

# Atlanta Area Mines Expanded Preliminary Assessment and Site Inspection Report

Elmore County



State of Idaho Department of  
Environmental Quality  
and  
Alta Science & Engineering, Inc.  
March 2019



## **Acknowledgments**

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## Abbreviations, Acronyms, and Symbols

Alta	Alta Science & Engineering, Inc.
CLP	Contract Laboratory Program
DEQ	Idaho Department of Environmental Quality
EPA	United States Environmental Protection Agency
IDFG	Idaho Department of Fish and Game
IGS	Idaho Geological Survey
kg	kilogram
L	liter
lb	pound
MCL	maximum contaminant level
mg	milligram
oz	ounce
PA	preliminary assessment
PPE	probable point of entry
ppm	parts per million
PWS	public water system
QAPP	quality assurance project plan
QA	quality assurance
QC	quality control
RSL	regional screening level
SAP	sampling and analysis plan
SI	site inspection
TDL	target distance limit
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

## 1 Introduction

This report presents expanded preliminary assessment and site inspection (PA/SI) results for the Atlanta area mines located in Elmore County, Idaho. Under a cooperative agreement with the US Environmental Protection Agency (EPA), Region 10, the Idaho Department of Environmental Quality (DEQ) provides technical support for performing the PA/SI process at various mine and industrial sites located on private, state, or mixed ownership (public and private) lands. Additional information about DEQ's PA program is at <http://www.deq.idaho.gov/preliminary-assessments>.

DEQ initiated the PA program in February 2002 to prioritize and assess potentially contaminated sites. Due to accessibility and funding considerations, priority is given to sites where potential contamination poses the most substantial threat to human health or the environment. Recently, DEQ focused efforts in areas where residential and recreational developments are encroaching on historic mining districts. Priority is also given to mining districts where groups or clusters of sites can be cost-effectively assessed on a watershed basis.

This expanded PA/SI collected additional samples to evaluate the surface water pathway based on 2016 PA/SI sample results and observations of extensive erosion from waste rock piles.

## 2 Site Background

The Atlanta area mines are located in Elmore County, Idaho, on the Middle Fork Boise River within the Atlanta (Middle Boise) Mining District approximately 90 miles northeast of Mountain Home (Figure 1). The sites are located on private property, and access was granted to the mine sites by Atlanta Gold Corporation and Hollenbeck Properties, LLC (Figure 2). Surrounding properties accessed during this additional SI are located on US Forest Service (USFS) lands.

### 2.1 Site Location

Site Name:	Atlanta Area Mines
Location:	Approximately 0.5 miles south of Atlanta, Idaho. Accessible via two roads: Quartz Street (208/209A) and Mine Hill Road/Middle Fork Road (207)
County:	Elmore
Latitude/Longitude:	43°48'06.09"N/115°07'37.48"W

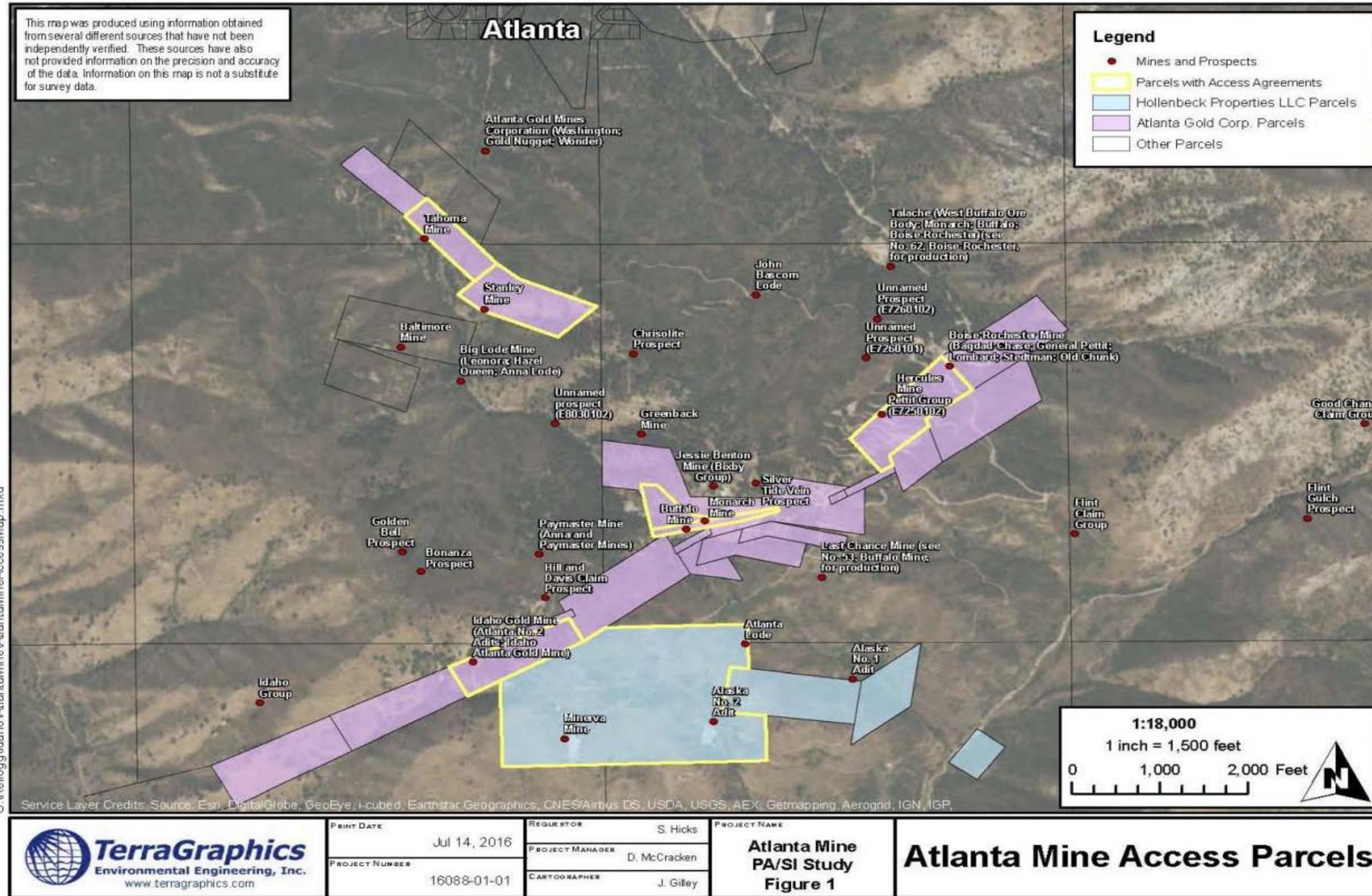


Figure 1. Site location map.

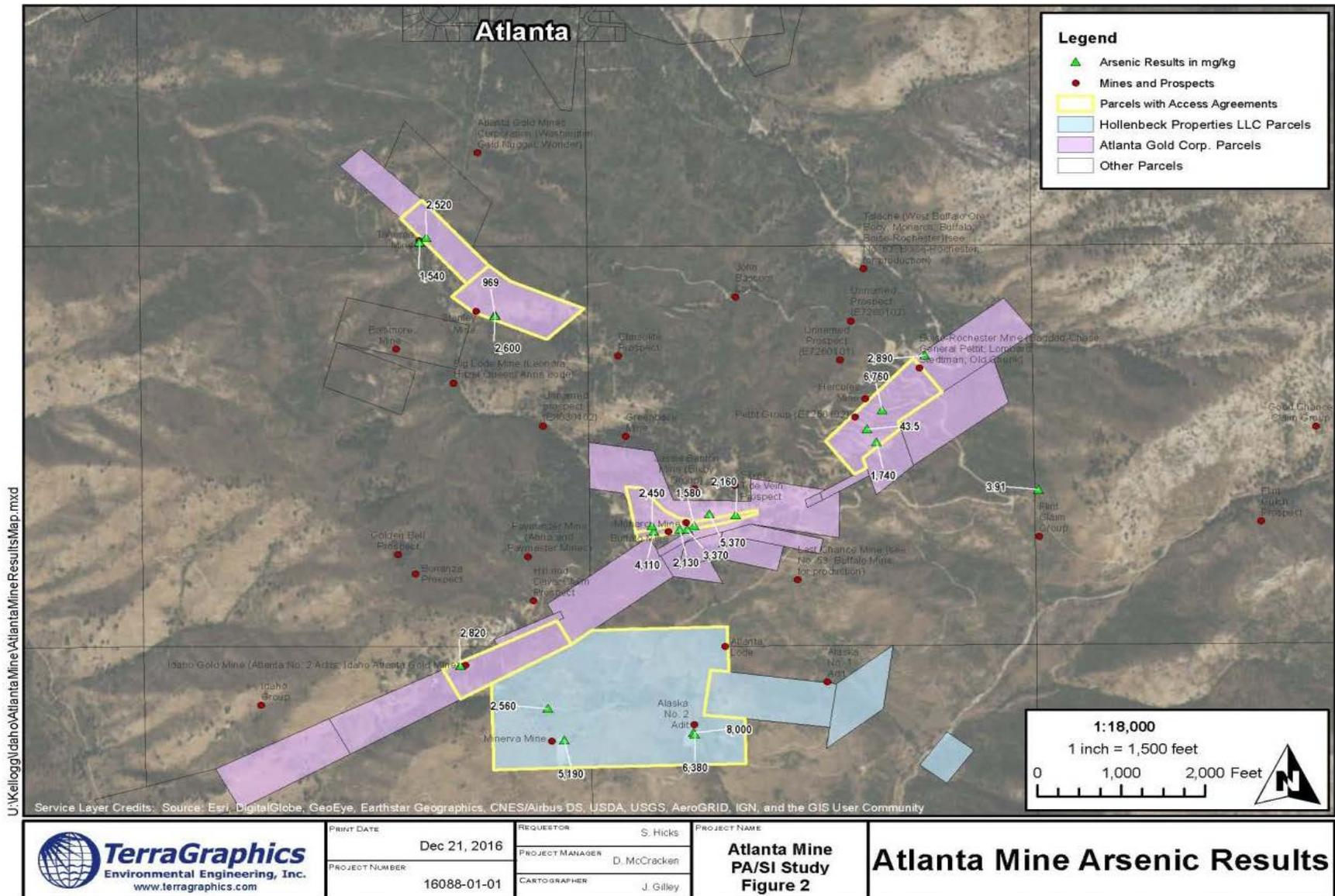


Figure 2. PA/SI sample locations and arsenic results for 2016.

## 2.2 Site Description

The Atlanta area mines are comprised of 33 mines located in a 2 x 2.5-mile mountainous area 0.5 miles south of Atlanta, Idaho. The mining area is bound to the north by the Middle Fork Boise River, to the south by Flint and Decker Creeks, to the east by Montezuma Creek, and to the west by Yuba River. Quartz Creek flows from within the mine area north to the Middle Fork Boise River. The mines are located on private property and USFS lands.

DEQ performed PA/SI activities in 2016 on 11 mines where access was granted from private property owners. Potential contamination sources, including waste piles and adit discharge, were identified on 10 of the 11 properties evaluated (DEQ and TerraGraphics 2017). A number of mines are located on surrounding USFS lands. Although waste piles were noted on some of these sites, they were not evaluated under DEQ's 2016 PA/SI. Potential contaminant source waste piles are discussed further in section 2.5.

## 2.3 Ownership History

The Atlanta area mines are located on private property in the Atlanta (Middle Boise) Mining District (Figure 1). Table 1 lists the coordinates (IGS 2016) and parcel numbers for each mine site. Sampling for this PA was conducted on private property. DEQ does not warrant the ownership research or location of property boundaries contained in this report. Information about ownership and property boundaries was obtained from the parcel maps for Elmore County (Idaho State Tax Commission 2016).

**Table 1. Mine site locations and parcel information.**

Mine Site	Latitude <sup>a</sup>	Longitude <sup>a</sup>	Parcel No.	Property Owner
Tahoma Mine	43.7909526706	-115.13050297	RPM5N11E031400	Atlanta Gold Corp.
Stanley Mine	43.7883927106	-115.127962867	RPM5N11E101410	Atlanta Gold Corp.
Buffalo Mine	43.7804028401	-115.119382526	RPM5N11E111360	Atlanta Gold Corp.
Monarch Mine	43.7807128428	-115.118592508	RPM5N11E111370	Atlanta Gold Corp.
Idaho Gold Mine	43.7756428193	-115.128582718	RPM5N11E150110	Atlanta Gold Corp.
Pettit Group	43.7844928617	-115.110942346	RPM5N11E110510	Atlanta Gold Corp.
Minerva Mine	43.7728728704	-115.124702574	RPM5N11E140670	Hollenbeck Properties LLC
Alaska No. 2 Adit	43.7734429093	-115.118282405	RPM5N11E140670	Hollenbeck Properties LLC

<sup>a</sup>World Geodetic Survey 1984

## 2.4 Climatology

Climate information is summarized for Atlanta, Idaho, (Station 100491) by the Western Regional Climate Center (WRCC 2016) at <https://wrcc.dri.edu/>. Based on data collected from 1955 to 1975, total annual precipitation averages 28.51 inches with a total annual snowfall average of 168.6 inches. The driest months of the year are July and August. The average annual high temperature is 55.7 °F, and the average annual low temperature is 25.2 °F. July is the hottest month with an average high temperature of 83.9 °F. December is the coldest month with an average low temperature of 11.8 °F.

## 2.5 Operations and Waste Characteristics

The geology and history of past mining activities help in understanding levels of production, commodities, and potential waste types at the site. This information documents the importance of historic mining districts and operations when reevaluated from an economics, multiple land use, human health risks, and ecological risks perspective. Historical research identifies the potential contaminants of concern, estimates the magnitude of waste at the site, locates potentially dangerous physical hazards such as open adits and shafts, and identifies historical land uses that coincide with mining. Numerous sources were researched before visiting the site and conducting the PA/SI.

### 2.5.1 Historic Site Operations

Table 2 provides a summary of commodities and production for each mine. Key documents containing the geology and history of past mining activities are listed below:

- *Preliminary Report on the Geology and Mineral Deposits of the Atlanta Hill Area, Elmore County, Idaho* (Kiilsgaard and Bacon 2004)
- *Geology and Ore Deposits of the Atlanta District, Elmore County, Idaho* (Anderson 1939)
- *History of the Atlanta Mining Area, Elmore County, Idaho* (Mitchell 2000)
- *Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 4)* (Kauffman, et.al. 2002)

**Table 2. Commodities and production (IGS 2016).**

Mine	Commodities (Production)
Tahoma Mine	Copper, gold (100–500 ounces [oz]), lead (101–500 pounds [lb]), silver (1,001–5,000 oz), zinc
Stanley Mine	None listed
Buffalo Mine	gold (51–100 oz), silver (501–1,000 oz)
Monarch Mine	gold (5,001–10,000 oz), lead (1,001–5,000 lb), silver (50,001–100,000 oz), zinc (501–1,000 lb)
Idaho Gold Mine	Gold, silver
Pettit Group	None listed
Minerva Mine	Antimony, gold (10,001–50,000 oz), silver (10,100–50,000 oz)
Alaska No. 2 Adit	None listed

Other areas of interest include the tailings site near the Talache Mine (Figure 1). On May 15, 1997, the upper tailings pile embankment failed and released tailings into adjacent areas. Time-critical removal actions were performed from 1997–1999 to stabilize the release area and relocate some of the dispersed tailings. Nontime-critical removal actions were performed from 2000–2003 to stabilize and close the upper tailings plie and lower tailings pile (MFG 2004). Long-term inspections and maintenance activities are ongoing.

## 2.5.2 Sources

Sources at the sites include 15 waste piles, 2 ore stockpiles, and 1 adit with flowing discharge. Waste sources at Tahoma Mine are located adjacent to a perennial stream (Quartz Creek). All other waste sources are located near seasonal streams that were dry during the 2016 SI. All waste piles showed evidence of erosion. A clear runoff path was evident between the flowing adit and Quartz Creek, although adit discharge was infiltrating before reaching the creek. Other waste sources are visible on aerial imagery or were observed on USFS lands during the 2016 SI; however, these sources and their associated surface water pathways were not evaluated during this expanded PA/SI.

Contaminants of concern at the site are metals associated with historical mining activities, primarily arsenic. Based on 2016 sampling, other contaminants of concern include antimony, which was detected at concentrations above industrial regional screening levels, and cadmium, copper, lead, mercury, selenium, silver, and zinc, which were detected at concentrations above background soil values (DEQ and TerraGraphics 2017).

## 2.6 Previous Investigations

In July 2016, a combination of grab soil samples, grab sediment samples, and surface water samples were collected as part of the PA/SI. The PA/SI assessed the potential threat posed to human health and the environment and determined the need for additional investigation of the Atlanta area mines. Figure 2 depicts sample locations and associated arsenic concentrations from the 2016 PA/SI. A summary of waste source sampling locations and descriptions from the 2016 PA/SI is presented in Table 3. The field crew visited 11 mine sites located on private property where consent was granted; of these sites, 10 contained at least one waste source. The field team evaluated two additional sites located on USFS land, but no sampling was conducted on USFS property. Grab samples were collected from waste piles, and collocated surface water and sediment were collected from adit discharge and impacted creeks if water was flowing. Table 4 shows soil and sediment sampling results, and Table 5 shows surface water results.

DEQ mine waste program staff and DEQ's contractor (Alta Science and Engineering, Inc., formerly TerraGraphics) completed a PA/SI report for the following Atlanta area mines: Tahoma Mine, Stanley Mine, Buffalo Mine, Monarch Mine, Idaho Gold Mine, Minerva Mine, Alaska No. 2 Adit, and Pettit Group (DEQ and TerraGraphics 2017).

**Table 3. Sample location descriptions from 2016 PA/SI.**

<b>Mine Site</b>	<b>Sample ID</b>	<b>Description</b>
Pettit Group	PG-WD-SS1	Pettit Group Mine grab sample from trench spoil pile that contained altered rock related to the mineralized zone.
Pettit Group	PG-WD-SS2	Pettit Group Mine grab sample from waste rock used to form a berm around collapsed shaft opening.
Monarch Mine	MC-WD-SS1	Monarch Mine grab sample from waste pile of fine-grained, mineralized rock. Rock contained visible arsenopyrite and scorodite (arsenopyrite oxide mineral).
Monarch Mine	MC-WD-SS2	Monarch Mine grab sample from discrete fine-grained waste rock pile.
Monarch Mine	MC-WD-SS3	Monarch Mine grab sample of gully wash material from waste at base of a heavily eroded alluvial fan slope.
Monarch Mine	MC-WD-SS4	Monarch Mine grab sample from waste material forming a berm below the gully wash material at road level.
Monarch Mine	MC-WD-SS5	Monarch Mine grab sample from roadway/parking area soils adjacent to the dirt road leading to the site.
Buffalo Mine	BM-WD-SS1	Buffalo Mine grab sample from stockpile of fine-grained waste material.
Buffalo Mine	BM-WD-SS2	Buffalo Mine grab sample from waste material forming a berm around shaft opening.
Idaho Gold Mine	IG-WD-SS1	Idaho Gold Mine grab sample from waste pile near adit opening.
Minerva Mine	MM-WD-SS1	Minerva Mine grab sample from upper waste pile.
Minerva Mine	MM-WD-SS2	Minerva Mine grab sample from lower waste pile below Adit No. 2.
Alaska No. 2 Adit	AK2-OS-SS1	Alaska No. 2 Adit grab sample from apparent ore stockpile.
Alaska No. 2 Adit	AK2-WD-SS2	Alaska No. 2 Adit grab sample from waste pile.
Hercules Mine	HM-WD-SS1	Hercules Mine grab sample from waste pile.
Boise-Rochester (Atlanta Gold 600 Level)	BR-WD-SS1	Boise Rochester Mine (Atlanta Gold 600 Level) grab sample of silt material from dried puddle located in the laydown yard of the 600 level.
Stanley Mine	SM-OS-SS1 and SM-OS-SS2	Stanley Mine grab sample from mineralized ore stockpile placed to the side of the adit opening. SM-OS-SS2 is a duplicate sample of SM-OS-SS1.
Stanley Mine	SM-WD-SS3	Stanley Mine grab sample from waste dump.
Background upslope of Atlanta area mines	AA-BK-SS1 and AA-BK-SS2	Atlanta area mines background sample collected from lower slope of Flint Mountain. Sample collected from rocky soils above ATV trail. AA-BK-SS2 is a duplicate sample of AA-BK-SS1.
Tahoma Mine	TM-WD-SS1	Tahoma Mine grab sample from waste pile berm on Adit No.1 level.
Tahoma Mine	TM-AD1-SD1 and TM-AD1-SD2	Tahoma Mine sediment sample collected from entrance of pond approximately 50 feet downstream of Adit No. 1 opening. TM-AD1-SD2 is a duplicate sample of TM-AD1-SD1.
Tahoma Mine	TM-US-SD1	Sediment sample collected from upstream location above the Tahoma Mine Adit No. 1 discharge.
Tahoma Mine	TM-US-SW1 and TM-US-SW2	Surface water sample collected from upstream location above the Tahoma Mine Adit No. 1 discharge. TM-US-SW2 is a duplicate sample of TM-US-SW1.

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<b>Mine Site</b>	<b>Sample ID</b>	<b>Description</b>
Tahoma Mine	TM-AD1-SW1	Surface water sample of Adit No. 1 discharge collected where discharge enters small pond approximately 50 feet downstream of adit opening.
Atlanta Public Water System (PWS)	APWS-US-SW1 and APWS-US-SW2	Surface water sample collected upstream of intake for the Atlanta, Idaho public drinking water system. Sample APWS-US-SW2 is a field blank sample collected after APWS-US-SW1 sample collection.

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Table 4. Soil and sediment sample results from 2016 PA/SI.

