	E200.2	09/09/15

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: OMI - Farmington
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Method Blank ID: WB1-0909

Date Received: N/A
Report Revision No: 0

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Metals									
Antimony	1	0.031	0.50	0.038	J	ug/L	E200.8	E200.2	09/09/15
Arsenic	1	0.030	0.50	0.50	U	ug/L	E200.8	E200.2	09/09/15
Barium	1	0.25	2.00	2.00	U	ug/L	E200.8	E200.2	09/09/15
Beryllium	1	0.025	0.50	0.50	U	ug/L	E200.8	E200.2	09/09/15
Cadmium	1	0.030	0.50	0.50	U	ug/L	E200.8	E200.2	09/09/15
Chromium	1	0.10	1.00	1.00	U	ug/L	E200.8	E200.2	09/09/15
Copper	1	0.50	2.00	2.00	U	ug/L	E200.8	E200.2	09/09/15
Lead	1	0.041	0.50	0.12	J	ug/L	E200.8	E200.2	09/09/15
Mercury	1	0.045	0.10	0.10	U	ug/L	E245.1	METHOD	09/10/15
Selenium	1	0.069	0.50	0.50	U	ug/L	E200.8	E200.2	09/09/15
Thallium	1	0.025	0.20	0.20	U	ug/L	E200.8	E200.2	09/09/15

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: OMI - Farmington
Sample Date: N/A
Sample Time: N/A
Type: QC
Matrix: Water

Lab Information

Method Blank ID: WB11-0909

Date Received: N/A
Report Revision No: 0

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Dissolved Metals									
Antimony	1	0.031	0.50	0.18	J	ug/L	E200.8	FLDFLT	09/09/15
Arsenic	1	0.030	0.50	0.50	U	ug/L	E200.8	FLDFLT	09/09/15
Barium	1	0.25	2.00	2.00	U	ug/L	E200.8	FLDFLT	09/09/15
Beryllium	1	0.025	0.50	0.50	U	ug/L	E200.8	FLDFLT	09/09/15
Cadmium	1	0.030	0.50	0.50	U	ug/L	E200.8	FLDFLT	09/09/15
Chromium	1	0.10	1.00	1.00	U	ug/L	E200.8	FLDFLT	09/09/15
Copper	1	0.50	2.00	2.00	U	ug/L	E200.8	FLDFLT	09/09/15
Lead	1	0.041	0.50	0.50	U	ug/L	E200.8	FLDFLT	09/09/15
Selenium	1	0.069	0.50	0.50	U	ug/L	E200.8	FLDFLT	09/09/15
Thallium	1	0.025	0.20	0.20	U	ug/L	E200.8	FLDFLT	09/09/15

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: OMI - Farmington
Type: QC
Matrix: Water

Lab Information

Blank Spike ID: BS11W0909

Report Revision No: 0
Dilution Factor: 1

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
Metals							
Antimony	20.0	20.1	ug/L	100	E200.8	FLDFLT	09/09/15
Arsenic	20.0	19.6	ug/L	98	E200.8	FLDFLT	09/09/15
Barium	20.0	20.0	ug/L	100	E200.8	FLDFLT	09/09/15
Beryllium	20.0	20.7	ug/L	103	E200.8	FLDFLT	09/09/15
Cadmium	20.0	19.9	ug/L	100	E200.8	FLDFLT	09/09/15
Chromium	20.0	20.0	ug/L	100	E200.8	FLDFLT	09/09/15
Copper	20.0	19.6	ug/L	98	E200.8	FLDFLT	09/09/15
Lead	20.0	20.7	ug/L	103	E200.8	FLDFLT	09/09/15
Selenium	20.0	19.9	ug/L	100	E200.8	FLDFLT	09/09/15
Thallium	20.0	20.3	ug/L	102	E200.8	FLDFLT	09/09/15

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: OMI - Farmington
Type: QC
Matrix: Water