Location Description	Sample ID	Sample Type	Date	Analyte (mg/kg)													
				antimony	arsenic	barium	cadmium	chromium	copper	iron	lead	manganese	selenium	silver	zinc	mercury	
<b>Petit Group</b>																	
trench spoil pile	PG-WD-SS1	grab - soil	7/18/2016	10	1,740 J	68.6 J-	<0.20	<0.60	2.45	15,300	19.1	455	2.48 J	<0.50	66.4	0.170 J-	
berm around shaft	PG-WD-SS2	grab - soil	7/18/2016	<2.0	43.5 J	95.4 J-	<0.20	1.11	3.59	13,500	8.02	369	1.99 J	<0.50	68.3	<0.033 UJ	
<b>Monarch Mine</b>																	
waste pile with mineralized rock	MC-WD-SS1	grab - soil	7/19/2016	8.8	2,160 J	37.3 J-	<0.20	<0.60	7.34	5,650	6.51	1.69	1.18 J	0.92	27.6	<0.033 UJ	
fine grained waste pile	MC-WD-SS2	grab - soil	7/19/2016	21.4	5,370 J	59.6 J-	<0.20	0.68	3.26	12,100	16.6	43.1	1.13 J	2.76	14.2	0.058 J-	
waste at base of heavily eroded slope	MC-WD-SS3	grab - soil	7/19/2016	19.6	1,580 J	57.8 J-	<0.20	0.92	2.61	15,300	11.8	383	1.84 J	2.68	90.6	0.065 J-	
berm around road level	MC-WD-SS4	grab - soil	7/19/2016	29.6	3,370 J	64.8 J-	<0.20	1.24	3.37	12,500	22.1	221	1.91 J	5.89	53.6	0.213 J-	
roadway/parking area soils	MC-WD-SS5	grab - soil	7/19/2016	32.2	2,130 J	26.4 J-	<0.20	<0.60	3.11	5,460	17.6	25.0	0.49 J	4.02	10.2	0.188 J-	
<b>Buffalo Mine</b>																	
fine grained waste pile	BM-WD-SS1	grab - soil	7/19/2016	21.2	4,110 J	46.7 J-	<0.20	1.27	7.95	10,700	34.0	26.7	1.00 J	12.6	20.4	0.233 J-	
berm around shaft	BM-WD-SS2	grab - soil	7/19/2016	21.9	2,450 J	48.7 J-	<0.20	7.36	14.5	15,100	31.6	224	1.58 J	364	50.3	0.317 J-	
<b>Idaho Gold Mine</b>																	
waste pile by adit opening	IG-WD-SS1	grab - soil	7/19/2016	22.9	2,820 J	28.7 J-	<0.20	<0.60	7.66	11,800	13.2	140	1.41 J	1.67	49.8	0.205 J-	
<b>Minerva Mine</b>																	
upper waste pile	MM-WD-SS1	grab - soil	7/20/2016	31.6	2,560 J	43.1 J-	<0.20	<0.60	10.8	6,770	68.3	75.9	1.36 J	62.7	24.7	0.282 J-	
lower waste pile	MM-WD-SS2	grab - soil	7/20/2016	14.3	5,190 J	37.8 J-	<0.20	<0.60	5.41	9,890	30.5	90.3	1.07 J	12.7	32.2	0.328 J-	
<b>Alaska No. 2 Adit</b>																	
ore stockpile	AK2-OS-SS1	grab - soil	7/20/2016	42.2	8,000 J	27.6 J-	<0.20	<0.60	3.39	10,900	54.1	8.50	0.66 J	36.6	27.8	0.118 J-	
waste pile	AK2-WD-SS2	grab - soil	7/20/2016	32.8	6,380 J	33.4 J-	<0.20	<0.60	4.01	9,080	42.3	4.89	0.65 J	70.2	12.0	0.097 J-	
<b>Hercules Mine</b>																	
waste pile	HM-WD-SS1	grab - soil	7/20/2016	37.9	6,760 J	34.6 J-	<0.20	<0.60	3.84	9,490	38.7	4.91	0.55 J	22.7	12.4	0.047 J-	
<b>Boise-Rochester (Atlanta Gold 600 Level)</b>																	
silt material from laydown yard	BR-WD-SS1	grab - soil	7/20/2016	12.6	2,890 J	72.2 J-	<0.20	2.25	16.2	16,100	33.3	393	1.72 J	3.62	101	0.322 J-	
<b>Stanley Mine</b>																	
ore stockpile by adit opening	SM-OS-SS1	grab - soil	7/21/2016	52.9	2,580 J	27.6 J-	<0.20	<0.60	39.2	13,500	250	13.3	0.41 J	113	11.9	2.36 J-	
ore stockpile by adit opening (duplicate)	SM-OS-SS2	grab - soil	7/21/2016	46.6	2,600 J	24.6 J-	<0.20	<0.60	40.0	12,800	251	9.69	0.38 J	137	13.0	1.97 J-	
waste dump	SM-WD-SS3	grab - soil	7/21/2016	10.2	969 J	30.3 J-	<0.20	<0.60	10.8	7,000	84.9	31.4	0.56 J	12.3	11.6	0.387 J-	
<b>Background Upslope of Atlanta Area Mines</b>																	
background soil sample	AA-BK-SS1	grab - soil	7/21/2016	<2.0	3.35 J	188 J-	0.22	6.02	6.60	14,900	19.7	529	0.77 J	<0.50	71.1	<0.033 UJ	
background soil sample (duplicate)	AA-BK-SS2	grab - soil	7/21/2016	<2.0	3.91 J	211 J-	0.29	7.96	7.27	17,000	20.0	595	0.79 J	<0.50	81.1	<0.033 UJ	
<b>Tahoma Mine</b>																	
waste pile berm on adit #1 level	TM-WD-SS1	grab - soil	7/21/2016	22.9	2,520 J	55.0 J-	<0.20	<0.60	12.4	10,500	23.6	164	1.25 J	29.7	45.4	0.145 J-	
adit #1 discharge pond sediment	TM-AD1-SD1	grab - sediment	7/21/2016	11.3	469 J	84.2 J-	1.69	3.33	157	22,600	50.9	205	9.06 J	7.21	480	0.668 J-	
adit #1 discharge pond sediment (duplicate)	TM-AD1-SD2	grab - sediment	7/21/2016	14.9	1,540 J	71.7 J-	2.46	2.74	202	27,800	43.2	177	10.4 J	5.01	575	0.538 J-	
sediment from upstream of adit discharge	TM-US-SD1	grab - sediment	7/21/2016	<2.0	306 J	46.5 J-	0.71	1.02	4.65	9,300	17.8	289	0.98 J	0.52	53.3	0.155 J-	
<b>EPA RSL for Resident Soil<sup>a</sup> (mg/kg)</b>				31	0.68	15,000	71	NA	3,100	55,000	400	1,800	390	390	23,000	11	
<b>EPA RSL for Industrial Soil<sup>a</sup> (mg/kg)</b>				470	3	220,000	980	NA	47,000	820,000	800	26,000	5,800	5,800	350,000	46	
<b>Mean Concentrations in Elmore County, Idaho<sup>b</sup> (ppm)</b>				NA	131	NA	NA	NA	15	NA	197	611	0.137	NA	122	0.058	

Notes:  
 Gray shaded values exceed regional screening levels (RSLs) for residential soils.  
 Orange shaded values exceed RSLs for both residential and industrial soils.  
 Bold = Three times greater than background concentrations when comparing: 1) the soil and sediment sample to the background value at AA-BK-SS1. Where the background value is not-detected the limit of detection was used as the background value for calculation purposes.  
<sup>a</sup>Based on a target hazard quotient of 1.0. <http://www2.epa.gov/risk/risk-based-screening-table-generic-tables>  
<sup>b</sup>Mean concentrations are not available for Sb, Ba, Cd, Cr, Fe, and Ag. <http://mrdata.usgs.gov/geochem/county.php?place=f16039&el=Pb&rf=northwestern>  
 mg/kg = milligram per kilogram  
 ppm = parts per million; ppm equals mg/kg  
 < = Result is below the detection limit.  
 NA = not available  
 J = The result is an estimated quantity.  
 J- = The result is an estimated quantity and is biased low.  
 UJ = Concentration was not detected and is qualified as an estimate.

**Table 5. Atlanta surface water results from the 2016 PA/SI.**

Analyte/Parameter	EPA		DEQ		Sample ID				
	Drinking Water Standard MCL	RSL for Tapwater	Cold Water Biota Standard Acute	Cold Water Biota Standard Chronic	Tahoma Mine Upstream TM-US-SW1	Tahoma Mine Upstream TM-US-SW2 (duplicate)	Tahoma Mine Adit #1 Discharge TM-AD1-SW1	Upstream of Public Water System Intake APWS-US-SW1	Field Blank APWS-US-SW2
Antimony (mg/L)	0.006	0.0078	NA	NA	<0.020	<0.020	<0.020	<0.020	<0.020
Arsenic (mg/L)	0.01	0.000052	0.34	0.15	0.0774	0.0754	0.0107	<0.00300	<0.00300
Barium (mg/L)	2	3.8	NA	NA	0.0180	0.0181	0.0230	0.0042	<0.0020
Cadmium (mg/L)	0.005	0.0092	0.00067 to 0.00200 (H)	0.00035 to 0.00075 (H)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Chromium (mg/L)	0.1	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Copper (mg/L)	1.0 <sup>a</sup>	0.8	0.0079 to 0.0267 (H)	0.0056 to 0.0171 (H)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Iron (mg/L)	0.3 <sup>a</sup>	14	NA	NA	<0.060	<0.060	<0.060	<0.060	<0.060
Lead (mg/L)	0.015 <sup>b</sup>	0.015	0.026 to 0.108 (H)	0.0010 to 0.0042 (H)	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300
Manganese (mg/L)	0.05 <sup>a</sup>	0.43	NA	NA	0.0087	0.0090	0.0160	<0.0040	<0.0040
Mercury (mg/L)	0.002	0.00063	NA	NA	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Selenium (mg/L)	0.05	0.1	0.02 (T)	0.005 (T)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Silver (mg/L)	0.1 <sup>a</sup>	0.094	0.0008 to 0.0078 (H)	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Zinc (mg/L)	5 <sup>a</sup>	6	0.058 to 0.175 (H)	0.059 to 0.177 (H)	<0.010	<0.010	<0.010	<0.010	<0.010
Temperature °C <sup>c</sup>	NA	NA	NA	Cold water aquatic life 22°C or less or a maximum daily average not >19°C <sup>d</sup> . Salmonid spawning 13°C or less with a maximum daily average not >9°C.	9.25	9.25	12.51	12.98	NA
pH (su)	6.5 - 8.5 <sup>a</sup>	NA	NA	6.5 - 9.0	7.24	7.24	6.25	7.85	NA
ORP (mV)	NA	NA	NA	NA	109	109	136	115	NA
SC (µS/cm)	NA	NA	NA	NA	230	230	624	66	NA
Turbidity (NTU)	b	NA	Not >50 NTU instantaneous	Not >50 NTU instantaneous and not >25 NTU over a 10 day period.	not recorded	not recorded	not recorded	not recorded	NA
DO (mg/L)	NA	NA	NA	>6 ppm	10.28	10.28	7.95	8.99	NA

Notes:

Shaded values exceed at least one standard and/or RSL.

(T)-Standard in Total, (H)-Hardness dependent for Cd, Cu, Pb, Ni, Ag, Zn, range presented based on calculated values for all samples (excluding background).

MCL = maximum contaminant level; RSL = regional screening level

<sup>a</sup>Secondary Standard MCL - non-enforceable guideline.

<sup>b</sup>Action level regulated by treatment technique.

<sup>c</sup>Only a snapshot temperature reading was collected. A daily temperature average was not collected.

mg/L=milligrams per liter, su=standard units, mV=millivolts, µS/cm=micro-Siemens per centimeter, NTU=nephelometric turbidity units, °C=degrees Celcius, ppm=parts per million

ORP = oxidation-reduction potential; SC = specific conductivity; DO = dissolved oxygen

NA = not available

## 2.7 2017 Site Investigation Activities

Alta staff visited the Atlanta area mines and collected samples and data for estimating waste pile volumes from August 14–17, 2017. Waste pile volume estimates, sample collection information, field parameters, stream discharge, and analytical results are presented in this section.

Sampling and laboratory analysis was conducted according to the “Sampling and Analysis (SAP)/Quality Assurance Project Plan (QAPP) for Atlanta Area Mines Additional Site Investigation Activities” (TerraGraphics 2017). All samples were collected, handled, and stored following the SAP/QAPP. Surface water samples and sediment samples were submitted for analysis to a laboratory in EPA’s Contract Laboratory Program (CLP).

Site photographs are included in Appendix A. Laboratory data reports are included in Appendix B. Discussion of quality assurance/quality control (QA/QC) samples is presented in the *QA/QC Review of the 2017 Atlanta Area Mines Expanded Site Investigation Sampling* memorandum (Alta 2018) (Appendix C).

### **2.7.1 Waste Source Volume Estimates**

Field crews returned to each source pile visited during the 2016 SI to collect measurements to estimate volumes for each waste pile. The height of each waste pile was determined using a laser range finder. A Brunton pocket transit was used to record the slope of waste pile faces and adjacent topography at select points on each waste pile. A sketch of the waste pile with reference points to field-collected data was recorded in the field logbook. The field-collected data were combined with digitized outlines of waste piles determined from aerial photographs, and the data were input to AutoCAD drafting software to estimate the volume of each pile (Table 6).

### **2.7.2 Sediment Sampling**

Sediment samples were collected from a depth of 0 to 6 inches using dedicated plastic scoops. Collected material was homogenized thoroughly in dedicated plastic bowls and placed into 8-oz glass jars. Material, such as rocks and vegetation, was removed during homogenization. Duplicate samples were collected as part of the QA/QC requirements; no rinsate blanks were collected because dedicated sampling equipment was used. Samples were shipped to a CLP laboratory for analysis of total metals (antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, selenium, silver, and zinc) by method EPA CLP SOW ISM02.4. A total of 26 sediment samples (excluding QA/QC samples) were collected: 5 samples from dry streams and 21 samples collocated with surface water samples from locations below site probable points of entry (PPEs), upstream/background locations, and locations below PPEs within the 15-mile target distance limit (TDL) (Figure 3). Sediment sample location descriptions and laboratory analytical results are presented in Table 7.

### **2.7.3 Surface Water Sampling**

Surface water samples were collected using the dip sampling method from the *Techniques of Water-Resources Investigations (TWRI), Book 9, Chapter A4, Collection of Water Samples* (USGS 2006). The method is described in the project QAPP (TerraGraphics 2017). QA/QC samples included duplicates, field blanks, and rinsate blanks. Samples were shipped to a CLP laboratory for analysis of total metals (antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, selenium, silver, and zinc) by method EPA CLP SOW ISM02.4.

A total of 21 surface water samples (excluding QA/QC samples) were collected from locations below site PPEs, upstream/background locations, and locations below PPEs within the 15-mile TDL (Figure 3). Surface water sample location descriptions and laboratory analytical results are presented in Table 8.

## **3 Migration/Exposure Pathways**

This subsection discusses the 2017 SI field observations and sampling results for the surface water migration pathway and potential targets within the site's range of influence. Ground water and air migration pathways, although not assessed as part of this PA/SI, are also briefly discussed.

**Table 6. Waste pile volume estimates.**

<b>Site Name</b>	<b>Description</b>	<b>Volume (cubic yards)</b>
Alaska No. 2 Adit	Upper waste pile	2,650
	Lower waste pile	3,023
Buffalo Mine	Waste pile	2,700
Idaho Gold Mine	Upper waste pile	9,737
	Lower waste pile	290
Minerva Mine	Waste pile	20,731
Monarch Mine	Lower waste piles and wash	8,891
	Upper waste pile	651
	Small cone waste pile midslope	67
Pettit Group	Waste pile	27,329
Stanley Mine	Waste pile	96
Tahoma Mine	Upper waste pile	2,433
	Lower waste pile	4,447



Figure 3. Atlanta 15-mile TDL and PPE locations.

Table 7. Sediment sample results for 2017.

Location Description	Sample ID	Date	Analyte (mg/kg)												
			Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Selenium	Silver	Zinc	Mercury
<b>Montezuma Creek Drainage (Eastern Watershed)</b>															
<b>Upstream</b>															
Montezuma Creek source spring	BK-SD7	8/15/2017	<7.3 UJ	9.9 J	46.8	<0.61	1.3	<3.0	9,070 J	3.7	293 J	1.1 J	<1.2	51.5	<0.12
Small tributary to Montezuma Creek downstream of source spring	BK-SD10	8/16/2017	<7.2 UJ	23.9 J	25.9	<0.60	<1.2	<3.0	5,820 J	10.3	243 J	0.48 J	<1.2	44.0	<0.12
Unnamed tributary to Montezuma Creek collected upstream of sludge treatment pad	BK-SD2	8/15/2017	<6.1 UJ	3.0 J	<20.5	<0.51	2.1	<2.6	8,010 J	3.8	166 J	0.84 J	<1.0	29.4	<0.10
Tributary to stream used for drinking water source (below source)	BK-SD6	8/15/2017	<6.9 UJ	71.5 J	29.4	<0.58	3.1	<2.9	8,750 J	4.6	185 J	0.49 J	<1.2	47.9	<0.12
<b>PPEs</b>															
Pettit Group and Hercules Mine Waste Piles	PPE9-SD4	8/15/2017	<7.4 UJ	166 J	43.0	<0.61	<1.2	<3.1	9,380 J	3.2	260 J	0.86 J	<1.2	47.8	0.035 J
Pettit Group and Hercules Mine Waste Piles	PPE7-SD8	8/15/2017	<6.1 UJ	294 J	39.3	<0.51	<1.0	<2.5	8,410 J	6.9	181 J	1.8 J	<1.0	38.4	<0.10
Boise-Rochester Mine Waste Pile	PPE8-SD3	8/15/2017	<7.1 UJ	39.6 J	<23.8	<0.59	<1.2	<3.0	4,870 J	2.9	183 J	0.24 J	<1.2	18.4	<0.12
<b>Downstream</b>															
Montezuma Creek below confluence with creek used as drinking water source	DS-SD1	8/15/2017	<6.8 UJ	15.3 J	<22.8	<0.57	1.7	<2.9	4,300 J	2.5	229 J	<2.9	<1.1	17.4	<0.11
Montezuma Creek at bridge on road leading to Forest Service Power Plant campground	DS-SD5	8/15/2017	<7.3 UJ	48.9 J	<24.2	<0.61	2.5	5.3	6,430 J	3.1	305 J	0.42 J	<1.2	27.9	<0.12
<b>Quartz Creek Drainage (Central Watershed)</b>															
<b>Upstream</b>															
Tributary to Quartz Creek (source of flowing water in Quartz Creek)	BK-SD26	8/17/2017	<6.5 UJ	99.0	41.9	<0.55	<1.1	<2.7	8,510	4.3	470	0.42 J	<1.1	30.6	<0.11
<b>PPEs</b>															
Monarch/Buffalo Mine Waste Piles	PPE4-SD25	8/17/2017	<7.3 UJ	808	66.8	<0.61	2.1	9.0	13,900	34.5	459	2.1 J	3.8	91.7	0.11 J
Stanley Mine Waste Pile	PPE5-SD23	8/17/2017	<6.2 UJ	18.2	74.3	<0.52	1.2	3.1	9,420	4.3	333	1.2 J	<1.0	52.3	<0.10
Tahoma Mine Waste Pile	PPE6-SD21	8/17/2017	<6.9 UJ	73.2	32.4	<0.57	<1.1	<2.9	5,780	2.2	206	0.71 J	<1.1	27.8	<0.11
<b>Downstream</b>															
Quartz Creek downstream of PPE 5	DS-SD22	8/17/2017	<7.2 UJ	135	38.3	<0.60	1.5	<3.0	7,660	5.8	221	0.93 J	0.35 J	44.7	0.083 J
Quartz Creek downstream of mining area	DS-SD9	8/15/2017	<6.9 UJ	78.3 J	28.2	<0.58	<1.2	<2.9	5,650 J	3.1	152 J	0.58 J	0.26 J	32.0	0.063 J
Middle Fork Boise River downstream of confluence with Quartz Creek	DS-SD27	8/17/2017	<7.2 UJ	34.4	<24.0	<0.60	1.5	<3.0	10,100	6.0	127	0.60 J	0.19 J	28.3	0.30
<b>Decker Creek Drainage (Southern Watershed)</b>															
<b>Upstream</b>															
Decker Creek below confluence with Flint Creek	BK-SD11	8/16/2017	<7.4 UJ	11.9 J	28.1	<0.61	6.1	<3.1	6,440 J	4.4	157 J	0.32 J	<1.2	23.7	<0.12
<b>PPEs</b>															
Alaska No. 2 Adit Waste Pile	PPE1-SD12	8/16/2017	<6.3 UJ	118 J	72.8	<0.53	<1.1	<2.6	9,420 J	3.0	493 J	0.95 J	<1.1	37.1	<0.11
Minerva Mine Waste Pile	PPE2-SD14	8/16/2017	<7.0 UJ	84.9 J	43.5	<0.58	<1.2	<2.9	13,400 J	4.1	224 J	1.6 J	1.1 J	48.0	<0.12
Idaho Gold Mine Waste Piles	PPE3-SD16	8/16/2017	<7.7 UJ	416	85.3	<0.64	<1.3	3.9	13,100	7.5	516	1.6 J	<1.3	84.7	0.065 J
<b>Downstream</b>															
Decker Creek downstream of PPE 1	DS-SD13	8/16/2017	<7.6 UJ	13.5 J	30.3	<0.63	3.6	<3.2	8,740 J	3.9	211 J	0.44 J	<1.3	33.6	<0.13
Decker Creek downstream of PPE 2	DS-SD15	8/16/2017	<7.1 UJ	12.4 J	<23.7	<0.59	1.4	<3.0	5,640 J	2.7	136 J	0.32 J	<1.2	19.6	<0.12
Decker Creek downstream of PPE 3	DS-SD17	8/16/2017	<7.5 UJ	30.5	27.2	<0.63	3.0	<3.1	11,000	5.5	180	1.2 J	<1.3	33.1	<0.13
<b>Yuba Creek Drainage (Western Watershed)</b>															
Yuba Creek upstream of confluence with Middle Fork Boise River (downstream of mining area)	DS-SD20	8/16/2017	<7.7 UJ	37.4	29.6	<0.64	2.0	<3.2	6,600	3.6	185	0.48 J	<1.3	29.8	<0.13

Location Description	Sample ID	Date	Analyte (mg/kg)												
			Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Selenium	Silver	Zinc	Mercury
<b>Atlanta Area Mines (Middle Fork Boise River)</b>															
<b>Upstream</b>															
Middle Fork Boise River upstream of confluence with Quartz Creek (downstream of Montezuma Creek)	BK-SD28	8/17/2017	<7.5 <i>UJ</i>	27.2	<25.0	<0.62	2.5	<3.1	10,600	7.6	145	0.98 <i>J</i>	<1.2	35.5	0.30
<b>Downstream</b>															
Middle Fork Boise River downstream of confluence with Yuba River	DS-SD18	8/16/2017	<7.1 <i>UJ</i>	18.6	25.4	<0.59	1.7	<3.0	6,490	2.5	156	0.54 <i>J</i>	<1.2	20.4	<0.12
<b>EPA RSL for Resident Soil<sup>a</sup> (mg/kg)</b>			31	0.68	15,000	71	NA	3,100	50,000	400	1,800	390	390	23,000	9.4
<b>EPA RSL for Industrial Soil<sup>a</sup> (mg/kg)</b>			470	3	220,000	980	NA	47,000	820,000	800	26,000	5,800	5,800	350,000	40
<b>Mean Concentrations in Elmore County, Idaho<sup>b</sup> (ppm)</b>			NA	131.369	NA	NA	NA	15.079	25,540	196.867	611.161	0.137	NA	121.647	0.058

*Notes:*

Gray shaded values exceed regional screening levels (RSLs) for residential soils.

Orange shaded values exceed RSLs for both residential and industrial soils.

<sup>a</sup> Based on a target hazard quotient of 1.0. <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016>

<sup>b</sup> Significant digits shown as reported by USGS. Mean concentrations are not available for Sb, Ba, Cd, Cr, Fe, and Ag. <http://mrddata.usgs.gov/geochem/county.php?place=f16039&el=Pb&rf=northwestern>

mg/kg = milligram per kilogram

ppm = parts per million

<value = result is below the detection limit shown

NA = not available

*J* = The result is an estimated quantity.

*J-* = The result is an estimated quantity and is biased low.

*UJ* = Concentration was not detected and is qualified as an estimate.

**Table 8. Surface water laboratory analytical results for 2017.**

Location Description	Sample ID	Date	Analyte (mg/L)													Parameter					
			Sb	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Se	Ag	Zn	Hg	Temperature (°C)	pH (su)	ORP (mV)	SC (µS/cm)	Turbidity (NTU)	DO (mg/L)
<b>Montezuma Creek Drainage (Eastern Watershed)</b>																					
<b>Upstream</b>																					
Montezuma Creek source spring	BK-SW6	8/15/2017	<0.0600	0.0039	<0.2	<0.0050	<0.0100	<0.0250	0.169	0.00013 J	0.0327	<0.0050	<0.0100	<0.0600	<0.00020	12.24	8.82	121.4	229.11	3.67	9.95
Small tributary to Montezuma Creek downstream of source spring	BK-SW9	8/16/2017	<0.0600	0.0050	<0.2	<0.0050	<0.0100	<0.0250	<0.1	<0.0010	<0.0150	<0.0050	<0.0100	<0.0600	<0.00020	7.08	6.10	180.7	179.80	1.14	12.07
Tributary to stream used for drinking water source (below source)	BK-SW5	8/15/2017	<0.0600	0.0032	<0.2	<0.0050	<0.0100	<0.0250	<0.1	<0.0010	<0.0150	<0.0050	<0.0100	<0.0600	<0.00020	10.45	8.26	128.0	161.6	3.19	10.58
<b>PPEs</b>																					
Pettit Group and Hercules Mine Waste Piles	PPE9-SW3	8/15/2017	<0.0600	0.0426	<0.2	<0.0050	<0.0100	<0.0250	<0.1	<0.0010	<0.0150	<0.0050	<0.0100	<0.0600	0.000055 J	8.53	8.54	95.3	122.9	1.72	11.46
Boise-Rochester Waste Pile	PPE8-SW2	8/15/2017	<0.0600	0.132	<0.2	<0.0050	<0.0100	<0.0250	0.372	0.00012 J	0.142	<0.0050	<0.0100	<0.0600	<0.00020	9.45	8.45	11.8	223.17	2.05	10.84
<b>Downstream</b>																					
Montezuma Creek below confluence with creek used as drinking water source	DS-SW1	8/15/2017	<0.0600	0.0503	<0.2	<0.0050	<0.0100	<0.0250	<0.1	<0.0010	0.0560	<0.0050	<0.0100	<0.0600	<0.00020	10.06	8.87	131.7	325.22	1.47	11.55
Montezuma Creek at bridge on road leading to Forest Service Power Plant campground	DS-SW4	8/15/2017	<0.0600	0.0469	<0.2	<0.0050	<0.0100	<0.0250	<0.1	<0.0010	0.0171	<0.0050	<0.0100	<0.0600	<0.00020	12.91	8.93	126.9	306.6	1.34	10.91
<b>Quartz Creek Drainage (Central Watershed)</b>																					
<b>Upstream</b>																					
Tributary to Quartz Creek (source of flowing water in Quartz Creek)	BK-SW24	8/17/2017	<0.0600	0.0208	<0.2	<0.0050	<0.0100	<0.0250	0.252	<0.0010	0.0608	<0.0050	<0.0100	<0.0600	<0.00020	10.04	7.05	63.2	144.67	3.93	10.61
<b>PPEs</b>																					
Tahoma Mine Waste Pile	PPE6-SW21	8/17/2017	<0.0600	0.129	<0.2	<0.0050	<0.0100	<0.0250	0.127	<0.0010	0.0516	<0.0050	<0.0100	<0.0600	<0.00020	8.24	7.42	69.3	266.7	1.66	11.86
<b>Downstream</b>																					
Quartz Creek downstream of PPE 5	DS-SW23	8/17/2017	<0.0600	0.0865	<0.2	<0.0050	<0.0100	<0.0250	<0.1	<0.0010	0.0173	<0.0050	<0.0100	<0.0600	<0.00020	8.17	7.32	84.3	243.84	2.11	11.91
Quartz Creek downstream of mining area	DS-SW7	8/15/2017	<0.0600	0.123	<0.2	<0.0050	<0.0100	<0.0250	<0.1	0.00013 J	<0.0150	<0.0050	<0.0100	<0.0600	<0.00020	12.43	8.71	125.4	255.9	3.19	10.64
Middle Fork Boise River downstream of confluence with Quartz Creek	DS-SW25	8/17/2017	<0.0600	0.0053	<0.2	<0.0050	<0.0100	<0.0250	<0.1	<0.0010	<0.0150	<0.0050	<0.0100	<0.0600	<0.00020	14.41	7.7	38.4	59.91	1.60	10.98
<b>Decker Creek Drainage (Southern Watershed)</b>																					
<b>Upstream</b>																					
Decker Creek below confluence with Flint Creek	BK-SW10	8/16/2017	<0.0600	0.0037	<0.2	<0.0050	<0.0100	<0.0250	<0.1	<0.0010	0.0156	<0.0050	<0.0100	<0.0600	<0.00020	9.05	6.94	119.6	66.56	1.12	12.01

Location Description	Sample ID	Date	Analyte (mg/L)													Parameter					
			Sb	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Se	Ag	Zn	Hg	Temperature (°C)	pH (su)	ORP (mV)	SC (µS/cm)	Turbidity (NTU)	DO (mg/L)
<b>Decker Creek Drainage (Southern Watershed)</b>																					
<b>PPEs</b>																					
Minerva Mine Waste Pile	PPE2-SW13	8/16/2017	<0.0600	0.0545	<0.2	<0.0050	<0.0100	<0.0250	0.154	0.00019 J	<0.0150	<0.0050	<0.0100	<0.0600	<0.00020	13.91	8.56	125.8	277.05	12.88	10.81
Idaho Gold Mine Waste Piles	PPE3-SW15	8/16/2017	<0.0600	0.27	<0.2	<0.0050	<0.0100	<0.0250	0.151	<0.0010	0.0236	<0.0050	<0.0100	<0.0600	<0.00020	15.14	8.49	117.4	324.9	4.55	10.43
<b>Downstream</b>																					
Decker Creek downstream of PPE 1	DS-SW12	8/16/2017	<0.0600	0.0034	<0.2	<0.0050	<0.0100	<0.0250	<0.1	<0.0010	<0.0150	<0.0050	<0.0100	<0.0600	<0.00020	10.58	7.71	112.9	66.02	1.30	11.58
Decker Creek downstream of PPE 2	DS-SW14	8/16/2017	<0.0600	0.0042	<0.2	<0.0050	<0.0100	<0.0250	<0.1	0.00012 J	<0.0150	<0.0050	<0.0100	<0.0600	<0.00020	11.48	7.88	93.8	69.13	1.50	11.40
Decker Creek downstream of PPE 3	DS-SW17	8/16/2017	<0.0600	0.0077	<0.2	<0.0050	<0.0100	<0.0250	<0.1	<0.0010	<0.0150	<0.0050	<0.0100	<0.0600	<0.00020	14.02	7.98	117.6	72.13	1.51	10.81
<b>Yuba Creek Drainage (Western Watershed)</b>																					
Yuba Creek upstream of confluence with Middle Fork Boise River	DS-SW20	8/16/2017	<0.0600	0.0069	<0.2	<0.0050	<0.0100	<0.0250	<0.1	0.00016 J	<0.0150	<0.0050	<0.0100	<0.0600	<0.00020	16.96	8.02	200.9	75.27	1.85	10.16
<b>Atlanta Area Mines (Middle Fork Boise River)</b>																					
<b>Upstream</b>																					
Middle Fork Boise River upstream of confluence with Quartz Creek	BK-SW26	8/17/2017	<0.0600	0.0046	<0.2	<0.0050	<0.0100	<0.0250	<0.1	<0.0010	<0.0150	<0.0050	<0.0100	<0.0600	<0.00020	15.12	7.73	57.0	55.49	1.53	10.69
<b>Downstream</b>																					
Middle Fork Boise River downstream of confluence with Yuba River	DS-SW18	8/16/2017	<0.0600	0.0071	<0.2	<0.0050	<0.0100	<0.0250	<0.1	<0.0010	<0.0150	<0.0050	<0.0100	<0.0600	<0.00020	17.82	7.93	131.0	71.51	1.98	9.89
<b>EPA Drinking Water MCL</b>			0.006	0.01	2	0.005	0.1	1.0 <sup>a</sup>	0.3 <sup>a</sup>	0.015 <sup>b</sup>	0.05 <sup>a</sup>	0.05	0.1 <sup>a</sup>	5 <sup>a</sup>	0.002	NA	6.5–8.5 <sup>a</sup>	NA	NA	b	NA
<b>EPA RSL for Tap water</b>			0.0078	0.000052	3.8	0.0092	NA	0.8	14	0.015	0.43	0.1	0.094	6	0.00063	NA	NA	NA	NA	NA	NA
<b>DEQ Cold Water Biota Standard Acute</b>			NA	0.34	NA	0.00067 to 0.00200 (H)	NA	0.0079 to 0.0267 (H)	NA	0.026 to 0.108 (H)	NA	0.02 (T)	0.0008 to 0.0078 (H)	0.058 to 0.175 (H)	NA	NA	NA	NA	NA	Not >50 NTU instantaneous	NA
<b>DEQ Cold Water Biota Standard Chronic</b>			NA	0.15	NA	0.00035 to 0.00075 (H)	NA	0.0056 to 0.0171 (H)	NA	0.0010 to 0.0042 (H)	NA	0.005 (T)	NA	0.059 to 0.177 (H)	NA	Cold water aquatic life 22 °C or less or a maximum daily average not >19 °C. Salmonid spawning 13 °C or less with a maximum daily average not >9°C.	6.5–9.0	NA	NA	Not >50 NTU instantaneous and not >25 NTU over a 10 day period.	>6 ppm

Location Description	Sample ID	Date	Analyte (mg/L)											Parameter					
			Sb	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Se	Ag	Zn	Hg	Temperature (°C)	pH (su)	ORP (mV)	SC (µS/cm)
<p><i>Notes:</i>                      Shaded values exceed at least one standard and/or RSL.                      (T)-Standard in Total, (H)-Hardness dependent for Cd, Cu, Pb, Ni, Ag, Zn, range presented based on calculated values for all samples (excluding background).                      MCL = maximum contaminant level; RSL = regional screening level  <sup>a</sup>Secondary Standard MCL—nonenforceable guideline.  <sup>b</sup>Action level regulated by treatment technique.  <sup>c</sup>Only a snapshot temperature reading was collected. A daily temperature average was not collected.                      Sb=antimony, As=arsenic, Ba=barium, Cd=cadmium, Cr=chromium, Cu=copper, Fe=iron, Pb=lead, Mn=manganese, Se=selenium, Ag=silver, Zn=zinc, Hg=mercury                      mg/L=milligram per liter, su=standard units, mV=millivolt, µS/cm=microsiemens per centimeter, NTU=nephelometric turbidity unit, °C=degrees Celsius, ppm=parts per million                      ORP = oxidation-reduction potential; SC = specific conductivity; DO = dissolved oxygen, NA = not available                      &lt;value = result is below the detection limit shown                      J = The result is an estimated quantity.                      J- = The result is an estimated quantity and is biased low.                      JJ = Concentration was not detected and is qualified as an estimate.</p>																			

### 3.1 Surface Water Migration Pathway

The surface water migration pathway TDL begins at the PPE of surface water runoff from the site to a surface water body and extends downstream for 15 miles. Eight PPEs to surface water at the Atlanta area mines were identified from waste sources discovered during the 2016 PA/SI. During the 2017 SI, an additional PPE was identified. Site PPEs and associated 15-mile TDLs are described in Table 9. The furthest 15-mile TDL, measured from the Tahoma Mine waste pile in contact with Quartz Creek, is complete approximately 0.5 miles downstream of the confluence of Hot Creek with the Middle Fork Boise River.

During the site visit, no surface water was observed at one background sample location and three PPEs; however, sediment samples were collected from the dry streams. The presence of a surface water pathway may be seasonal (e.g., during snow melt) or only present during high precipitation events at these locations.

Flowing water was observed within the 15-mile TDL on Middle Fork Boise River, Yuba Creek, Decker Creek, Quartz Creek, and many of the creeks' tributaries. Surface water and collocated sediment samples were collected at all sample sites with flowing water. Sample locations are shown in Figure 4.

#### 3.1.1 Overland Route and Target Distance Limit

Waste sources at Atlanta area mines are located in mountainous terrain. Watersheds from the mines' source areas to perennial creeks are as follows:

1. Central watershed—Runoff from the central region of the Atlanta area mines (Tahoma, Stanley, Buffalo, and Monarch Mines) flows to Quartz Creek, which then flows 0.5 miles north to the Middle Fork Boise River. Quartz Creek originates within the Atlanta area mines' footprint, west of the Buffalo Mine.
2. Eastern watershed—Runoff from the eastern region of the Atlanta area mines (Pettit Group, Hercules Mine, and Boise-Rochester Mine) flows to Montezuma Creek, which flows 1.2 miles north then 0.6 miles northeast to the Middle Fork Boise River. Montezuma Creek originates approximately 0.2 miles upstream of the Boise-Rochester waste pile.
3. Southern watershed—Runoff from the southern region of the Atlanta area mines (Alaska No. 2 Adit, Minerva Mine, and Idaho Gold Mine), flows to Decker Creek, which then flows 0.4 miles west to Yuba Creek. Yuba Creek is a tributary to the Middle Fork Boise River. The Yuba Creek confluence with the Middle Fork Boise River is 2.5 miles downstream from the Decker Creek confluence with Yuba Creek. Decker Creek originates in the mountains south of the Atlanta area mines.
4. Western watershed—Runoff from the western region of the Atlanta area mines flows to Yuba Creek. Although waste sources are visible on aerial imagery in this region, none of these potential waste sources were evaluated during the 2016 PA/SI. Yuba Creek originates in the mountains south-southwest of the Atlanta area mines.

Nine PPEs were identified for the Atlanta area mines waste sources. PPEs 1 through 3 are located on Decker Creek in the southern watershed, PPEs 4 through 6 are located on Quartz Creek in the central watershed, and PPEs 7 through 9 are located on Montezuma Creek in the eastern watershed. Table 9 describes each PPE.

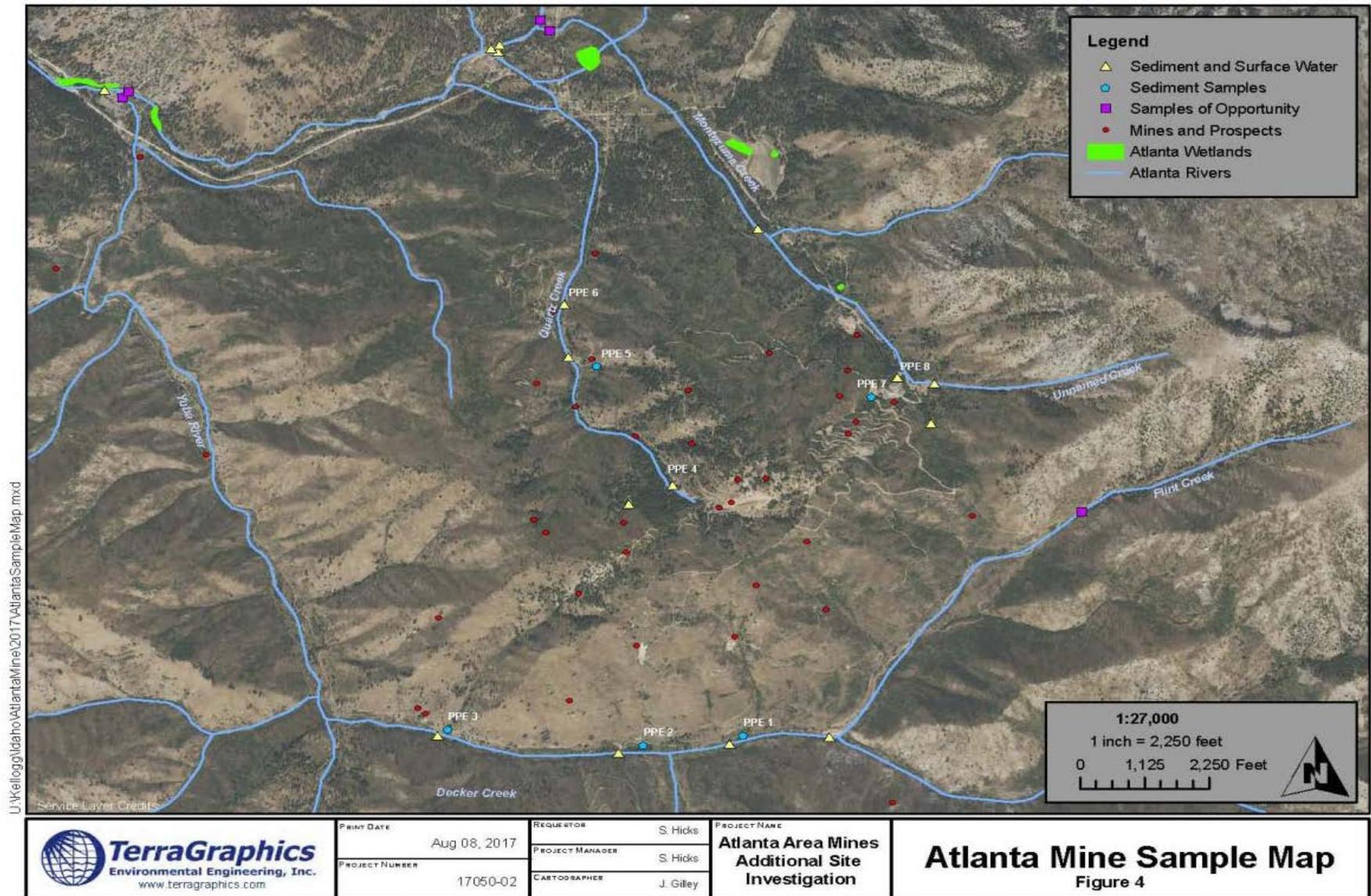


Figure 4. Atlanta 2017 sample locations.

Sediment samples are compared to EPA Regional Screening Levels (RSLs) for residential and industrial soils. Surface water samples are compared to EPA Maximum Contaminant Levels (MCLs) for drinking water and RSLs for tap water. Results for the four watersheds are discussed in the following sections. Sediment sample results are shown in Table 7, surface water results are shown in Table 8, and arsenic results are presented on Figure 5.

**Table 9. PPE descriptions.**

<b>PPE Number</b>	<b>Source</b>	<b>Pathway Description</b>
1	Alaska No. 2 Adit waste pile	The waste pile is located 0.35 miles upgradient from Decker Creek and is situated at the head of a seasonal stream. PPE 1 is located where the waste pile is in contact with this seasonal stream. Surface water flows 0.35 miles to Decker Creek. From that point, surface water flows 1.35 miles to Yuba Creek and then 2.80 miles down Yuba Creek to the Middle Fork Boise River. Once in the Middle Fork Boise River, surface water flows an additional 10.5 miles to the conclusion of the 15-mile TDL.
2	Minerva Mine waste pile	The waste pile is located 0.30 miles upgradient from Decker Creek and is situated at the head of a seasonal stream. PPE 2 is located where the waste pile is in contact with this seasonal stream. Surface water flows 0.30 miles to Decker Creek. From that point, surface water flows 1 mile to Yuba Creek and then 2.80 miles down Yuba Creek to the Middle Fork Boise River. Once in the Middle Fork Boise River, surface water flows an additional 10.9 miles to the conclusion of the 15-mile TDL.
3	Idaho Gold Mine waste pile	The waste pile is located 0.6 miles upgradient from Decker Creek and is situated at the head of a seasonal stream. PPE 3 is located where the waste pile is in contact with this seasonal stream. Surface water flows 0.6 miles to Decker Creek. From that point, surface water flows 0.35 mile to Yuba Creek and then 2.80 miles down Yuba Creek to the Middle Fork Boise River. Once in the Middle Fork Boise River, surface water flows an additional 11.25 miles to the conclusion of the 15-mile TDL.
4	Monarch Mine and Buffalo Mine waste piles	Runoff from the Monarch Mine flows to the Buffalo Mine, and combined runoff from both sites enters Quartz Creek 0.15 miles downgradient of the Buffalo Mine waste pile. PPE 4 is located where the combined runoff enters Quartz Creek. From that point, surface water flows 1.90 miles down Quartz Creek to the Middle Fork Boise River. Once in the Middle Fork Boise River, surface water flows an additional 12.95 miles to the conclusion of the 15-mile TDL.
5	Stanley Mine waste pile	The waste pile is located 125 feet upslope of a seasonal stream. PPE 5 is located where waste material enters the seasonal stream. Water flows 375 feet down the seasonal stream to Quartz Creek. From that point, surface water flows 1.4 miles down Quartz Creek to the Middle Fork Boise River. Once in the Middle Fork Boise River, surface water flows an additional 13.5 miles to the conclusion of the 15-mile TDL.
6	Tahoma Mine waste pile and adit discharge	The Tahoma Mine waste pile is in contact with Quartz Creek. PPE 6 is located at the downstream toe of the waste pile. Surface water flows 1.1 miles down Quartz Creek to the Middle Fork Boise River. Once in the Middle Fork Boise River, surface water flows an additional 13.9 miles to the conclusion of the 15-mile TDL.
7	Pettit Group and Hercules Mine waste piles	The waste piles are located at the head of a seasonal stream upgradient from Montezuma Creek. Erosion from both waste piles follows many small gullies and rills on the hillside and down multiple dirt roads before eventually combining in a stormwater ditch constructed along the main dirt access road that crosses Montezuma Creek. PPE 7 is located where runoff is estimated to enter this stormwater ditch. Surface water flows 0.2 miles down the roadside stormwater ditch before entering Montezuma Creek. Surface water then flows 2 miles down Montezuma Creek to the Middle Fork Boise River. Once in the Middle Fork Boise River, surface water flows an additional 12.8 miles to the conclusion of the 15-mile TDL.

8	Boise-Rochester waste pile	The waste pile is in contact with Montezuma Creek. PPE 9 is located at the downstream toe of the waste pile. Surface water flows 1.9 miles down Montezuma Creek to the Middle Fork Boise River. Once in the Middle Fork Boise River, surface water flows an additional 13.1 miles to the conclusion of the 15-mile TDL.
9	Pettit Group and Hercules Mine waste piles (alternate PPE)	The waste piles are located at the head of a seasonal stream upgradient from Montezuma Creek. Erosion from both waste piles follows many small gullies and rills on the hillside and down multiple dirt roads before combining in a stormwater ditch constructed along the main dirt access road that crosses Montezuma Creek. One hillside drainage receives a portion of erosional runoff and is located above the stormwater ditch-contained flowing water. PPE 9 is located where flowing water is located above the roadside stormwater runoff ditch. Surface water flows 0.3 miles down the roadside stormwater ditch before entering Montezuma Creek. Surface water then flows 2 miles down Montezuma Creek to the Middle Fork Boise River. Once in the Middle Fork Boise River, surface water flows an additional 12.7 miles to the conclusion of the 15-mile TDL.