Lab Information

Blank Spike ID: BS1W0909

Report Revision No: 0
Dilution Factor: 1

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
Metals							
Antimony	50.0	47.6	ug/L	95	E200.8	E200.2	09/09/15
Arsenic	50.0	48.2	ug/L	96	E200.8	E200.2	09/09/15
Barium	50.0	50.1	ug/L	100	E200.8	E200.2	09/09/15
Beryllium	50.0	51.8	ug/L	104	E200.8	E200.2	09/09/15
Cadmium	50.0	49.6	ug/L	99	E200.8	E200.2	09/09/15
Chromium	50.0	49.7	ug/L	99	E200.8	E200.2	09/09/15
Copper	50.0	46.6	ug/L	93	E200.8	E200.2	09/09/15
Lead	50.0	49.7	ug/L	99	E200.8	E200.2	09/09/15
Mercury	1.00	1.05	ug/L	105	E245.1	METHOD	09/10/15
Selenium	50.0	49.2	ug/L	98	E200.8	E200.2	09/09/15
Thallium	50.0	50.9	ug/L	102	E200.8	E200.2	09/09/15

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CASE NARRATIVE
GENERAL CHEMISTRY ANALYSIS

Lab Name: CH2M HILL ASL **ASL SDG#:** P3063

Project: OMI - Farmington **Project #:** 402544.A6.16.00.00

With the exceptions noted as flags, footnotes, or detailed in the section below; standard operating procedures were followed in the analysis of the samples and no problems were encountered or anomalies observed.

All laboratory quality control samples were within established control limits, with any exceptions noted below, or in the associated QC summary forms.

Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. For diluted samples, the reporting limits are adjusted for the dilution required.

Calculations are performed before rounding to minimize errors in calculated values.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the section below, or in the sample receipt documentation.

Method(s):
E335.4

CH2M HILL Applied Sciences Laboratory (ASL)

Client Information		Lab Information	
Project Name:	**OMI - Farmington**	**Lab Batch ID:**	**P3063**
Date Received:	09/09/15	Analysis Method:	E335.4
Type:	See C.O.C.	Units:	mg/L
Matrix:	Water	Report Revision No.:	0

Client Sample ID	Lab Sample ID	Dilution Factor	DL	Cyanide, Total RL	Result	Qualifier	Date Analyzed
General Chemistry							
APS#2 - 20150908-2	P306303	1	0.0015	0.0050	0.0050	U	09/10/15
Farmers Ditch 20150908-2	P306305	1	0.0015	0.0050	0.0050	U	09/10/15
WB1-090915	WB1-090915	1	0.0015	0.0050	0.0050	U	09/10/15

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CH2M HILL Applied Sciences Laboratory (ASL)

Client Information

Project Name: OMI - Farmington
Type: QC
Matrix: Water

Lab Information

Lab Batch ID: P3063

Report Revision No.: 0

LCS ID	Analyte	Spike Amount	Sample Result	Units	% Recovery	Analysis Method	Date Analyzed
General Chemistry							
BS1W0909	Cyanide, Total	0.10	0.10	mg/L	101	E335.4	09/10/15

*=See case narrative
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J=Estimated value below reporting limit

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CH2MHILL Applied Sciences Laboratory
CHAIN OF CUSTODY RECORD
AND AGREEMENT TO PERFORM SERVICES

Chain of Custody Record

1100 NE Circle Blvd. Suite 300
Corvallis, OR 97330
(541) 768-3120

Client Contact

Project Name: Animas River - Post Gold King Mine Spill
Project # or PO #: 402544
Company Name: CH2M - Farmington
Address: 615 S. Carlton Ave.
City/State/Zip: Farmington, NM 87401
Project Manager: Monica Peterson
Phone #: 505-325-6953 - 505-793-0040
Report to email: Monica.Peterson@ch2m.com

Analysis Turnaround Time

TAT is Calander days
TAT if different from below _____
☐ 21 days (STD)
☐ 14 days * ☐ 3 day *
☐ 7 days * ☐ 2 days *
☐ 5 days * ☑ 1 day *
* (Surcharges will apply)

Preservation Used

For Lab Use Only:
SDG: P3063
Custody Seals intact? ☐ Yes ☐ No
Hand delivered? ☐ Yes ☐ No
Cooler Temp: 0.1 °C
Therm ID No. 173 Therm Exp/ 12/15
Packing Material: Circle Below
Ice Blue Ice Box Bubble Wrap
Radiological Screen? ☐ Yes ☑ No