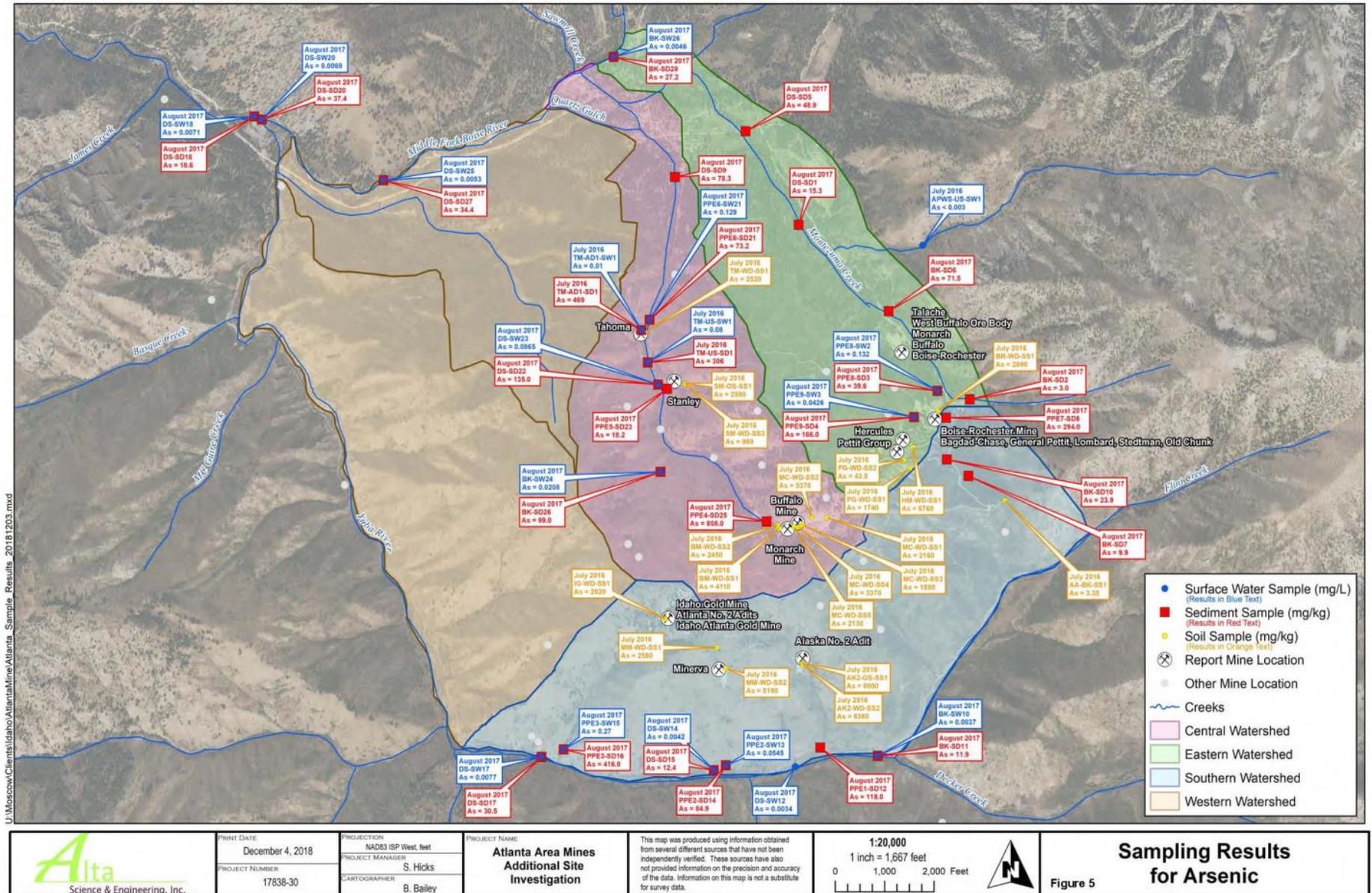


Figure 5. Atlanta area mines arsenic results.

### **3.1.1.1 Central Watershed (Quartz Creek)**

Arsenic concentrations in sediment exceeded the RSLs for both residential soils (0.68 milligrams per kilogram [mg/kg]) and industrial soils (3 mg/kg) at all sample locations in the Quartz Creek drainage. The sediment sample result for arsenic in the upstream/background location for Quartz Creek (BK-SD26) is 99.0 mg/kg, which is higher than two of the three PPE locations. The background sample location for Quartz Creek was located at a spring where flowing water first appeared within the Quartz Creek drainage.

Three PPEs were identified in the Quartz Creek drainage: PPE 4 is located below the combined Monarch and Buffalo Mines waste piles; PPE 5 is located below the Stanley Mine waste pile; and PPE 6 is located below the Tahoma Mine waste pile. PPEs 5 and 6 were both dry sites. The highest arsenic value in sediment (808 mg/kg) occurred at PPE 4.

Arsenic results for downstream sediment samples for the Quartz Creek drainage ranged from 34.4 mg/kg to 135 mg/kg and decreased with distance downstream of the source area, although all were above RSLs for residential and industrial soils.

Arsenic in surface water at the background location BK-SW24 (0.0208 milligrams per liter [mg/L]) exceeded the EPA drinking water MCL (0.01 mg/L) and tap water RSL (0.000052 mg/L). Arsenic results in surface water at PPE 6 (0.129 mg/L) were elevated above EPA standards, and concentrations were detected in the background sample and both downstream samples on Quartz Creek (DS-SW7, 0.123 mg/L; DS-SW23, 0.0865 mg/L). Arsenic in sample DS-SW25, collected below the confluence of Quartz Creek with Middle Fork Boise River, exceeded the EPA RSL for tap water and was lower than background sample BK-SW24.

### **3.1.1.2 Eastern Watershed (Montezuma Creek)**

Arsenic concentrations in sediment exceeded the RSLs for both residential and industrial soils at all sample locations in the Montezuma Creek drainage except for BK-SD2 (a dry location) that exceeded the RSL for residential soil. The background sample BK-SD7 for this drainage is located at the headwater source spring of Montezuma Creek. The sediment sample result for arsenic in the background location (BK-SD7) for Montezuma Creek is 9.9 mg/kg, which is lower than all PPE and downstream samples. Three additional upstream samples were collected from the Montezuma Creek drainage: BK-SD10 is located on a small tributary to Montezuma Creek downstream of the source spring and serves as an alternate background; BK-SD2 is located on an unnamed tributary that has a source outside of the mining impacted area and serves as an alternate background location; and BK-SD6 is located on a tributary to the unnamed stream where the surface water intake is located for the public drinking water system used by Atlanta residents.

Three PPEs were identified in the Montezuma Creek drainage: PPE 8 is located below the Boise-Rochester Mine waste pile; PPE 7 is located on a roadside ditch that receives runoff from multiple points below the Pettit Group and Hercules Mine waste piles; and PPE 9 is located on a spring-fed tributary located below the Pettit Group and Hercules Mine waste piles. PPE 7 was a dry site. The highest arsenic value (294 mg/kg) in sediment occurred at PPE 7.

Arsenic results for downstream sediment samples for the Montezuma Creek drainage ranged from 15.3 mg/kg to 48.9 mg/kg. The lowest arsenic result (15.3 mg/kg) was located at the furthest upstream of the two samples (DS-SD1, upstream of the Talache Mine tailings site) and

the higher arsenic result (48.9 mg/kg) was located at the furthest downstream sample (DS-SD5, downstream of the Talache Mine tailings site).

Arsenic in surface water at the three upstream locations with flowing water exceeded the EPA RSL for tap water but did not exceed the EPA MCL for drinking water. Arsenic results in surface water were elevated above EPA standards and the background sample at PPE 8 (0.132 mg/L) and PPE 9 (0.0426 mg/L) and both downstream samples on Montezuma Creek (DS-SW1, 0.0503 mg/L; DS-SW4, 0.0469 mg/L). Similar to trends in sediment samples, the arsenic results in the downstream samples were lower in the furthest upstream location (DS-SW1, above the Talache Mine tailings site) and higher in the furthest downstream location (DS-SW4, below the Talache Mine tailings site).

### **3.1.1.3 Southern Watershed (Decker Creek)**

Arsenic concentrations in sediment exceeded the RSLs for both residential and industrial soils at all sample locations in the Decker Creek drainage. The sediment sample result for arsenic in the upstream/background location for Decker Creek (BK-SD11) was 11.9 mg/kg. The background sample location for Decker Creek was located below the confluence of Flint Creek with Decker Creek and is upstream of the Atlanta area mines.

Three PPEs were identified in the Decker Creek drainage: PPE 1 is located below the Alaska No. 2 Adit waste pile; PPE 2 is located below the Minerva Mine waste pile; and PPE 3 is located below the Idaho Group Mine waste piles. PPE 1 was a dry site. Extensive washout erosion was observed at the PPE 3 sample location. The highest arsenic value in sediment (416 mg/kg) occurred at PPE 3.

Arsenic results for downstream sediment samples for the Decker Creek drainage ranged from 12.4 mg/kg to 30.5 mg/kg and increased with distance downstream from the background sample location.

Arsenic in surface water at the background location BK-SW10 (0.0037 mg/L) exceeded the EPA tap water RSL. Surface water arsenic concentrations at PPE 2 (0.0545 mg/L) and PPE 3 (0.27 mg/kg) are above both EPA drinking water MCL and tap water RSL, above the background sample, and above respective downstream samples for each PPE. Sample DS-SW12, collected downstream of PPE 1 and nearest to the background sample locations, has an arsenic concentration of 0.0034 mg/L, which is slightly less than the background sample location. Arsenic concentrations in Decker Creek downstream of PPE 2 (DS-SW14; 0.0042 mg/L) and PPE 3 (DS-SW17; 0.0077 mg/L) exceeded arsenic concentrations in the background sample at BK-SW10.

### **3.1.1.4 Western Watershed (Yuba Creek)**

One sediment sample and one surface water sample were collected from Yuba Creek at the downstream end of the western watershed just before the confluence with the Middle Fork Boise River although no mine sites in this drainage were assessed as part of this SI.

Arsenic concentrations in sediment are above EPA RSLs for both residential and industrial soils at this location. The Yuba Creek sediment sample (DS-SD20) arsenic concentration (37.4 mg/kg) exceeds arsenic concentrations in sediment at PPE 3 (PPE3-SD16; 30.5 mg/kg), which is the furthest downstream sample on Decker Creek before the confluence with Yuba Creek and serves as a background sample location for the western watershed.

Arsenic concentrations in surface water in the Yuba Creek sample are above the EPA RSL for tap water but below arsenic concentrations in the background location (DS-SW17) on Decker Creek.

### 3.1.2 Drinking Water Targets

A surface water intake (East Fork Montezuma, E0006845) for the Atlanta Water Association (Public Water System [PWS] #ID4200005) is located on an unnamed tributary to Montezuma Creek south of Atlanta. The source water delineation showing the area of contribution to this intake is depicted in Figure 6. This PWS serves approximately 91 people through 114 connections (DEQ 2013).

Surface water quality upstream of the PWS intake was evaluated during the 2016 PA/SI and is discussed in the PA/SI report for Atlanta area mines (DEQ and TerraGraphics 2017). Sediment quality was not assessed in the creek used as a drinking water source for area residents.

### 3.1.3 Human Food Chain Targets

Fishing is permitted within the 15-mile TDL on the Middle Fork Boise River and Decker, Yuba, Quartz, and Montezuma Creeks; however, fish catch statistics could not be located. For this reason, it is assumed that between 0 and 100 lb of fish are harvested and consumed within the TDL. Fish stocking records for the Middle Fork of the Boise River indicate that stocking of rainbow trout occurred from 1968 to 2017 (IDFG 2018).

### 3.1.4 Environmental Targets

Sensitive species can have large habitat ranges that overlap the vicinity of the Atlanta area mines. Based on the resource list obtained during a search of the Information for Planning and Conservation System (USFWS 2017a), the following species are identified for the Atlanta area mines and the 15-mile TDL corridor:

- Mammals: Canada Lynx, *Lynx Canadensis*, threatened species and North American Wolverine, *Gulo gulo luscus*, proposed threatened species
- Fishes: Bull Trout, *Salvelinus confluentus*, threatened species and threatened species-designated critical habitat
- Plants: Whitebark Pine, *Pinus albicaulis*, candidate species

Wetlands are present along the 15-mile TDL (USFWS 2017b). The nearest wetland is located on the Middle Fork Boise River, approximately 1.6 miles downgradient of the site (Figure 7).

## 3.2 Ground Water Migration Pathway

In areas where historic mines are close to residential areas, contamination of drinking water systems may come from mine sources such as ore bodies and waste dumps and/or along a ground water pathway. When heavy metals leach out from tailing piles or waste rock dumps, they can contaminate the shallow ground water system. When heavy metals leach out of ore bodies, they can be transported through the geologic formation to shallow ground water or be discharged from underground workings as adit water, which is then conveyed to the shallow ground water system.

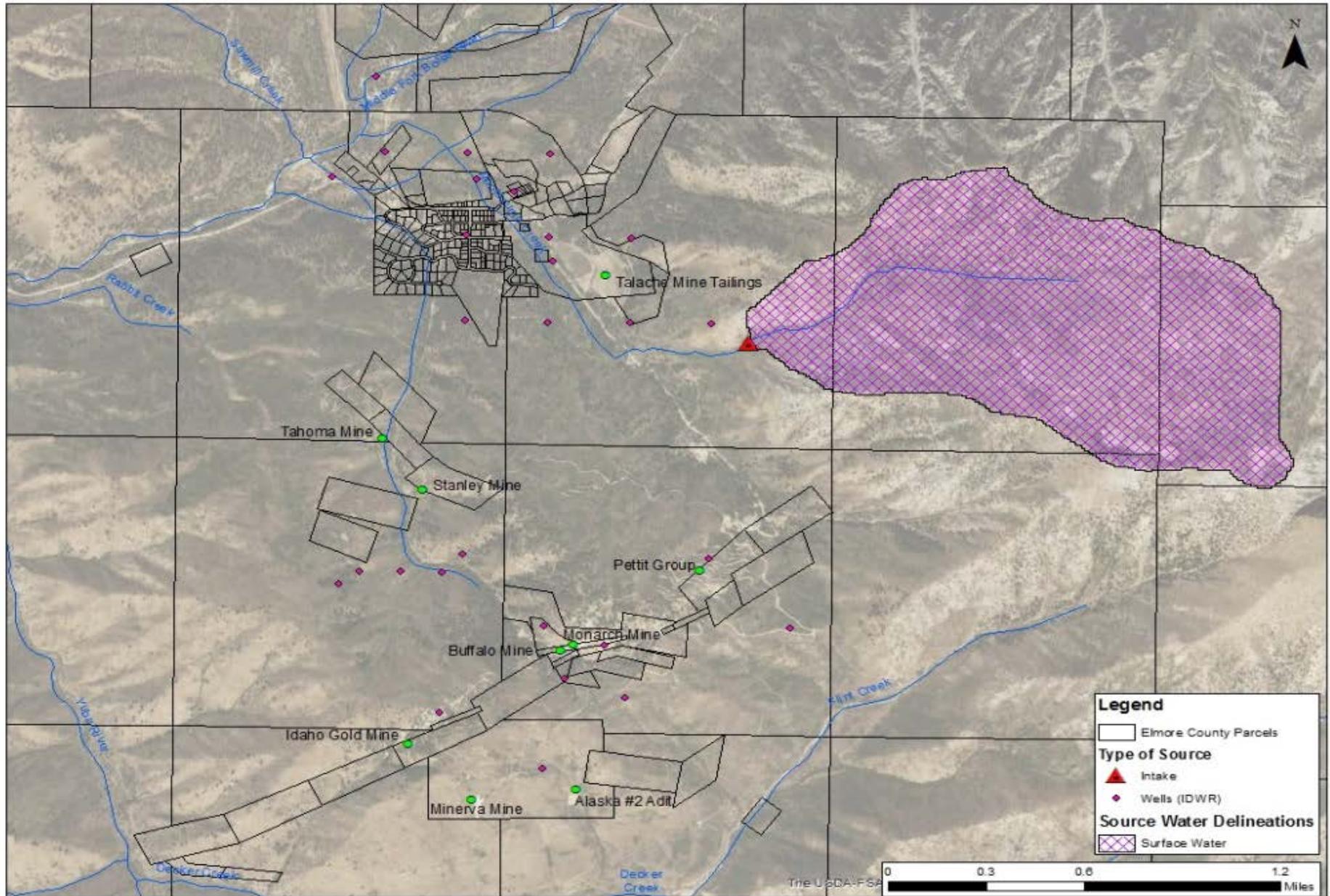


Figure 6. Atlanta, Idaho PWS.

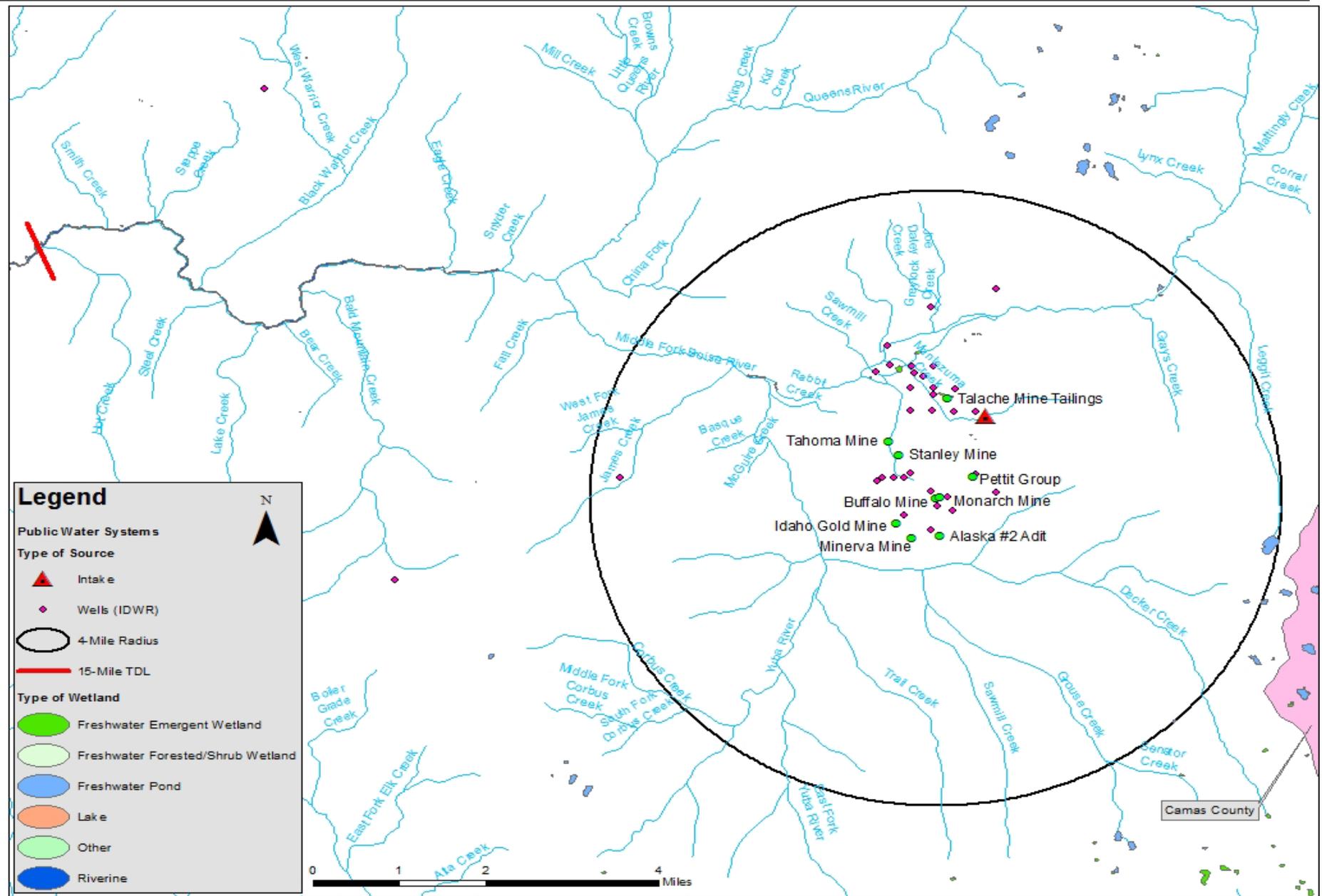


Figure 7. PWS, wells, and wetlands.

Ground water within a 4-mile radius of the Atlanta area mine sites supplies 162 wells, both domestic wells within and near the town of Atlanta and monitoring wells installed by mining companies (Figure 7). Because this assessment includes several mines, Buffalo Mine was used as the central point for the 4-mile radius.

The ground water pathway was not assessed as part of this PA/SI. DEQ understands that Atlanta Gold Corporation has an ongoing ground water monitoring program.

### **3.3 Air Migration Pathway**

The air pathway was not assessed as part of this PA/SI. As noted in DEQ's 2017 PA/SI report, the waste dump and ore piles remaining at the Atlanta area mines are surrounded by vegetation and most piles, especially those with a significant fine-grained component, have formed a hard surface crust; therefore, fugitive dust is likely limited to the immediate vicinity of the mine wastes.

## **4 Summary and Conclusions**

An expanded 2017 PA/SI was conducted at the Atlanta area mines to collect additional samples for evaluating the surface water pathway based on 2016 PA/SI sample results and observations of extensive erosion from waste rock piles. This Atlanta area mines PA/SI provides property owners, residents, and recreational users with information about the levels of metals in soil and possible exposure pathways.

- Sediments have been impacted by historic mining activities. Arsenic concentrations in sediment exceeded the RSLs for both residential and industrial soils at all sample locations in the Quartz and Decker Creek drainages, in the single sample collected from the Yuba Creek drainage, and in all sample locations in the Montezuma Creek drainage except for one dry background location that exceeded the RSL for residential soil. The highest arsenic values measured in sediment collected from the PPEs into surface water occurred at locations below mine waste piles: PPE 4, below the combined Monarch and Buffalo Mines waste piles; PPE 7, on a roadside ditch that receives runoff from below the Pettit Group and Hercules Mine waste piles; and PPE 3, below the Idaho Group Mine waste piles. Downstream arsenic results in Montezuma Creek sediments increased below the Talache Mine tailings site.
- Surface water has been impacted by historic mining activities. Arsenic concentrations at PPE 6 and in both downstream samples in Quartz Creek exceeded the EPA drinking water MCL and tap water RSL and were higher than in the background sample; arsenic results at PPEs 8 and 9 and in both downstream samples on Montezuma Creek exceeded the EPA MCL for drinking water and tap water RSL and were higher than in the background sample; downstream arsenic results in Montezuma Creek increased below the Talache Mine tailings site; arsenic concentrations at PPEs 2 and 3 on Decker Creek exceeded the EPA drinking water MCL and tap water RSL and were higher than in the background sample; and arsenic concentrations in Decker Creek downstream of PPE 2 and 3 were higher than in the background sample.

## 5 Recommendations

DEQ understands that mining is the future land use planned by Atlanta Gold Corporation and Hollenbeck Properties LLC; however, some recreational uses of this area were observed during the site visit. The detections of arsenic discussed in sections 3 and 4 of this PA/SI identify a concern for human health and the environment.

Historic mining activities have impacted sediment and surface water. The waste piles show evidence of erosion, and arsenic concentrations are elevated above background concentrations and EPA screening levels below and downstream of the waste piles. Consequently, DEQ recommends **Additional Actions** at this site. The waste piles should be stabilized and measures implemented to prevent continued erosion of the piles and further degradation of water quality. DEQ's recommendations from the 2016 PA/SI should also be followed.

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## Appendix A. Site Photographs



Photo 1. Montezuma Creek below confluence with drinking water source creek, looking upstream.



Photo 2. Unnamed tributary to Montezuma Creek, looking upstream. Background sample collected upstream of sludge treatment pad (adjacent to 600 level).



**Photo 3. Collecting surface water sample in Montezuma Creek at bridge under road from Atlanta to USFS campground, looking downstream.**



**Photo 4. Hillside runoff/erosion below Pettit Group and Hercules Mine waste piles. Runoff is captured by a roadside ditch on opposite side of 600 level.**



**Photo 5. Quartz Creek in culvert downstream of mining areas/upstream of townsite, looking downstream.**



**Photo 6. Decker Creek below confluence with Flint Creek, looking downstream.**



**Photo 7. Decker Creek downstream of PPE 1 entry, looking downstream.**



**Photo 8. Small creek below Idaho Group Mine, above ATV road, looking downstream.**



**Photo 9. Middle Fork Boise River downstream of confluence with Yuba Creek, upstream of Kirby Dam, looking upstream.**



**Photo 10. Yuba Creek above confluence with Middle Fork Boise River, looking upstream.**



**Photo 11. Quartz Creek downstream of Tahoma Mine waste pile, looking upstream.**



**Photo 12. Dry drainage below Stanley Mine waste pile (above ATV road) before entry to Quartz Creek, looking upstream.**



**Photo 13. Settling pond below Monarch/Buffalo Mines runoff ditch.**



**Photo 14. Middle Fork Boise River downstream of confluence with Quartz Creek, looking upstream. Nearest public/safe access.**



**Photo 15. North Fork Boise River downstream of Montezuma Creek, upstream of confluence with Quartz Creek, looking upstream.**



**Photo 16. Channelized erosion above lower Tahoma Mine waste pile.**



**Photo 17. Gully washout upstream of PPE 1 location and below Alaska No. 2 Adit.**



**Photo 18. Flowing water below Minerva Mine waste pile, above ATV road.**



**Photo 19. Common merganser family, North Fork Boise River.**



**Photo 20. Garter snake, North Fork Boise River.**



**Photo 21. Monarch Mine.**



**Photo 22. Collapsed adit at the Jessie Benton Mine, located on USFS land, adjacent to the Monarch Mine. No samples were collected from the Jessie Benton Mine property.**

## **Appendix B. Analytical Laboratory Reports**



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10**

1200 Sixth Avenue, Suite 900  
Seattle, WA 98101-3140

OFFICE OF  
ENVIRONMENTAL REVIEW  
AND ASSESSMENT

September 18, 2017

**MEMORANDUM**

**SUBJECT:** Data Validation Report for the Atlanta Area Mines Preliminary Assessment,  
Case# 47144, SDG: MJJ3T0, Inorganic Analyses

**FROM:** Don Matheny, Chemist   
Environmental Services Unit, OERA

**TO:** Ken Marcy, Site Assessment Manager  
Office of Environmental Cleanup

The quality assurance (QA) review of the analytical data generated from the analysis of fifteen sediment samples collected from the above referenced site has been completed. These samples were analyzed for total metals (including mercury) by Bonner Analytical located in Hattiesburg, MS.

Sample analyses were evaluated following EPA's Stage 4 Data Validation Electronic/Manual Process (S4VEM). The validation was conducted according to the Quality Control Specifications outlined in:

- SQAP for Atlanta Area Mines Additional Site Investigation Activities, TerraGraphics (August, 2017)
- USEPA CLP Statement of Work for Inorganic Superfund Methods (ISM02.4)
- National Functional Guidelines for Inorganic Superfund Data Review (EPA-540-R-2017-001)
- Guidance for Labeling Externally Validated Laboratory Analytical Data (EPA-540-R08-005)

Some data may be qualified using the reviewer's professional judgment. The conclusions presented herein are based on the information provided for the review. A summary of samples evaluated in this validation report and the pertinent dates for sample collection, laboratory sample receipt and analyses is attached along with the validated data.

## I. QUALITY CONTROL RESULTS SUMMARY

The table below summarizes the major sample quality control (QC) tests, associated test results, criteria for evaluation and identification of outliers. Some criteria for evaluation may be QAPP specific and different from the National Functional Guidelines. Certain QC tests are electronically evaluated the results of which are not summarized in the table below though any excursions of these tests will appear in the *Data Qualifications* section. In addition to the QC tests, calculations from 10% of the samples are verified against the raw data.

### QC Results Summary

Quality Control Test <sup>1</sup>	Result Ranges	Outliers <sup>2</sup> (Y or N)	Evaluation Criteria
Preservation / Holding Times	Holding Times met	N	Cool $\leq 6^{\circ}\text{C}$ Metals 180 Days; Hg 28 Days
MS Tune	Tuning criteria met	N	$\leq 0.1$ amu; $\leq 5\%$ RSD
Instrument Calibration	Calibration criteria met	N	$\pm 30\%$ Difference; Corr. Coeff. $\geq 0.995$
Calibration Verification	All checks passed	N	Metals 90 – 110% Recovery Hg 85 – 115% Recovery
Interference Check Std.	96 - 109%	N	80 – 120% Recovery
<b>Lab Blanks</b>	<b>Significant detects reported</b>	<b>Y</b>	<b>Not detected or &lt;10% of Sample</b>
<b>Matrix Spike<sup>3</sup></b>	<b>58 - 173%</b>	<b>Y</b>	<b>75 - 125% Recovery</b>
<b>Lab Duplicate</b>	<b><math>\leq 51\%</math> or <math>\pm 2\text{xCRQL}</math></b>	<b>Y</b>	<b><math>\leq 35\%</math> RPD or <math>\pm 2\text{xCRQL}</math></b>
LCS (blank spike)	90 - 114%	N	70 - 130% Recovery
<b>Serial Dilution<sup>4</sup></b>	<b><math>\leq 54\%</math></b>	<b>Y</b>	<b><math>\leq 15\%</math> Difference (Soils)</b>

<sup>1</sup> Lab QC (matrix spike, lab duplicate, serial dilution) were performed on sample MJJ3T2.

<sup>2</sup> See the “*Data Qualifications*” section below for QC excursions and qualification of affected data.

<sup>3</sup> The Matrix Spike recovery was not applicable to Arsenic as the native concentration in the sample exceeded the spike concentration by  $> 4\text{x}$ .

<sup>4</sup> The native concentrations of Antimony, Barium, Cadmium, Chromium, Copper, Lead, Selenium, Silver and Zinc in the sample were too low for evaluating a 1:5 Serial Dilution.

## II. DATA QUALIFICATIONS

### Summary of Data Validation Qualifiers Applied

After the manual and electronic data review, the following data qualifications were applied:

1. **Blanks** – The following analytes have detected sample results < CRQLs and the associated laboratory blanks also had detects at concentrations < CRQL.

Data Qualifications: Sample results are qualified U and the values elevated to the CRQLs.

Qualified Analytical Results:

- Antimony** - MJJ3T0, MJJ3T1, MJJ3T3, MJJ3T4, MJJ3T5, MJJ3T7, MJJ3T8, MJJ3T9, MJJ3W1, MJJ3W3
- Barium** - MJJ3T0, MJJ3T1, MJJ3T2, MJJ3T4, MJJ3W4
- Chromium** - MJJ3T2, MJJ3T3, MJJ3T7, MJJ3T8, MJJ3T9, MJJ3W1, MJJ3W3
- Copper** - MJJ3T0 - MJJ3T3, MJJ3T5 - MJJ3W4

2. **Detection / Quantitation Limits** - The following analytes have positively detected results < CRQLs (below the range of quantitation) and the associated laboratory blanks were not detected.

Data Qualifications: Sample results are qualified J with no indication of bias.

Qualified Analytical Results:

- Mercury** - MJJ3T3, MJJ3T8
- Selenium** - MJJ3T1 - MJJ3T9, MJJ3W0 - MJJ3W4
- Silver** - MJJ3T8, MJJ3W3

3. **Matrix Spikes** – Antimony had a low spike recovery (58%) and the post-digestion spike recovery > 75%. All Antimony data were qualified UJ. Manganese had a high spike recovery (173%) and a post digestion spike recovery of < 125%. A review of the remaining QC suggests that the high Manganese recovery is likely due to sample variability (see Lab Duplicates).
4. **Lab Duplicates** – Iron (48%) and Manganese (51%) had duplicate RPDs > 35% and the native concentrations in the samples were > 5xCRQLs. All sample results for these elements were qualified J with no indication of bias.
5. **ICP Serial Dilution** – Arsenic had a percent difference (54%) for the Serial Dilution that exceeded the 15% D criteria for soils. All Arsenic data were qualified J.

### Data Qualifiers

The data qualifiers and their respective definitions applied to the sample result(s) are provided as follows.

Functional Guidelines Data Qualifiers	
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
J	The associated value is an estimated quantity.
UJ	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The data are unusable. The analyte may or may not be present in the sample.

### III. SAMPLE INDEX

The sample listing dates of sample collection, laboratory receipt and analysis are provided below.

Sample ID	Matrix	Sample Date	Date Rec'd	ICP-AES Analysis	ICP-MS Analysis	Mercury Analysis
MJJ3T0	Sediment	8/15/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3T1	Sediment	8/15/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3T2	Sediment	8/15/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3T3	Sediment	8/15/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3T4	Sediment	8/15/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3T5	Sediment	8/15/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3T6	Sediment	8/15/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3T7	Sediment	8/15/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3T8	Sediment	8/15/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3T9	Sediment	8/16/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3W0	Sediment	8/16/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3W1	Sediment	8/16/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3W2	Sediment	8/16/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3W3	Sediment	8/16/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3W4	Sediment	8/16/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T0	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Montezuma 1	pH:	Sample Date: 08/15/2017	Sample Time: 09:55:00
% Moisture:		% Solids: 87.6	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.11	U	mg/kg	0.11	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T0	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Montezuma 1	pH:	Sample Date: 08/15/2017	Sample Time: 09:55:00
% Moisture:		% Solids: 87.6	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	6.8	UJ	mg/kg	3.8	J*	1	YES	S4VEM
Barium	Target	22.8	U	mg/kg	12.2	J*	1	YES	S4VEM
Cadmium	Target	0.57	U	mg/kg	0.57	U	1	YES	S4VEM
Chromium	Target	1.7		mg/kg	1.7		1	YES	S4VEM
Copper	Target	2.9	U	mg/kg	0.25	J	1	YES	S4VEM
Iron	Target	4300	J	mg/kg	4300	*	1	YES	S4VEM
Manganese	Target	229	J	mg/kg	229	*	1	YES	S4VEM
Silver	Target	1.1	U	mg/kg	1.1	U	1	YES	S4VEM
Zinc	Target	17.4		mg/kg	17.4	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T0	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Montezuma 1	pH:	Sample Date: 08/15/2017	Sample Time: 09:55:00
% Moisture:		% Solids: 87.6	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	15.3	J	mg/kg	15.3	*	1	YES	S4VEM
Lead	Target	2.5		mg/kg	2.5	*	1	YES	S4VEM
Selenium	Target	2.9	U	mg/kg	2.9	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T1	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Montezuma 2	pH:	Sample Date: 08/15/2017	Sample Time: 10:30:00
% Moisture:		% Solids: 97.7	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.10	U	mg/kg	0.10	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T1	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Montezuma 2	pH:	Sample Date: 08/15/2017	Sample Time: 10:30:00
% Moisture:		% Solids: 97.7	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	6.1	UJ	mg/kg	0.30	J*	1	YES	S4VEM
Barium	Target	20.5	U	mg/kg	16.4	J*	1	YES	S4VEM
Cadmium	Target	0.51	U	mg/kg	0.51	U	1	YES	S4VEM
Chromium	Target	2.1		mg/kg	2.1		1	YES	S4VEM
Copper	Target	2.6	U	mg/kg	0.21	J	1	YES	S4VEM
Iron	Target	8010	J	mg/kg	8010	*	1	YES	S4VEM
Manganese	Target	166	J	mg/kg	166	*	1	YES	S4VEM
Silver	Target	1.0	U	mg/kg	1.0	U	1	YES	S4VEM
Zinc	Target	29.4		mg/kg	29.4	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T1	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Montezuma 2	pH:	Sample Date: 08/15/2017	Sample Time: 10:30:00
% Moisture:		% Solids: 97.7	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	3.0	J	mg/kg	3.0	*	1	YES	S4VEM
Lead	Target	3.8		mg/kg	3.8	*	1	YES	S4VEM
Selenium	Target	0.84	J	mg/kg	0.84	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T2	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Montezuma 3	pH:	Sample Date: 08/15/2017	Sample Time: 11:15:00
% Moisture:		% Solids: 84.1	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.12	U	mg/kg	0.12	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T2	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Montezuma 3	pH:	Sample Date: 08/15/2017	Sample Time: 11:15:00
% Moisture:		% Solids: 84.1	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.1	UJ	mg/kg	7.1	U*	1	YES	S4VEM
Barium	Target	23.8	U	mg/kg	13.2	J*	1	YES	S4VEM
Cadmium	Target	0.59	U	mg/kg	0.59	U	1	YES	S4VEM
Chromium	Target	1.2	U	mg/kg	0.69	J	1	YES	S4VEM
Copper	Target	3.0	U	mg/kg	0.26	J	1	YES	S4VEM
Iron	Target	4870	J	mg/kg	4870	*	1	YES	S4VEM
Manganese	Target	183	J	mg/kg	183	*	1	YES	S4VEM
Silver	Target	1.2	U	mg/kg	1.2	U	1	YES	S4VEM
Zinc	Target	18.4		mg/kg	18.4	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T2	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Montezuma 3	pH:	Sample Date: 08/15/2017	Sample Time: 11:15:00
% Moisture:		% Solids: 84.1	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	39.6	J	mg/kg	39.6	*	1	YES	S4VEM
Lead	Target	2.9		mg/kg	2.9	*	1	YES	S4VEM
Selenium	Target	0.24	J	mg/kg	0.24	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T3	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Petit Hercules 1	pH:	Sample Date: 08/15/2017	Sample Time: 12:15:00
% Moisture:		% Solids: 81.6	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.035	J	mg/kg	0.035	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T3	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Petit Hercules 1	pH:	Sample Date: 08/15/2017	Sample Time: 12:15:00
% Moisture:		% Solids: 81.6	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.4	UJ	mg/kg	0.48	J*	1	YES	S4VEM
Barium	Target	43.0		mg/kg	43.0	*	1	YES	S4VEM
Cadmium	Target	0.61	U	mg/kg	0.61	U	1	YES	S4VEM
Chromium	Target	1.2	U	mg/kg	0.73	J	1	YES	S4VEM
Copper	Target	3.1	U	mg/kg	1.5	J	1	YES	S4VEM
Iron	Target	9380	J	mg/kg	9380	*	1	YES	S4VEM
Manganese	Target	260	J	mg/kg	260	*	1	YES	S4VEM
Silver	Target	1.2	U	mg/kg	1.2	U	1	YES	S4VEM
Zinc	Target	47.8		mg/kg	47.8	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T3	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Petit Hercules 1	pH:	Sample Date: 08/15/2017	Sample Time: 12:15:00
% Moisture:		% Solids: 81.6	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	166	J	mg/kg	166	*	1	YES	S4VEM
Lead	Target	3.2		mg/kg	3.2	*	1	YES	S4VEM
Selenium	Target	0.86	J	mg/kg	0.86	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T4	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Montezuma 4	pH:	Sample Date: 08/15/2017	Sample Time: 13:15:00
% Moisture:		% Solids: 82.6	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.12	U	mg/kg	0.12	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T4	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Montezuma 4	pH:	Sample Date: 08/15/2017	Sample Time: 13:15:00
% Moisture:		% Solids: 82.6	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.3	UJ	mg/kg	0.77	J*	1	YES	S4VEM
Barium	Target	24.2	U	mg/kg	20.2	J*	1	YES	S4VEM
Cadmium	Target	0.61	U	mg/kg	0.61	U	1	YES	S4VEM
Chromium	Target	2.5		mg/kg	2.5		1	YES	S4VEM
Copper	Target	5.3		mg/kg	5.3		1	YES	S4VEM
Iron	Target	6430	J	mg/kg	6430	*	1	YES	S4VEM
Manganese	Target	305	J	mg/kg	305	*	1	YES	S4VEM
Silver	Target	1.2	U	mg/kg	1.2	U	1	YES	S4VEM
Zinc	Target	27.9		mg/kg	27.9	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T4	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Montezuma 4	pH:	Sample Date: 08/15/2017	Sample Time: 13:15:00
% Moisture:		% Solids: 82.6	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	48.9	J	mg/kg	48.9	*	1	YES	S4VEM
Lead	Target	3.1		mg/kg	3.1	*	1	YES	S4VEM
Selenium	Target	0.42	J	mg/kg	0.42	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T5	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Montezuma 5	pH:	Sample Date: 08/15/2017	Sample Time: 13:45:00
% Moisture:		% Solids: 86.5	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.12	U	mg/kg	0.12	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T5	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Montezuma 5	pH:	Sample Date: 08/15/2017	Sample Time: 13:45:00
% Moisture:		% Solids: 86.5	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	6.9	UJ	mg/kg	0.60	J*	1	YES	S4VEM
Barium	Target	29.4		mg/kg	29.4	*	1	YES	S4VEM
Cadmium	Target	0.58	U	mg/kg	0.58	U	1	YES	S4VEM
Chromium	Target	3.1		mg/kg	3.1		1	YES	S4VEM
Copper	Target	2.9	U	mg/kg	1.4	J	1	YES	S4VEM
Iron	Target	8750	J	mg/kg	8750	*	1	YES	S4VEM
Manganese	Target	185	J	mg/kg	185	*	1	YES	S4VEM
Silver	Target	1.2	U	mg/kg	1.2	U	1	YES	S4VEM
Zinc	Target	47.9		mg/kg	47.9	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T5	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Montezuma 5	pH:	Sample Date: 08/15/2017	Sample Time: 13:45:00
% Moisture:		% Solids: 86.5	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	71.5	J	mg/kg	71.5	*	1	YES	S4VEM
Lead	Target	4.6		mg/kg	4.6	*	1	YES	S4VEM
Selenium	Target	0.49	J	mg/kg	0.49	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T6	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Montezuma 6	pH:	Sample Date: 08/15/2017	Sample Time: 14:45:00
% Moisture:		% Solids: 82.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.12	U	mg/kg	0.12	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T6	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Montezuma 6	pH:	Sample Date: 08/15/2017	Sample Time: 14:45:00
% Moisture:		% Solids: 82.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.3	UJ	mg/kg	7.3	U*	1	YES	S4VEM
Barium	Target	46.8		mg/kg	46.8	*	1	YES	S4VEM
Cadmium	Target	0.61	U	mg/kg	0.61	U	1	YES	S4VEM
Chromium	Target	1.3		mg/kg	1.3		1	YES	S4VEM
Copper	Target	3.0	U	mg/kg	1.0	J	1	YES	S4VEM
Iron	Target	9070	J	mg/kg	9070	*	1	YES	S4VEM
Manganese	Target	293	J	mg/kg	293	*	1	YES	S4VEM
Silver	Target	1.2	U	mg/kg	1.2	U	1	YES	S4VEM
Zinc	Target	51.5		mg/kg	51.5	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T6	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Montezuma 6	pH:	Sample Date: 08/15/2017	Sample Time: 14:45:00
% Moisture:		% Solids: 82.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	9.9	J	mg/kg	9.9	*	1	YES	S4VEM
Lead	Target	3.7		mg/kg	3.7	*	1	YES	S4VEM
Selenium	Target	1.1	J	mg/kg	1.1	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T7	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Petit Hercules 2	pH:	Sample Date: 08/15/2017	Sample Time: 15:30:00
% Moisture:		% Solids: 98.2	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.10	U	mg/kg	0.10	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T7	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Petit Hercules 2	pH:	Sample Date: 08/15/2017	Sample Time: 15:30:00
% Moisture:		% Solids: 98.2	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	6.1	UJ	mg/kg	0.39	J*	1	YES	S4VEM
Barium	Target	39.3		mg/kg	39.3	*	1	YES	S4VEM
Cadmium	Target	0.51	U	mg/kg	0.51	U	1	YES	S4VEM
Chromium	Target	1.0	U	mg/kg	0.64	J	1	YES	S4VEM
Copper	Target	2.5	U	mg/kg	1.5	J	1	YES	S4VEM
Iron	Target	8410	J	mg/kg	8410	*	1	YES	S4VEM
Manganese	Target	181	J	mg/kg	181	*	1	YES	S4VEM
Silver	Target	1.0	U	mg/kg	1.0	U	1	YES	S4VEM
Zinc	Target	38.4		mg/kg	38.4	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T7	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Petit Hercules 2	pH:	Sample Date: 08/15/2017	Sample Time: 15:30:00
% Moisture:		% Solids: 98.2	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	294	J	mg/kg	294	*	1	YES	S4VEM
Lead	Target	6.9		mg/kg	6.9	*	1	YES	S4VEM
Selenium	Target	1.8	J	mg/kg	1.8	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T8	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 1	pH:	Sample Date: 08/15/2017	Sample Time: 16:15:00
% Moisture:		% Solids: 86.9	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.063	J	mg/kg	0.063	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T8      Method: Metals by ICP-AES      Matrix: Soil      MA Number:  
Sample Location: Quartz Creek 1      pH:      Sample Date: 08/15/2017      Sample Time: 16:15:00  
% Moisture:      % Solids: 86.9

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	6.9	UJ	mg/kg	0.29	J*	1	YES	S4VEM
Barium	Target	28.2		mg/kg	28.2	*	1	YES	S4VEM
Cadmium	Target	0.58	U	mg/kg	0.58	U	1	YES	S4VEM
Chromium	Target	1.2	U	mg/kg	0.36	J	1	YES	S4VEM
Copper	Target	2.9	U	mg/kg	1.9	J	1	YES	S4VEM
Iron	Target	5650	J	mg/kg	5650	*	1	YES	S4VEM
Manganese	Target	152	J	mg/kg	152	*	1	YES	S4VEM
Silver	Target	0.26	J	mg/kg	0.26	J	1	YES	S4VEM
Zinc	Target	32.0		mg/kg	32.0	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T8	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 1	pH:	Sample Date: 08/15/2017	Sample Time: 16:15:00
% Moisture:		% Solids: 86.9	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	78.3	J	mg/kg	78.3	*	1	YES	S4VEM
Lead	Target	3.1		mg/kg	3.1	*	1	YES	S4VEM
Selenium	Target	0.58	J	mg/kg	0.58	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T9	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Montezuma 7	pH:	Sample Date: 08/16/2017	Sample Time: 08:45:00
% Moisture:		% Solids: 83.5	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.12	U	mg/kg	0.12	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T9	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Montezuma 7	pH:	Sample Date: 08/16/2017	Sample Time: 08:45:00
% Moisture:		% Solids: 83.5	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.2	UJ	mg/kg	0.29	J*	1	YES	S4VEM
Barium	Target	25.9		mg/kg	25.9	*	1	YES	S4VEM
Cadmium	Target	0.60	U	mg/kg	0.60	U	1	YES	S4VEM
Chromium	Target	1.2	U	mg/kg	0.34	J	1	YES	S4VEM
Copper	Target	3.0	U	mg/kg	0.71	J	1	YES	S4VEM
Iron	Target	5820	J	mg/kg	5820	*	1	YES	S4VEM
Manganese	Target	243	J	mg/kg	243	*	1	YES	S4VEM
Silver	Target	1.2	U	mg/kg	1.2	U	1	YES	S4VEM
Zinc	Target	44.0		mg/kg	44.0	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3T9	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Montezuma 7	pH:	Sample Date: 08/16/2017	Sample Time: 08:45:00
% Moisture:		% Solids: 83.5	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	23.9	J	mg/kg	23.9	*	1	YES	S4VEM
Lead	Target	10.3		mg/kg	10.3	*	1	YES	S4VEM
Selenium	Target	0.48	J	mg/kg	0.48	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W0	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Decker Creek 1	pH:	Sample Date: 08/16/2017	Sample Time: 10:15:00
% Moisture:		% Solids: 81.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.12	U	mg/kg	0.12	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W0	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Decker Creek 1	pH:	Sample Date: 08/16/2017	Sample Time: 10:15:00
% Moisture:		% Solids: 81.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.4	UJ	mg/kg	7.4	U*	1	YES	S4VEM
Barium	Target	28.1		mg/kg	28.1	*	1	YES	S4VEM
Cadmium	Target	0.61	U	mg/kg	0.61	U	1	YES	S4VEM
Chromium	Target	6.1		mg/kg	6.1		1	YES	S4VEM
Copper	Target	3.1	U	mg/kg	0.35	J	1	YES	S4VEM
Iron	Target	6440	J	mg/kg	6440	*	1	YES	S4VEM
Manganese	Target	157	J	mg/kg	157	*	1	YES	S4VEM
Silver	Target	1.2	U	mg/kg	1.2	U	1	YES	S4VEM
Zinc	Target	23.7		mg/kg	23.7	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W0	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Decker Creek 1	pH:	Sample Date: 08/16/2017	Sample Time: 10:15:00
% Moisture:		% Solids: 81.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	11.9	J	mg/kg	11.9	*	1	YES	S4VEM
Lead	Target	4.4		mg/kg	4.4	*	1	YES	S4VEM
Selenium	Target	0.32	J	mg/kg	0.32	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W1	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Alaska No. 2 Adit	pH:	Sample Date: 08/16/2017	Sample Time: 10:30:00
% Moisture:		% Solids: 95.0	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.11	U	mg/kg	0.11	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W1	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Alaska No. 2 Adit	pH:	Sample Date: 08/16/2017	Sample Time: 10:30:00
% Moisture:		% Solids: 95.0	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	6.3	UJ	mg/kg	0.30	J*	1	YES	S4VEM
Barium	Target	72.8		mg/kg	72.8	*	1	YES	S4VEM
Cadmium	Target	0.53	U	mg/kg	0.53	U	1	YES	S4VEM
Chromium	Target	1.1	U	mg/kg	0.70	J	1	YES	S4VEM
Copper	Target	2.6	U	mg/kg	1.2	J	1	YES	S4VEM
Iron	Target	9420	J	mg/kg	9420	*	1	YES	S4VEM
Manganese	Target	493	J	mg/kg	493	*	1	YES	S4VEM
Silver	Target	1.1	U	mg/kg	1.1	U	1	YES	S4VEM
Zinc	Target	37.1		mg/kg	37.1	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W1	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Alaska No. 2 Adit	pH:	Sample Date: 08/16/2017	Sample Time: 10:30:00
% Moisture:		% Solids: 95.0	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	118	J	mg/kg	118	*	1	YES	S4VEM
Lead	Target	3.0		mg/kg	3.0	*	1	YES	S4VEM
Selenium	Target	0.95	J	mg/kg	0.95	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W2	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Decker Creek 2	pH:	Sample Date: 08/16/2017	Sample Time: 10:50:00
% Moisture:		% Solids: 78.9	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.13	U	mg/kg	0.13	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W2	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Decker Creek 2	pH:	Sample Date: 08/16/2017	Sample Time: 10:50:00
% Moisture:		% Solids: 78.9	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.6	UJ	mg/kg	7.6	U*	1	YES	S4VEM
Barium	Target	30.3		mg/kg	30.3	*	1	YES	S4VEM
Cadmium	Target	0.63	U	mg/kg	0.63	U	1	YES	S4VEM
Chromium	Target	3.6		mg/kg	3.6		1	YES	S4VEM
Copper	Target	3.2	U	mg/kg	0.44	J	1	YES	S4VEM
Iron	Target	8740	J	mg/kg	8740	*	1	YES	S4VEM
Manganese	Target	211	J	mg/kg	211	*	1	YES	S4VEM
Silver	Target	1.3	U	mg/kg	1.3	U	1	YES	S4VEM
Zinc	Target	33.6		mg/kg	33.6	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W2	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Decker Creek 2	pH:	Sample Date: 08/16/2017	Sample Time: 10:50:00
% Moisture:		% Solids: 78.9	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	13.5	J	mg/kg	13.5	*	1	YES	S4VEM
Lead	Target	3.9		mg/kg	3.9	*	1	YES	S4VEM
Selenium	Target	0.44	J	mg/kg	0.44	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W3	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Minerva Mine Waste Pile	pH:	Sample Date: 08/16/2017	Sample Time: 11:45:00
% Moisture:		% Solids: 86.0	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.12	U	mg/kg	0.12	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W3	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Minerva Mine Waste Pile	pH:	Sample Date: 08/16/2017	Sample Time: 11:45:00
% Moisture:		% Solids: 86.0	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.0	UJ	mg/kg	0.34	J*	1	YES	S4VEM
Barium	Target	43.5		mg/kg	43.5	*	1	YES	S4VEM
Cadmium	Target	0.58	U	mg/kg	0.58	U	1	YES	S4VEM
Chromium	Target	1.2	U	mg/kg	0.75	J	1	YES	S4VEM
Copper	Target	2.9	U	mg/kg	0.48	J	1	YES	S4VEM
Iron	Target	13400	J	mg/kg	13400	*	1	YES	S4VEM
Manganese	Target	224	J	mg/kg	224	*	1	YES	S4VEM
Silver	Target	1.1	J	mg/kg	1.1	J	1	YES	S4VEM
Zinc	Target	48.0		mg/kg	48.0	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W3	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Minerva Mine Waste Pile	pH:	Sample Date: 08/16/2017	Sample Time: 11:45:00
% Moisture:		% Solids: 86.0	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	84.9	J	mg/kg	84.9	*	1	YES	S4VEM
Lead	Target	4.1		mg/kg	4.1	*	1	YES	S4VEM
Selenium	Target	1.6	J	mg/kg	1.6	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W4	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Decker Creek 3	pH:	Sample Date: 08/16/2017	Sample Time: 12:15:00
% Moisture:		% Solids: 84.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.12	U	mg/kg	0.12	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W4	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Decker Creek 3	pH:	Sample Date: 08/16/2017	Sample Time: 12:15:00
% Moisture:		% Solids: 84.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.1	UJ	mg/kg	7.1	U*	1	YES	S4VEM
Barium	Target	23.7	U	mg/kg	16.7	J*	1	YES	S4VEM
Cadmium	Target	0.59	U	mg/kg	0.59	U	1	YES	S4VEM
Chromium	Target	1.4		mg/kg	1.4		1	YES	S4VEM
Copper	Target	3.0	U	mg/kg	0.36	J	1	YES	S4VEM
Iron	Target	5640	J	mg/kg	5640	*	1	YES	S4VEM
Manganese	Target	136	J	mg/kg	136	*	1	YES	S4VEM
Silver	Target	1.2	U	mg/kg	1.2	U	1	YES	S4VEM
Zinc	Target	19.6		mg/kg	19.6	*	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3T0

Lab Code: BON

Sample Number: MJJ3W4	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Decker Creek 3	pH:	Sample Date: 08/16/2017	Sample Time: 12:15:00
% Moisture:		% Solids: 84.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	12.4	J	mg/kg	12.4	*	1	YES	S4VEM
Lead	Target	2.7		mg/kg	2.7	*	1	YES	S4VEM
Selenium	Target	0.32	J	mg/kg	0.32	J	1	YES	S4VEM



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10**

1200 Sixth Avenue, Suite 900  
Seattle, WA 98101-3140

OFFICE OF  
ENVIRONMENTAL REVIEW  
AND ASSESSMENT

September 18, 2017

**MEMORANDUM**

**SUBJECT:** Data Validation Report for the Atlanta Area Mines Preliminary Assessment,  
Case# 47144, SDG: MJJ3W5, Inorganic Analyses

**FROM:** Don Matheny, Chemist   
Environmental Services Unit, OERA

**TO:** Ken Marcy, Site Assessment Manager  
Office of Environmental Cleanup

The quality assurance (QA) review of the analytical data generated from the analysis of thirteen sediment samples collected from the above referenced site has been completed. These samples were analyzed for total metals (including mercury) by Bonner Analytical located in Hattiesburg, MS.

Sample analyses were evaluated following EPA's Stage 4 Data Validation Electronic/Manual Process (S4VEM). The validation was conducted according to the Quality Control Specifications outlined in:

- SQAP for Atlanta Area Mines Additional Site Investigation Activities, TerraGraphics (August, 2017)
- USEPA CLP Statement of Work for Inorganic Superfund Methods (ISM02.4)
- National Functional Guidelines for Inorganic Superfund Data Review (EPA-540-R-2017-001)
- Guidance for Labeling Externally Validated Laboratory Analytical Data (EPA-540-R08-005)

Some data may be qualified using the reviewer's professional judgment. The conclusions presented herein are based on the information provided for the review. A summary of samples evaluated in this validation report and the pertinent dates for sample collection, laboratory sample receipt and analyses is attached along with the validated data.

## I. QUALITY CONTROL RESULTS SUMMARY

The table below summarizes the major sample quality control (QC) tests, associated test results, criteria for evaluation and identification of outliers. Some criteria for evaluation may be QAPP specific and different from the National Functional Guidelines. Certain QC tests are electronically evaluated the results of which are not summarized in the table below though any excursions of these tests will appear in the *Data Qualifications* section. In addition to the QC tests, calculations from 10% of the samples are verified against the raw data.

### QC Results Summary

Quality Control Test <sup>1</sup>	Result Ranges	Outliers <sup>2</sup> (Y or N)	Evaluation Criteria
Preservation / Holding Times	Holding Times met	N	Cool $\leq 6^{\circ}\text{C}$ Metals 180 Days; Hg 28 Days
MS Tune	Tuning criteria met	N	$\leq 0.1$ amu; $\leq 5\%$ RSD
Instrument Calibration	Calibration criteria met	N	$\pm 30\%$ Difference; Corr. Coeff. $\geq 0.995$
Calibration Verification	All checks passed	N	Metals 90 – 110% Recovery Hg 85 – 115% Recovery
Interference Check Std.	96 - 109%	N	80 – 120% Recovery
<b>Lab Blanks</b>	<b>Significant detects reported</b>	<b>Y</b>	<b>Not detected or &lt;10% of Sample</b>
<b>Matrix Spike<sup>3</sup></b>	<b>47 - 102%</b>	<b>Y</b>	<b>75 - 125% Recovery</b>
Lab Duplicate	$\leq 28\%$ or $\pm 2\text{xCRQL}$	N	$\leq 35\%$ RPD or $\pm 2\text{xCRQL}$
LCS (blank spike)	93 - 110%	N	70 - 130% Recovery
Serial Dilution <sup>4</sup>	$\leq 11\%$	N	$\leq 15\%$ Difference (Soils)

<sup>1</sup> Lab QC (matrix spike, lab duplicate, serial dilution) were performed on sample MJJ3X1.

<sup>2</sup> See the “*Data Qualifications*” section below for QC excursions and qualification of affected data.

<sup>3</sup> The Matrix Spike recovery was not applicable to Arsenic as the native concentration in the sample exceeded the spike concentration by  $> 4\text{x}$ .

<sup>4</sup> The native concentrations of Antimony, Barium, Cadmium, Chromium, Copper, Selenium and Silver in the sample were too low for evaluating a 1:5 Serial Dilution.

## II. DATA QUALIFICATIONS

### Summary of Data Validation Qualifiers Applied

After the manual and electronic data review, the following data qualifications were applied:

- Blanks** – The following analytes have detected sample results < CRQLs and the associated laboratory blanks also had detects at concentrations < CRQL.

<u>Data Qualifications:</u> Sample results are qualified U and the values elevated to the CRQLs.
<p>Qualified Analytical Results:</p> <p><b>Antimony</b> - MJJ3W5, MJJ3W6, MJJ3W7, MJJ3X1 - MJJ3X7</p> <p><b>Barium</b> - MJJ3W8, MJJ3X6, MJJ3X7</p> <p><b>Chromium</b> - MJJ3W5, MJJ3X0, MJJ3X5</p> <p><b>Copper</b> - MJJ3W6 - MJJ3X1, MJJ3X5, MJJ3X6, MJJ3X7</p>

- Detection / Quantitation Limits** - The following analytes have positively detected results < CRQLs (below the range of quantitation) and the associated laboratory blanks were not detected.

<u>Data Qualifications:</u> Sample results are qualified J with no indication of bias.
<p>Qualified Analytical Results:</p> <p><b>Mercury</b> - MJJ3W5, MJJ3X1, MJJ3X4</p> <p><b>Selenium</b> - All samples</p> <p><b>Silver</b> - MJJ3X1, MJJ3X6</p>

- Matrix Spikes** – Antimony had a low spike recovery (47%) and the post-digestion spike recovery > 75%. All Antimony data were qualified UJ.

### Data Qualifiers

The data qualifiers and their respective definitions applied to the sample result(s) are provided as follows.

Functional Guidelines Data Qualifiers	
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
J	The associated value is an estimated quantity.
UJ	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The data are unusable. The analyte may or may not be present in the sample.

**III. SAMPLE INDEX**

The sample listing dates of sample collection, laboratory receipt and analysis are provided below.

<b>Sample ID</b>	<b>Matrix</b>	<b>Sample Date</b>	<b>Date Rec'd</b>	<b>ICP-AES Analysis</b>	<b>ICP-MS Analysis</b>	<b>Mercury Analysis</b>
MJJ3W5	Sediment	8/16/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3W6	Sediment	8/16/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3W7	Sediment	8/16/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3W8	Sediment	8/16/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3W9	Sediment	8/16/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3X0	Sediment	8/17/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3X1	Sediment	8/17/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3X2	Sediment	8/17/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3X3	Sediment	8/17/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3X4	Sediment	8/17/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3X5	Sediment	8/17/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3X6	Sediment	8/17/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017
MJJ3X7	Sediment	8/17/2017	8/23/2017	8/31/2017	9/7/2017	8/29/2017

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W5	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Idaho Group	pH:	Sample Date: 08/16/2017	Sample Time: 13:40:00
% Moisture:		% Solids: 78.0	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.065	J	mg/kg	0.065	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W5	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Idaho Group	pH:	Sample Date: 08/16/2017	Sample Time: 13:40:00
% Moisture:		% Solids: 78.0	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.7	UJ	mg/kg	1.0	J*	1	YES	S4VEM
Barium	Target	85.3		mg/kg	85.3		1	YES	S4VEM
Cadmium	Target	0.64	U	mg/kg	0.64	U	1	YES	S4VEM
Chromium	Target	1.3	U	mg/kg	1.3		1	YES	S4VEM
Copper	Target	3.9		mg/kg	3.9		1	YES	S4VEM
Iron	Target	13100		mg/kg	13100		1	YES	S4VEM
Manganese	Target	516		mg/kg	516		1	YES	S4VEM
Silver	Target	1.3	U	mg/kg	1.3	U	1	YES	S4VEM
Zinc	Target	84.7		mg/kg	84.7		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W5	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Idaho Group	pH:	Sample Date: 08/16/2017	Sample Time: 13:40:00
% Moisture:		% Solids: 78.0	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	416		mg/kg	416	*	1	YES	S4VEM
Lead	Target	7.5		mg/kg	7.5	*	1	YES	S4VEM
Selenium	Target	1.6	J	mg/kg	1.6	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W6	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Decker Creek 4	pH:	Sample Date: 08/16/2017	Sample Time: 14:15:00
% Moisture:		% Solids: 79.8	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.13	U	mg/kg	0.13	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W6      Method: Metals by ICP-AES      Matrix: Soil      MA Number:  
Sample Location: Decker Creek 4      pH:      Sample Date: 08/16/2017      Sample Time: 14:15:00  
% Moisture:      % Solids: 79.8

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.5	UJ	mg/kg	0.36	J*	1	YES	S4VEM
Barium	Target	27.2		mg/kg	27.2		1	YES	S4VEM
Cadmium	Target	0.63	U	mg/kg	0.63	U	1	YES	S4VEM
Chromium	Target	3.0		mg/kg	3.0		1	YES	S4VEM
Copper	Target	3.1	U	mg/kg	0.53	J	1	YES	S4VEM
Iron	Target	11000		mg/kg	11000		1	YES	S4VEM
Manganese	Target	180		mg/kg	180		1	YES	S4VEM
Silver	Target	1.3	U	mg/kg	1.3	U	1	YES	S4VEM
Zinc	Target	33.1		mg/kg	33.1		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W6	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Decker Creek 4	pH:	Sample Date: 08/16/2017	Sample Time: 14:15:00
% Moisture:		% Solids: 79.8	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	30.5		mg/kg	30.5	*	1	YES	S4VEM
Lead	Target	5.5		mg/kg	5.5	*	1	YES	S4VEM
Selenium	Target	1.2	J	mg/kg	1.2	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W7	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Boise River 1	pH:	Sample Date: 08/16/2017	Sample Time: 16:45:00
% Moisture:		% Solids: 84.2	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.12	U	mg/kg	0.12	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W7	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Boise River 1	pH:	Sample Date: 08/16/2017	Sample Time: 16:45:00
% Moisture:		% Solids: 84.2	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.1	UJ	mg/kg	0.33	J*	1	YES	S4VEM
Barium	Target	25.4		mg/kg	25.4		1	YES	S4VEM
Cadmium	Target	0.59	U	mg/kg	0.59	U	1	YES	S4VEM
Chromium	Target	1.7		mg/kg	1.7		1	YES	S4VEM
Copper	Target	3.0	U	mg/kg	0.27	J	1	YES	S4VEM
Iron	Target	6490		mg/kg	6490		1	YES	S4VEM
Manganese	Target	156		mg/kg	156		1	YES	S4VEM
Silver	Target	1.2	U	mg/kg	1.2	U	1	YES	S4VEM
Zinc	Target	20.4		mg/kg	20.4		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W7	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Boise River 1	pH:	Sample Date: 08/16/2017	Sample Time: 16:45:00
% Moisture:		% Solids: 84.2	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	18.6		mg/kg	18.6	*	1	YES	S4VEM
Lead	Target	2.5		mg/kg	2.5	*	1	YES	S4VEM
Selenium	Target	0.54	J	mg/kg	0.54	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W8	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Boise River 1	pH:	Sample Date: 08/16/2017	Sample Time: 16:45:00
% Moisture:		% Solids: 82.1	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.12	U	mg/kg	0.12	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W8	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Boise River 1	pH:	Sample Date: 08/16/2017	Sample Time: 16:45:00
% Moisture:		% Solids: 82.1	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.3	UJ	mg/kg	7.3	U*	1	YES	S4VEM
Barium	Target	24.4	U	mg/kg	17.2	J	1	YES	S4VEM
Cadmium	Target	0.61	U	mg/kg	0.61	U	1	YES	S4VEM
Chromium	Target	2.0		mg/kg	2.0		1	YES	S4VEM
Copper	Target	3.0	U	mg/kg	0.11	J	1	YES	S4VEM
Iron	Target	4730		mg/kg	4730		1	YES	S4VEM
Manganese	Target	122		mg/kg	122		1	YES	S4VEM
Silver	Target	1.2	U	mg/kg	1.2	U	1	YES	S4VEM
Zinc	Target	17.7		mg/kg	17.7		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W8	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Boise River 1	pH:	Sample Date: 08/16/2017	Sample Time: 16:45:00
% Moisture:		% Solids: 82.1	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	20.2		mg/kg	20.2	*	1	YES	S4VEM
Lead	Target	1.9		mg/kg	1.9	*	1	YES	S4VEM
Selenium	Target	0.31	J	mg/kg	0.31	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W9	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Yuba Creek	pH:	Sample Date: 08/16/2017	Sample Time: 17:15:00
% Moisture:		% Solids: 77.8	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.13	U	mg/kg	0.13	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W9	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Yuba Creek	pH:	Sample Date: 08/16/2017	Sample Time: 17:15:00
% Moisture:		% Solids: 77.8	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.7	UJ	mg/kg	7.7	U*	1	YES	S4VEM
Barium	Target	29.6		mg/kg	29.6		1	YES	S4VEM
Cadmium	Target	0.64	U	mg/kg	0.64	U	1	YES	S4VEM
Chromium	Target	2.0		mg/kg	2.0		1	YES	S4VEM
Copper	Target	3.2	U	mg/kg	1.0	J	1	YES	S4VEM
Iron	Target	6600		mg/kg	6600		1	YES	S4VEM
Manganese	Target	185		mg/kg	185		1	YES	S4VEM
Silver	Target	1.3	U	mg/kg	1.3	U	1	YES	S4VEM
Zinc	Target	29.8		mg/kg	29.8		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3W9	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Yuba Creek	pH:	Sample Date: 08/16/2017	Sample Time: 17:15:00
% Moisture:		% Solids: 77.8	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	37.4		mg/kg	37.4	*	1	YES	S4VEM
Lead	Target	3.6		mg/kg	3.6	*	1	YES	S4VEM
Selenium	Target	0.48	J	mg/kg	0.48	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X0	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 2	pH:	Sample Date: 08/17/2017	Sample Time: 08:45:00
% Moisture:		% Solids: 87.3	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.11	U	mg/kg	0.11	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X0	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 2	pH:	Sample Date: 08/17/2017	Sample Time: 08:45:00
% Moisture:		% Solids: 87.3	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	6.9	UJ	mg/kg	6.9	U*	1	YES	S4VEM
Barium	Target	32.4		mg/kg	32.4		1	YES	S4VEM
Cadmium	Target	0.57	U	mg/kg	0.57	U	1	YES	S4VEM
Chromium	Target	1.1	U	mg/kg	0.21	J	1	YES	S4VEM
Copper	Target	2.9	U	mg/kg	1.4	J	1	YES	S4VEM
Iron	Target	5780		mg/kg	5780		1	YES	S4VEM
Manganese	Target	206		mg/kg	206		1	YES	S4VEM
Silver	Target	1.1	U	mg/kg	1.1	U	1	YES	S4VEM
Zinc	Target	27.8		mg/kg	27.8		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X0	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 2	pH:	Sample Date: 08/17/2017	Sample Time: 08:45:00
% Moisture:		% Solids: 87.3	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	73.2		mg/kg	73.2	*	1	YES	S4VEM
Lead	Target	2.2		mg/kg	2.2	*	1	YES	S4VEM
Selenium	Target	0.71	J	mg/kg	0.71	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X1	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 3	pH:	Sample Date: 08/17/2017	Sample Time: 09:30:00
% Moisture:		% Solids: 83.5	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.083	J	mg/kg	0.083	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X1	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 3	pH:	Sample Date: 08/17/2017	Sample Time: 09:30:00
% Moisture:		% Solids: 83.5	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.2	UJ	mg/kg	0.46	J*	1	YES	S4VEM
Barium	Target	38.3		mg/kg	38.3		1	YES	S4VEM
Cadmium	Target	0.60	U	mg/kg	0.60	U	1	YES	S4VEM
Chromium	Target	1.5		mg/kg	1.5		1	YES	S4VEM
Copper	Target	3.0	U	mg/kg	2.6	J	1	YES	S4VEM
Iron	Target	7660		mg/kg	7660		1	YES	S4VEM
Manganese	Target	221		mg/kg	221		1	YES	S4VEM
Silver	Target	0.35	J	mg/kg	0.35	J	1	YES	S4VEM
Zinc	Target	44.7		mg/kg	44.7		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X1	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 3	pH:	Sample Date: 08/17/2017	Sample Time: 09:30:00
% Moisture:		% Solids: 83.5	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	135		mg/kg	135	*	1	YES	S4VEM
Lead	Target	5.8		mg/kg	5.8	*	1	YES	S4VEM
Selenium	Target	0.93	J	mg/kg	0.93	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X2	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 4	pH:	Sample Date: 08/17/2017	Sample Time: 10:00:00
% Moisture:		% Solids: 96.1	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.10	U	mg/kg	0.10	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X2	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 4	pH:	Sample Date: 08/17/2017	Sample Time: 10:00:00
% Moisture:		% Solids: 96.1	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	6.2	UJ	mg/kg	0.27	J*	1	YES	S4VEM
Barium	Target	74.3		mg/kg	74.3		1	YES	S4VEM
Cadmium	Target	0.52	U	mg/kg	0.52	U	1	YES	S4VEM
Chromium	Target	1.2		mg/kg	1.2		1	YES	S4VEM
Copper	Target	3.1		mg/kg	3.1		1	YES	S4VEM
Iron	Target	9420		mg/kg	9420		1	YES	S4VEM
Manganese	Target	333		mg/kg	333		1	YES	S4VEM
Silver	Target	1.0	U	mg/kg	1.0	U	1	YES	S4VEM
Zinc	Target	52.3		mg/kg	52.3		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X2	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 4	pH:	Sample Date: 08/17/2017	Sample Time: 10:00:00
% Moisture:		% Solids: 96.1	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	18.2		mg/kg	18.2	*	1	YES	S4VEM
Lead	Target	4.3		mg/kg	4.3	*	1	YES	S4VEM
Selenium	Target	1.2	J	mg/kg	1.2	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X3	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 4	pH:	Sample Date: 08/17/2017	Sample Time: 10:00:00
% Moisture:		% Solids: 96.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.10	U	mg/kg	0.10	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X3	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 4	pH:	Sample Date: 08/17/2017	Sample Time: 10:00:00
% Moisture:		% Solids: 96.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	6.2	UJ	mg/kg	0.42	J*	1	YES	S4VEM
Barium	Target	93.7		mg/kg	93.7		1	YES	S4VEM
Cadmium	Target	0.52	U	mg/kg	0.52	U	1	YES	S4VEM
Chromium	Target	1.6		mg/kg	1.6		1	YES	S4VEM
Copper	Target	4.1		mg/kg	4.1		1	YES	S4VEM
Iron	Target	11800		mg/kg	11800		1	YES	S4VEM
Manganese	Target	420		mg/kg	420		1	YES	S4VEM
Silver	Target	1.0	U	mg/kg	1.0	U	1	YES	S4VEM
Zinc	Target	69.0		mg/kg	69.0		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X3	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 4	pH:	Sample Date: 08/17/2017	Sample Time: 10:00:00
% Moisture:		% Solids: 96.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	25.6		mg/kg	25.6	*	1	YES	S4VEM
Lead	Target	6.2		mg/kg	6.2	*	1	YES	S4VEM
Selenium	Target	1.4	J	mg/kg	1.4	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X4	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Monarch/Buffalo	pH:	Sample Date: 08/17/2017	Sample Time: 10:15:00
% Moisture:		% Solids: 82.3	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.11	J	mg/kg	0.11	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X4	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Monarch/Buffalo	pH:	Sample Date: 08/17/2017	Sample Time: 10:15:00
% Moisture:		% Solids: 82.3	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.3	UJ	mg/kg	1.4	J*	1	YES	S4VEM
Barium	Target	66.8		mg/kg	66.8		1	YES	S4VEM
Cadmium	Target	0.61	U	mg/kg	0.61	U	1	YES	S4VEM
Chromium	Target	2.1		mg/kg	2.1		1	YES	S4VEM
Copper	Target	9.0		mg/kg	9.0		1	YES	S4VEM
Iron	Target	13900		mg/kg	13900		1	YES	S4VEM
Manganese	Target	459		mg/kg	459		1	YES	S4VEM
Silver	Target	3.8		mg/kg	3.8		1	YES	S4VEM
Zinc	Target	91.7		mg/kg	91.7		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X4	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Monarch/Buffalo	pH:	Sample Date: 08/17/2017	Sample Time: 10:15:00
% Moisture:		% Solids: 82.3	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	808		mg/kg	808	*	1	YES	S4VEM
Lead	Target	34.5		mg/kg	34.5	*	1	YES	S4VEM
Selenium	Target	2.1	J	mg/kg	2.1	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X5	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 5	pH:	Sample Date: 08/17/2017	Sample Time: 11:00:00
% Moisture:		% Solids: 91.7	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.11	U	mg/kg	0.11	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X5	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 5	pH:	Sample Date: 08/17/2017	Sample Time: 11:00:00
% Moisture:		% Solids: 91.7	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	6.5	UJ	mg/kg	0.25	J*	1	YES	S4VEM
Barium	Target	41.9		mg/kg	41.9		1	YES	S4VEM
Cadmium	Target	0.55	U	mg/kg	0.55	U	1	YES	S4VEM
Chromium	Target	1.1	U	mg/kg	0.41	J	1	YES	S4VEM
Copper	Target	2.7	U	mg/kg	2.2	J	1	YES	S4VEM
Iron	Target	8510		mg/kg	8510		1	YES	S4VEM
Manganese	Target	470		mg/kg	470		1	YES	S4VEM
Silver	Target	1.1	U	mg/kg	1.1	U	1	YES	S4VEM
Zinc	Target	30.6		mg/kg	30.6		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X5	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Quartz Creek 5	pH:	Sample Date: 08/17/2017	Sample Time: 11:00:00
% Moisture:		% Solids: 91.7	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	99.0		mg/kg	99.0	*	1	YES	S4VEM
Lead	Target	4.3		mg/kg	4.3	*	1	YES	S4VEM
Selenium	Target	0.42	J	mg/kg	0.42	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X6	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Boise River 2	pH:	Sample Date: 08/17/2017	Sample Time: 13:15:00
% Moisture:		% Solids: 83.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.30		mg/kg	0.30		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X6	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Boise River 2	pH:	Sample Date: 08/17/2017	Sample Time: 13:15:00
% Moisture:		% Solids: 83.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.2	UJ	mg/kg	0.30	J*	1	YES	S4VEM
Barium	Target	24.0	U	mg/kg	19.7	J	1	YES	S4VEM
Cadmium	Target	0.60	U	mg/kg	0.60	U	1	YES	S4VEM
Chromium	Target	1.5		mg/kg	1.5		1	YES	S4VEM
Copper	Target	3.0	U	mg/kg	1.4	J	1	YES	S4VEM
Iron	Target	10100		mg/kg	10100		1	YES	S4VEM
Manganese	Target	127		mg/kg	127		1	YES	S4VEM
Silver	Target	0.19	J	mg/kg	0.19	J	1	YES	S4VEM
Zinc	Target	28.3		mg/kg	28.3		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X6	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Boise River 2	pH:	Sample Date: 08/17/2017	Sample Time: 13:15:00
% Moisture:		% Solids: 83.4	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	34.4		mg/kg	34.4	*	1	YES	S4VEM
Lead	Target	6.0		mg/kg	6.0	*	1	YES	S4VEM
Selenium	Target	0.60	J	mg/kg	0.60	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X7	Method: Mercury by Cold Vapor	Matrix: Soil	MA Number:
Sample Location: Boise River 3	pH:	Sample Date: 08/17/2017	Sample Time: 14:10:00
% Moisture:		% Solids: 80.0	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.30		mg/kg	0.30		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X7	Method: Metals by ICP-AES	Matrix: Soil	MA Number:
Sample Location: Boise River 3	pH:	Sample Date: 08/17/2017	Sample Time: 14:10:00
% Moisture:		% Solids: 80.0	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	7.5	UJ	mg/kg	0.33	J*	1	YES	S4VEM
Barium	Target	25.0	U	mg/kg	20.9	J	1	YES	S4VEM
Cadmium	Target	0.62	U	mg/kg	0.62	U	1	YES	S4VEM
Chromium	Target	2.5		mg/kg	2.5		1	YES	S4VEM
Copper	Target	3.1	U	mg/kg	0.90	J	1	YES	S4VEM
Iron	Target	10600		mg/kg	10600		1	YES	S4VEM
Manganese	Target	145		mg/kg	145		1	YES	S4VEM
Silver	Target	1.2	U	mg/kg	1.2	U	1	YES	S4VEM
Zinc	Target	35.5		mg/kg	35.5		1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3W5

Lab Code: BON

Sample Number: MJJ3X7	Method: Metals by ICP-MS	Matrix: Soil	MA Number:
Sample Location: Boise River 3	pH:	Sample Date: 08/17/2017	Sample Time: 14:10:00
% Moisture:		% Solids: 80.0	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	27.2		mg/kg	27.2	*	1	YES	S4VEM
Lead	Target	7.6		mg/kg	7.6	*	1	YES	S4VEM
Selenium	Target	0.98	J	mg/kg	0.98	J	1	YES	S4VEM



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10**

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OFFICE OF  
ENVIRONMENTAL REVIEW  
AND ASSESSMENT

September 14, 2017

**MEMORANDUM**

**SUBJECT:** Data Validation Report for the Atlanta Area Mines Preliminary Assessment,  
Case# 47144, SDG: MJJ3X8, Inorganic Analyses

**FROM:** Don Matheny, Chemist   
Environmental Services Unit, OERA

**TO:** Ken Marcy, Site Assessment Manager  
Office of Environmental Cleanup

The quality assurance (QA) review of the analytical data generated from the analysis of nineteen water samples collected from the above referenced site has been completed. These samples were analyzed for total metals (including mercury) by Bonner Analytical located in Hattiesburg, MS.

Sample analyses were evaluated following EPA's Stage 4 Data Validation Electronic/Manual Process (S4VEM). The validation was conducted according to the Quality Control Specifications outlined in:

- SQAP for Atlanta Area Mines Additional Site Investigation Activities, TerraGraphics (August, 2017)
- USEPA CLP Statement of Work for Inorganic Superfund Methods (ISM02.4)
- National Functional Guidelines for Inorganic Superfund Data Review (EPA-540-R-2017-001)
- Guidance for Labeling Externally Validated Laboratory Analytical Data (EPA-540-R08-005)

Some data may be qualified using the reviewer's professional judgment. The conclusions presented herein are based on the information provided for the review. A summary of samples evaluated in this validation report and the pertinent dates for sample collection, laboratory sample receipt and analyses is attached along with the validated data.

## I. QUALITY CONTROL RESULTS SUMMARY

The table below summarizes the major sample quality control (QC) tests, associated test results, criteria for evaluation and identification of outliers. Some criteria for evaluation may be QAPP specific and different from the National Functional Guidelines. Certain QC tests are electronically evaluated the results of which are not summarized in the table below though any excursions of these tests will appear in the *Data Qualifications* section. In addition to the QC tests, calculations from 10% of the samples are verified against the raw data.

### QC Results Summary

Quality Control Test <sup>1</sup>	Result Ranges	Outliers <sup>2</sup> (Y or N)	Evaluation Criteria
Preservation / Holding Times	Holding Times met	N	Cool $\leq 6^{\circ}\text{C}$ ; pH $<2$ Metals 180 Days; Hg 28 Days
MS Tune	Tuning criteria met	N	$\leq 0.1$ amu; $\leq 5\%$ RSD
Instrument Calibration	Calibration criteria met	N	$\pm 30\%$ Difference; Corr. Coeff. $\geq 0.995$
Calibration Verification	All checks passed	N	Metals 90 – 110% Recovery Hg 85 – 115% Recovery
Interference Check Std.	94 - 110%	N	80 – 120% Recovery
<b>Lab Blanks</b>	<b>Significant detects reported</b>	<b>Y</b>	<b>Not detected or &lt;10% of Sample</b>
Matrix Spike	89 - 115%	N	75 - 125% Recovery
Lab Duplicate	$\pm$ CRQL	N	$\leq 20\%$ RPD or $\pm$ CRQL
LCS (blank spike)	96 - 106%	N	70 - 130% Recovery
Serial Dilution <sup>3</sup>	N/A	N	$\leq 10\%$ Difference

<sup>1</sup> Lab QC (matrix spike, lab duplicate, serial dilution) were performed on sample MJJ3Z3.

<sup>2</sup> See the “*Data Qualifications*” section below for QC excursions and qualification of affected data.

<sup>3</sup> The native concentrations of the all elements in the sample were too low for evaluating a 1:5 Serial Dilution.

## II. DATA QUALIFICATIONS

### Summary of Data Validation Qualifiers Applied

After the manual and electronic data review, the following data qualifications were applied:

- Blanks** – The following analytes have detected sample results < CRQLs and the associated laboratory blanks also had detects at concentrations < CRQL.

<u>Data Qualifications:</u> Sample results are qualified U and the values elevated to the CRQLs.
<p>Qualified Analytical Results:</p> <p><b>Antimony</b> - MJJ3X8 - MJJ3Z3, MJJ3Z5, MJJ3Z6</p> <p><b>Barium</b> - MJJ3X8 - MJJ3Y4, MJJ3Y6 - MJJ3Z2, MJJ3Z4, MJJ3Z5</p> <p><b>Copper</b> - MJJ3X8, MJJ3Y1, MJJ3Y8, MJJ3Y9, MJJ3Z2</p> <p><b>Iron</b> – MJJ3X8, MJJ3Y0 - MJJ3Y2, MJJ3Y4, MJJ3Y6 - MJJ3Y9, MJJ3Z1, MJJ3Z4, MJJ3Z5</p> <p><b>Manganese</b> - MJJ3Y0, MJJ3Y2, MJJ3Y4, MJJ3Y6, MJJ3Y9, MJJ3Z0, MJJ3Z1, MJJ3Z4, MJJ3Z5</p> <p><b>Silver</b> - MJJ3X8 - MJJ3Y9, MJJ3Z1 - MJJ3Z6</p> <p><b>Zinc</b> - MJJ3Y4, MJJ3Y8, MJJ3Y9</p>

- Detection / Quantitation Limits** - The following analytes have positively detected results < CRQLs (below the range of quantitation) and the associated laboratory blanks were not detected.

<u>Data Qualifications:</u> Sample results are qualified J with no indication of bias.
<p>Qualified Analytical Results:</p> <p><b>Lead</b> - MJJ3X9, MJJ3Y3, MJJ3Y4, MJJ3Y8, MJJ3Z0, MJJ3Z1</p> <p><b>Mercury</b> - MJJ3Y0, MJJ3Y8</p>

### Data Qualifiers

The data qualifiers and their respective definitions applied to the sample result(s) are provided as follows.

Functional Guidelines Data Qualifiers	
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
J	The associated value is an estimated quantity.
UJ	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The data are unusable. The analyte may or may not be present in the sample.

**III. SAMPLE INDEX**

The sample listing dates of sample collection, laboratory receipt and analysis are provided below.

<b>Sample ID</b>	<b>Matrix</b>	<b>Sample Date</b>	<b>Date Rec'd</b>	<b>ICP-AES Analysis</b>	<b>ICP-MS Analysis</b>	<b>Mercury Analysis</b>
MJJ3X8	Water	8/15/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3X9	Water	8/15/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Y0	Water	8/15/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Y1	Water	8/15/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Y2	Water	8/15/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Y3	Water	8/15/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Y4	Water	8/15/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Y5	Water	8/15/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Y6	Water	8/16/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Y7	Water	8/16/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Y8	Water	8/16/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Y9	Water	8/16/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Z0	Water	8/16/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Z1	Water	8/16/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Z2	Water	8/16/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Z3	Water	8/16/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Z4	Water	8/16/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Z5	Water	8/16/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Z6	Water	8/16/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3X8	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Montezuma 1	pH: 0	Sample Date: 08/15/2017	Sample Time: 09:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3X8	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Montezuma 1	pH: 0	Sample Date: 08/15/2017	Sample Time: 09:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	3.0	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	12.6	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	0.38	J	1	YES	S4VEM
Iron	Target	100	U	ug/L	62.4	J	1	YES	S4VEM
Manganese	Target	56.0		ug/L	56.0		1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.72	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3X8	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Montezuma 1	pH: 0	Sample Date: 08/15/2017	Sample Time: 09:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	50.3		ug/L	50.3		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3X9	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Montezuma 3	pH: 0	Sample Date: 08/15/2017	Sample Time: 11:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3X9      Method: Metals by ICP-AES      Matrix: Water      MA Number:  
Sample Location: Montezuma 3      pH: 0      Sample Date: 08/15/2017      Sample Time: 11:00:00  
% Moisture:      % Solids:

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.1	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	13.5	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	372		ug/L	372		1	YES	S4VEM
Manganese	Target	142		ug/L	142		1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.89	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3X9	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Montezuma 3	pH: 0	Sample Date: 08/15/2017	Sample Time: 11:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	132		ug/L	132		1	YES	S4VEM
Lead	Target	0.12	J	ug/L	0.12	J	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y0	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Petit Hercules 1	pH: 0	Sample Date: 08/15/2017	Sample Time: 12:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.055	J	ug/L	0.055	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y0	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Petit Hercules 1	pH: 0	Sample Date: 08/15/2017	Sample Time: 12:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	3.3	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	6.3	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	46.8	J	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	14.5	J	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.88	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y0	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Petit Hercules 1	pH: 0	Sample Date: 08/15/2017	Sample Time: 12:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	42.6		ug/L	42.6		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y1	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Montezuma 4	pH: 0	Sample Date: 08/15/2017	Sample Time: 13:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y1	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Montezuma 4	pH: 0	Sample Date: 08/15/2017	Sample Time: 13:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.8	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	13.5	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	0.35	J	1	YES	S4VEM
Iron	Target	100	U	ug/L	34.6	J	1	YES	S4VEM
Manganese	Target	17.1		ug/L	17.1		1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.82	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y1	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Montezuma 4	pH: 0	Sample Date: 08/15/2017	Sample Time: 13:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	46.9		ug/L	46.9		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y2	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Montezuma 5	pH: 0	Sample Date: 08/15/2017	Sample Time: 13:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y2	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Montezuma 5	pH: 0	Sample Date: 08/15/2017	Sample Time: 13:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.6	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	10.7	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	82.5	J	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	7.7	J	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.77	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y2	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Montezuma 5	pH: 0	Sample Date: 08/15/2017	Sample Time: 13:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	3.2		ug/L	3.2		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y3	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Montezuma 6	pH: 0	Sample Date: 08/15/2017	Sample Time: 14:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y3	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Montezuma 6	pH: 0	Sample Date: 08/15/2017	Sample Time: 14:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.0	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	10.4	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	169		ug/L	169		1	YES	S4VEM
Manganese	Target	32.7		ug/L	32.7		1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.74	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y3	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Montezuma 6	pH: 0	Sample Date: 08/15/2017	Sample Time: 14:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	3.9		ug/L	3.9		1	YES	S4VEM
Lead	Target	0.13	J	ug/L	0.13	J	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y4	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Quartz Creek 1	pH: 0	Sample Date: 08/15/2017	Sample Time: 16:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y4      Method: Metals by ICP-AES      Matrix: Water      MA Number:  
Sample Location: Quartz Creek 1      pH: 0      Sample Date: 08/15/2017      Sample Time: 16:00:00  
% Moisture:      % Solids:

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.8	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	17.9	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	57.3	J	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	9.3	J	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.83	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	2.1	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y4	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Quartz Creek 1	pH: 0	Sample Date: 08/15/2017	Sample Time: 16:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	123		ug/L	123		1	YES	S4VEM
Lead	Target	0.13	J	ug/L	0.13	J	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y5	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Quartz Creek 1	pH: 0	Sample Date: 08/15/2017	Sample Time: 16:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y5	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Quartz Creek 1	pH: 0	Sample Date: 08/15/2017	Sample Time: 16:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.8	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	200	U	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	100	U	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	15.0	U	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	1.0	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y5	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Quartz Creek 1	pH: 0	Sample Date: 08/15/2017	Sample Time: 16:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y6	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Montezuma 7	pH: 0	Sample Date: 08/16/2017	Sample Time: 08:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y6      Method: Metals by ICP-AES      Matrix: Water      MA Number:  
Sample Location: Montezuma 7      pH: 0      Sample Date: 08/16/2017      Sample Time: 08:30:00  
% Moisture:      % Solids:

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	1.6	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	8.0	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	7.9	J	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	2.0	J	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.84	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y6	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Montezuma 7	pH: 0	Sample Date: 08/16/2017	Sample Time: 08:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	5.0		ug/L	5.0		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y7	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Decker Creek 1	pH: 0	Sample Date: 08/16/2017	Sample Time: 10:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y7	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Decker Creek 1	pH: 0	Sample Date: 08/16/2017	Sample Time: 10:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	1.7	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	3.0	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	71.8	J	1	YES	S4VEM
Manganese	Target	15.6		ug/L	15.6		1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.66	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y7	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Decker Creek 1	pH: 0	Sample Date: 08/16/2017	Sample Time: 10:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	3.7		ug/L	3.7		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y8	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Decker Creek 1	pH: 0	Sample Date: 08/16/2017	Sample Time: 10:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.062	J	ug/L	0.062	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y8      Method: Metals by ICP-AES      Matrix: Water      MA Number:  
Sample Location: Decker Creek 1      pH: 0      Sample Date: 08/16/2017      Sample Time: 10:00:00  
% Moisture:      % Solids:

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.0	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	3.5	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	0.74	J	1	YES	S4VEM
Iron	Target	100	U	ug/L	98.3	J	1	YES	S4VEM
Manganese	Target	16.3		ug/L	16.3		1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.96	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	9.6	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y8	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Decker Creek 1	pH: 0	Sample Date: 08/16/2017	Sample Time: 10:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	3.8		ug/L	3.8		1	YES	S4VEM
Lead	Target	0.46	J	ug/L	0.46	J	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y9	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Decker Creek 2	pH: 0	Sample Date: 08/16/2017	Sample Time: 10:45:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y9      Method: Metals by ICP-AES      Matrix: Water      MA Number:  
Sample Location: Decker Creek 2      pH: 0      Sample Date: 08/16/2017      Sample Time: 10:45:00  
% Moisture:      % Solids:

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	1.6	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	3.6	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	0.35	J	1	YES	S4VEM
Iron	Target	100	U	ug/L	42.7	J	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	10.8	J	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.90	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	2.7	J	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Y9	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Decker Creek 2	pH: 0	Sample Date: 08/16/2017	Sample Time: 10:45:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	3.4		ug/L	3.4		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z0	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Minerva Mine Waste Pile	pH: 0	Sample Date: 08/16/2017	Sample Time: 11:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z0	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Minerva Mine Waste Pile	pH: 0	Sample Date: 08/16/2017	Sample Time: 11:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.9	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	20.7	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	154		ug/L	154		1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	12.7	J	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z0	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Minerva Mine Waste Pile	pH: 0	Sample Date: 08/16/2017	Sample Time: 11:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	54.5		ug/L	54.5		1	YES	S4VEM
Lead	Target	0.19	J	ug/L	0.19	J	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z1	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Decker Creek 3	pH: 0	Sample Date: 08/16/2017	Sample Time: 12:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z1	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Decker Creek 3	pH: 0	Sample Date: 08/16/2017	Sample Time: 12:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	1.9	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	3.6	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	36.4	J	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	10.4	J	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.63	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z1	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Decker Creek 3	pH: 0	Sample Date: 08/16/2017	Sample Time: 12:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	4.2		ug/L	4.2		1	YES	S4VEM
Lead	Target	0.12	J	ug/L	0.12	J	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z2	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Idaho Group	pH: 0	Sample Date: 08/16/2017	Sample Time: 13:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z2	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Idaho Group	pH: 0	Sample Date: 08/16/2017	Sample Time: 13:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	3.3	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	27.2	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	0.35	J	1	YES	S4VEM
Iron	Target	151		ug/L	151		1	YES	S4VEM
Manganese	Target	23.6		ug/L	23.6		1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.96	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z2	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Idaho Group	pH: 0	Sample Date: 08/16/2017	Sample Time: 13:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	270		ug/L	270		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z3	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Idaho Group	pH: 0	Sample Date: 08/16/2017	Sample Time: 13:45:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z3      Method: Metals by ICP-AES      Matrix: Water      MA Number:  
Sample Location: Idaho Group      pH: 0      Sample Date: 08/16/2017      Sample Time: 13:45:00  
% Moisture:      % Solids:

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.2	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	200	U	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	100	U	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	15.0	U	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.86	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z3	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Idaho Group	pH: 0	Sample Date: 08/16/2017	Sample Time: 13:45:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z4	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Decker Creek 4	pH: 0	Sample Date: 08/16/2017	Sample Time: 14:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z4	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Decker Creek 4	pH: 0	Sample Date: 08/16/2017	Sample Time: 14:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM
Barium	Target	200	U	ug/L	4.1	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	40.7	J	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	11.8	J	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.55	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z4	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Decker Creek 4	pH: 0	Sample Date: 08/16/2017	Sample Time: 14:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	7.7		ug/L	7.7		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z5	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Boise River 1	pH: 0	Sample Date: 08/16/2017	Sample Time: 16:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z5	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Boise River 1	pH: 0	Sample Date: 08/16/2017	Sample Time: 16:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.4	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	5.1	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	29.9	J	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	8.8	J	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.72	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z5	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Boise River 1	pH: 0	Sample Date: 08/16/2017	Sample Time: 16:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	7.1		ug/L	7.1		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z6	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Yuba Creek	pH: 0	Sample Date: 08/16/2017	Sample Time: 16:45:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z6      Method: Metals by ICP-AES      Matrix: Water      MA Number:  
Sample Location: Yuba Creek      pH: 0      Sample Date: 08/16/2017      Sample Time: 16:45:00  
% Moisture:      % Solids:

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.5	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	200	U	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	100	U	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	15.0	U	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.63	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3X8

Lab Code: BON

Sample Number: MJJ3Z6	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Yuba Creek	pH: 0	Sample Date: 08/16/2017	Sample Time: 16:45:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10**

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OFFICE OF  
ENVIRONMENTAL REVIEW  
AND ASSESSMENT

September 14, 2017

**MEMORANDUM**

**SUBJECT:** Data Validation Report for the Atlanta Area Mines Preliminary Assessment,  
Case# 47144, SDG: MJJ3Z7, Inorganic Analyses

**FROM:** Don Matheny, Chemist   
Environmental Services Unit, OERA

**TO:** Ken Marcy, Site Assessment Manager  
Office of Environmental Cleanup

The quality assurance (QA) review of the analytical data generated from the analysis of nine water samples collected from the above referenced site has been completed. These samples were analyzed for total metals (including mercury) by Bonner Analytical located in Hattiesburg, MS.

Sample analyses were evaluated following EPA's Stage 4 Data Validation Electronic/Manual Process (S4VEM). The validation was conducted according to the Quality Control Specifications outlined in:

- SQAP for Atlanta Area Mines Additional Site Investigation Activities, TerraGraphics (August, 2017)
- USEPA CLP Statement of Work for Inorganic Superfund Methods (ISM02.4)
- National Functional Guidelines for Inorganic Superfund Data Review (EPA-540-R-2017-001)
- Guidance for Labeling Externally Validated Laboratory Analytical Data (EPA-540-R08-005)

Some data may be qualified using the reviewer's professional judgment. The conclusions presented herein are based on the information provided for the review. A summary of samples evaluated in this validation report and the pertinent dates for sample collection, laboratory sample receipt and analyses is attached along with the validated data.

## I. QUALITY CONTROL RESULTS SUMMARY

The table below summarizes the major sample quality control (QC) tests, associated test results, criteria for evaluation and identification of outliers. Some criteria for evaluation may be QAPP specific and different from the National Functional Guidelines. Certain QC tests are electronically evaluated the results of which are not summarized in the table below though any excursions of these tests will appear in the *Data Qualifications* section. In addition to the QC tests, calculations from 10% of the samples are verified against the raw data.

### QC Results Summary

Quality Control Test <sup>1</sup>	Result Ranges	Outliers <sup>2</sup> (Y or N)	Evaluation Criteria
Preservation / Holding Times	Holding Times met	N	Cool $\leq 6^{\circ}\text{C}$ ; pH $<2$ Metals 180 Days; Hg 28 Days
MS Tune	Tuning criteria met	N	$\leq 0.1$ amu; $\leq 5\%$ RSD
Instrument Calibration	Calibration criteria met	N	$\pm 30\%$ Difference; Corr. Coeff. $\geq 0.995$
Calibration Verification	All checks passed	N	Metals 90 – 110% Recovery Hg 85 – 115% Recovery
Interference Check Std.	94 - 110%	N	80 – 120% Recovery
<b>Lab Blanks</b>	<b>Significant detects reported</b>	<b>Y</b>	<b>Not detected or <math>&lt;10\%</math> of Sample</b>
Matrix Spike <sup>3</sup>	96 - 111%	N	75 - 125% Recovery
Lab Duplicate	14% or $\pm$ CRQL	N	$\leq 20\%$ RPD or $\pm$ CRQL
LCS (blank spike)	97 - 109%	N	70 - 130% Recovery
Serial Dilution <sup>4</sup>	N/A	N	$\leq 10\%$ Difference

<sup>1</sup> Lab QC (matrix spike, lab duplicate, serial dilution) were performed on sample MJJ402.

<sup>2</sup> See the “*Data Qualifications*” section below for QC excursions and qualification of affected data.

<sup>3</sup> The spike recovery for Iron was near 0% with a follow-up high post spike recovery ( $>75\%$ ) which is indicative of a spiking error. As there were no other indications of interferences from the remaining QC and instrument raw data, Iron values were not qualified due to the matrix spike recovery alone.

<sup>4</sup> The native concentrations of the all elements in the sample were too low for evaluating a 1:5 Serial Dilution.

## II. DATA QUALIFICATIONS

### Summary of Data Validation Qualifiers Applied

After the manual and electronic data review, the following data qualifications were applied:

- Blanks** – The following analytes have detected sample results < CRQLs and the associated laboratory blanks also had detects at concentrations < CRQL.

<u>Data Qualifications:</u> Sample results are qualified U and the values elevated to the CRQLs.
Qualified Analytical Results:  <b>Antimony</b> - MJJ3Z7 - MJJ400, MJJ403, MJJ404 <b>Barium</b> - MJJ3Z7 - MJJ403 <b>Copper</b> - MJJ3Z7, MJJ3Z9, MJJ400, MJJ402 <b>Iron</b> – MJJ403, MJJ403, MJJ403 <b>Manganese</b> - MJJ3Z7, MJJ402, MJJ403 <b>Silver</b> - MJJ3Z7, MJJ3Z9, MJJ400, MJJ401, MJJ402, MJJ404, MJJ405

- Detection / Quantitation Limits** - The following analytes have positively detected results < CRQLs (below the range of quantitation) and the associated laboratory blanks were not detected.

<u>Data Qualifications:</u> Sample results are qualified J with no indication of bias.
Qualified Analytical Results:  <b>Lead</b> - MJJ3Z7, MJJ3Z9

### Data Qualifiers

The data qualifiers and their respective definitions applied to the sample result(s) are provided as follows.

Functional Guidelines Data Qualifiers	
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
J	The associated value is an estimated quantity.
UJ	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The data are unusable. The analyte may or may not be present in the sample.

### III. SAMPLE INDEX

The sample listing dates of sample collection, laboratory receipt and analysis are provided below.

<b>Sample ID</b>	<b>Matrix</b>	<b>Sample Date</b>	<b>Date Rec'd</b>	<b>ICP-AES Analysis</b>	<b>ICP-MS Analysis</b>	<b>Mercury Analysis</b>
MJJ3Z7	Water	8/16/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Z8	Water	8/17/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ3Z9	Water	8/17/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ400	Water	8/17/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ401	Water	8/17/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ402	Water	8/17/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ403	Water	8/17/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ404	Water	8/17/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017
MJJ405	Water	8/17/2017	8/23/2017	9/1/2017	9/5/2017	9/7/2017

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ3Z7	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Yuba Creek	pH: 0	Sample Date: 08/16/2017	Sample Time: 17:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ3Z7	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Yuba Creek	pH: 0	Sample Date: 08/16/2017	Sample Time: 17:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	1.6	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	5.2	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	0.45	J	1	YES	S4VEM
Iron	Target	100	U	ug/L	27.0	J*	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	7.9	J	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.79	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ3Z7	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Yuba Creek	pH: 0	Sample Date: 08/16/2017	Sample Time: 17:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	6.9		ug/L	6.9		1	YES	S4VEM
Lead	Target	0.16	J	ug/L	0.16	J	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ3Z8	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Quartz Creek 2	pH: 0	Sample Date: 08/17/2017	Sample Time: 08:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ3Z8	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Quartz Creek 2	pH: 0	Sample Date: 08/17/2017	Sample Time: 08:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.9	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	18.4	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	127		ug/L	127	*	1	YES	S4VEM
Manganese	Target	51.6		ug/L	51.6		1	YES	S4VEM
Silver	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ3Z8	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Quartz Creek 2	pH: 0	Sample Date: 08/17/2017	Sample Time: 08:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	129		ug/L	129		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ3Z9	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Quartz Creek 2	pH: 0	Sample Date: 08/17/2017	Sample Time: 08:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ3Z9

Method: Metals by ICP-AES

Matrix: Water

MA Number:

Sample Location: Quartz Creek 2

pH: 0

Sample Date: 08/17/2017

Sample Time: 08:30:00

% Moisture:

% Solids:

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.7	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	18.0	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	0.34	J	1	YES	S4VEM
Iron	Target	127		ug/L	127	*	1	YES	S4VEM
Manganese	Target	51.2		ug/L	51.2		1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.78	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ3Z9	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Quartz Creek 2	pH: 0	Sample Date: 08/17/2017	Sample Time: 08:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	127		ug/L	127		1	YES	S4VEM
Lead	Target	0.13	J	ug/L	0.13	J	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ400	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Quartz Creek 3	pH: 0	Sample Date: 08/17/2017	Sample Time: 09:15:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ400      Method: Metals by ICP-AES      Matrix: Water      MA Number:  
Sample Location: Quartz Creek 3      pH: 0      Sample Date: 08/17/2017      Sample Time: 09:15:00  
% Moisture:      % Solids:

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	3.7	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	17.2	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	0.49	J	1	YES	S4VEM
Iron	Target	100	U	ug/L	76.8	J*	1	YES	S4VEM
Manganese	Target	17.3		ug/L	17.3		1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.93	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ400	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Quartz Creek 3	pH: 0	Sample Date: 08/17/2017	Sample Time: 09:15:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	86.5		ug/L	86.5		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ401	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Quartz Creek 5	pH: 0	Sample Date: 08/17/2017	Sample Time: 10:45:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ401	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Quartz Creek 5	pH: 0	Sample Date: 08/17/2017	Sample Time: 10:45:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM
Barium	Target	200	U	ug/L	11.0	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	252		ug/L	252	*	1	YES	S4VEM
Manganese	Target	60.8		ug/L	60.8		1	YES	S4VEM
Silver	Target	10.0	U	ug/L	1.1	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ401	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Quartz Creek 5	pH: 0	Sample Date: 08/17/2017	Sample Time: 10:45:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	20.8		ug/L	20.8		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ402	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Boise River 2	pH: 0	Sample Date: 08/17/2017	Sample Time: 13:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ402	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Boise River 2	pH: 0	Sample Date: 08/17/2017	Sample Time: 13:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM
Barium	Target	200	U	ug/L	1.7	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	0.39	J	1	YES	S4VEM
Iron	Target	100	U	ug/L	16.3	J*	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	2.4	J	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.71	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ402	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Boise River 2	pH: 0	Sample Date: 08/17/2017	Sample Time: 13:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	5.3		ug/L	5.3		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ403	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Boise River 3	pH: 0	Sample Date: 08/17/2017	Sample Time: 14:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ403	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Boise River 3	pH: 0	Sample Date: 08/17/2017	Sample Time: 14:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	1.5	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	1.4	J	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	11.4	J*	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	2.3	J	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ403	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Boise River 3	pH: 0	Sample Date: 08/17/2017	Sample Time: 14:00:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	4.6		ug/L	4.6		1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ404	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Boise River 3	pH: 0	Sample Date: 08/17/2017	Sample Time: 14:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ404	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Boise River 3	pH: 0	Sample Date: 08/17/2017	Sample Time: 14:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	2.6	J	1	YES	S4VEM
Barium	Target	200	U	ug/L	200	U	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	100	U*	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	15.0	U	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.84	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ404	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Boise River 3	pH: 0	Sample Date: 08/17/2017	Sample Time: 14:30:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ405	Method: Mercury by Cold Vapor	Matrix: Water	MA Number:
Sample Location: Boise River 3	pH: 0	Sample Date: 08/17/2017	Sample Time: 14:45:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Mercury	Target	0.20	U	ug/L	0.20	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ405	Method: Metals by ICP-AES	Matrix: Water	MA Number:
Sample Location: Boise River 3	pH: 0	Sample Date: 08/17/2017	Sample Time: 14:45:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Antimony	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM
Barium	Target	200	U	ug/L	200	U	1	YES	S4VEM
Cadmium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM
Chromium	Target	10.0	U	ug/L	10.0	U	1	YES	S4VEM
Copper	Target	25.0	U	ug/L	25.0	U	1	YES	S4VEM
Iron	Target	100	U	ug/L	100	U*	1	YES	S4VEM
Manganese	Target	15.0	U	ug/L	15.0	U	1	YES	S4VEM
Silver	Target	10.0	U	ug/L	0.86	J	1	YES	S4VEM
Zinc	Target	60.0	U	ug/L	60.0	U	1	YES	S4VEM

# Sample Summary Report

Case: 47144

Contract: EPW14029

SDG: MJJ3Z7

Lab Code: BON

Sample Number: MJJ405	Method: Metals by ICP-MS	Matrix: Water	MA Number:
Sample Location: Boise River 3	pH: 0	Sample Date: 08/17/2017	Sample Time: 14:45:00
% Moisture:		% Solids:	

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1	YES	S4VEM
Selenium	Target	5.0	U	ug/L	5.0	U	1	YES	S4VEM

## **Appendix C. QA/QC Review**

## **I N T E R N A L   P R O J E C T   M E M O R A N D U M**

**To:** Shelley Hicks, Project Manager, Kellogg  
Susan Spalinger, Principal, Moscow

**From:** Mara Thorhaug, Quality Assurance Officer, Kellogg

**Date:** April 19, 2018

**Job Code:** IDEQ Contract K157 TO #33 17838-30

**Subject:** QA/QC Review of the 2017 Atlanta Area Mines Expanded Site Investigation Sampling

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### **Section 1   Introduction**

This memorandum provides a summary of the data validation and data quality assessment performed for sampling conducted from August 15 through August 17, 2017 at the Atlanta Area Mines. Sampling procedures and the quality assurance (QA)/ quality control (QC) review followed guidelines set forth in the following documents:

- Sampling Analysis Plan (SAP) / Quality Assurance Project Plan (QAPP) for Atlanta Area Mines Additional Site Investigation Activities (TerraGraphics 2017)
- National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA 2017)
- Guidance on Environmental Data Verification and Data Validation (USEPA 2002)
- Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (USEPA 2009)

This memo discusses the data quality assessment and data validation performed for the Sample Delivery Groups (SDGs) listed in Table 1. Data qualifiers used in this review are defined in the *National Functional Guidelines for Inorganic Superfund Methods Data Review* (USEPA 2017).

**Table 1. SDG Data Validation Summary**

Laboratory	Case Number	SDG	Matrix	Analyses	Data Validation Level (USEPA 2009)	Review Conducted by
CLP	47144	MJJ3T0	Sediment	Total Metals <sup>a</sup>	Stage 4	USEPA chemist
	47144	MJJ3W5	Sediment			
	47144	MJJ3X8	Water			
	47144	MJJ3Z7	Water			

<sup>a</sup> Antimony (Sb), arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), copper (Cu), iron (Fe), lead (Pb), manganese (Mn), mercury (Hg), selenium (Se), silver (Ag), and zinc (Zn).

SDG = sample delivery group

CLP = Contract Laboratory Program

USEPA = U.S. Environmental Protection Agency

## Section 2 Data Validation and Quality Review Summary

The laboratories submitted all required deliverables. Attachment A contains the data validation reports (DVRs), which also show the laboratory data. The DVRs document the Stage 4 validation reviews, with the exception of field blank, rinsate blank, and field duplicate evaluations (summarized in Table 2 and discussed in Section 2.2).

### 2.1 CLP Stage 4 Validation Summary

The DVRs in Attachment A contain further detail on the data validation. In summary, the following data were qualified as estimates (J) because detected sample concentrations were less than the contract required quantitation limits (CRQLs):

- SDG MJJ3T0: Certain mercury, selenium, and silver results
- SDG MJJ3W5: Certain mercury and silver results, and all selenium results
- SDG MJJ3X8: Certain mercury and lead results
- SDG MJJ3Z7: Certain lead results

The following non-detect data were qualified as estimates (UJ) due to matrix spike recoveries:

- SDGs MJJ3T0 and MJJ3W5: All antimony results

The following data were qualified as estimates (J) because laboratory duplicate RPD results were greater than 35%:

- SDG MJJ3T0: All iron and manganese results

The following data were qualified as estimates (J) because percent differences exceeded the serial dilution criteria for soil/sediments:

- SDG MJJ3T0: All arsenic results

## 2.2 Field QA/QC Data

Alta's review of the field QA/QC data is summarized in Table 2.

**Table 2. Alta's Data Quality Review Summary**

Data Validation/Review Procedure or Check	Acceptable Frequency? <sup>a</sup>	Acceptable Performance? <sup>b</sup>	Data Qualified?	Discussion Item Number
Field Blanks (Table 3)	Y	Y	N	-
Rinsate Blanks (Table 3)	Y	Y	N	-
Field Duplicates (Table 4)	Y	Y	N	-

<sup>a</sup> Frequencies as defined in the SAP/QAPP (TerraGraphics 2017).

<sup>b</sup> Based on i) criteria defined in the SAP/QAPP (TerraGraphics 2017) or ii) professional judgment of the data validator.  
 -- = not applicable

**Table 3. Field and Rinsate Blank Analysis**

Sample Type:	Field Blanks				Rinsate Blanks					
Site Name:	PPE3-SW16		BK-SW27		DS-SW8		DS-SW19		BK-SW28	
Sample Date:	8/16/2017		8/17/2017		8/15/2017		8/16/2017		8/17/2017	
Analyte	Concentration (mg/L)									
Arsenic	0.0010	U								
Lead	0.0010	U								
Selenium	0.0050	U								
Antimony	0.060	U								
Barium	0.200	U								
Cadmium	0.0050	U								
Chromium	0.010	U								
Copper	0.025	U								
Iron	0.100	U								
Manganese	0.015	U								
Silver	0.010	U								
Zinc	0.060	U								
Mercury	0.0002	U	0.00020	U	0.00020	U	0.00020	U	0.0002	U

mg/L = milligrams per liter

U = concentration was not detected (CLP reports non-detects as the contract required quantitation limits)

Table 4. Duplicate Sample Analysis

SampleID:	BK-SW10		BK-SW11		RPD	PPE6-SW21		PPE6-SW22		RPD	DS-SD18		DS-SD19		RPD	PPE5-SD23		PPE5-SD24		RPD
Sample Type:	Original		Duplicate			Original		Duplicate			Original		Duplicate			Original		Duplicate		
Analyte	Concentration (µg/L)		Concentration (µg/L)			Concentration (µg/L)		Concentration (µg/L)			Concentration (mg/kg)		Concentration (mg/kg)			Concentration (mg/kg)		Concentration (mg/kg)		
Arsenic	3.7		3.8		1.8%	129		127		1.0%	18.6		20.2		5.6%	18.2		25.6		24%
Lead	1.0	U	0.46	J	NA	1.0	U	0.13	J	NA	2.5		1.9		17%	4.3		6.2		26%
Selenium	5.0	U	5.0	U	NA	5.0	U	5.0	U	NA	0.54	J	0.31	J	33%	1.2	J	1.4	J	11%
Antimony	60.0	U	60.0	U	NA	60.0	U	60.0	U	NA	7.1	UJ	7.3	UJ	NA	6.2	UJ	