Sample Identification (Limit of 20 characters)	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix (Water, Soil, Air)	Total # of Cont.	Total Metals: Be, Sb, As, Ba, Cd, Cr, Pb, Se, Tl, Hg, Cu (1, 4)	Dissolved Metals: Be, Sb, As, Ba, Cd, Cr, Pb, Se, Tl, Hg, Cu (1)	CN (1, 5)							Sample Specific Notes:	Lab ID:
APS#2, Upstream Boat Access - 20150908-3	9/8/2015	1054	G	Water	1	X										1
APS#2, Upstream Boat Access - 20150908-4	9/8/15	1058	G	Water	1		X								FILTERED	2
APS#2, Upstream Boat Access - 20150908-2	9/8/15	1050	G	Water	1			X								3
Farmers Ditch, 20150908-3	9/8/15	1134	G	Water	1	X										4
Farmers Ditch, 20150908-2	9/8/15	1130	G	Water	1			X								5

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are samples hazardous? ☐ Yes ☑ No
If yes, select hazard(s): ☐ Listed ☐ Ignitable ☐ Corrosive ☐ Reactive ☐ Toxic
If YES or NO is not checked above, samples will be assumed hazardous and hazardous disposal fees will be applied.

Sample Disposal (A fee may be added if samples are retained longer than 30 day per client request, samples are returned to client, or classified as hazardous.)
☐ Return to Client ☑ Disposal by Lab ☐ Archive for 1 months

Sampled By: [signature] Date/Time: 9/8/15 @ 1054
Received by: FedEx Date/Time: 9/8/15 @ 1600
Received in Laboratory by: [signature] Date/Time: 9/9/15 10:55

Relinquished by: [signature] Date/Time: 9/8/15 1600
Relinquished by: Date/Time:
Shipped Via: ☐ UPS ☑ Fed-Ex ☐ USPS ☐ Other Tracking #:

Special Instructions/QC Requirements

DOC CONTROL ID: ASL1081-0814

CH2MHILL
Applied Sciences Laboratory (ASL)

Sample Receipt Record

SDG ID: P3063 | Date Received: 9/9/2015

Client/Project: OMI Farmington | Received By: PC

Were custody seals intact and on the outside of the cooler?	☑ Yes	☐ No	☐ N/A
Shipping Record:	☐ Hand Delivered	☑ On File	☐ COC
Radiological Screening for DoD	☐ Yes	☐ No	☑ N/A
Packing Material:	☐ Hand Delivered	☑ Ice	☐ Blue Ice ☐ Box
Temp OK? (<6C) Therm ID: TH173 Exp. 10/15	0.1 °C	☐ Yes	☐ No ☐ N/A
Was a Chain of Custody (CoC) Provided?	☑ Yes	☐ No	☐ N/A
Was the CoC correctly filled out (If No, document below)	☑ Yes	☐ No	☐ N/A
Did sample labels agree with COC? (If No, document below)	☑ Yes	☐ No	☐ N/A
Did the CoC list a correct bottle count and the preservative types (No=Correct on CoC)	☑ Yes	☐ No	☐ N/A
Were the sample containers in good condition (broken or leaking)?	☑ Yes	☐ No	☐ N/A
Was enough sample volume provided for analysis? (If No, document below)	☑ Yes	☐ No	☐ N/A
Containers supplied by ASL?	☐ Yes	☑ No	☐ N/A
Any sample with < 1/2 holding time remaining? If so contact LPM	☐ Yes	☑ No	☐ N/A
Samples have multi-phase? If yes, document on SRER	☐ Yes	☑ No	☐ N/A
All water VOCs free of air bubbles? No, document on SRER	☐ Yes	☐ No	☑ N/A
pH of all samples met criteria on receipt? If "No", preserve and document below.	☑ Yes	☐ No	☐ N/A
Dissolved/Soluble metals filtered in the field?	☑ Yes	☐ No	☐ N/A
Dissolved/Soluble metals have sediment in bottom of container? If so document below.	☐ Yes	☑ No	☐ N/A

Preservation Adjustment

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials/Time	24 hour pH check Initials/Time

Did pH of all metals samples preserved upon receipt meet criteria 24 hours after preservation? ☐ Yes ☐ No

Sample Exception Report (The following exceptions were noted)

Client was notified on: Client contact:

Resolution to Exception: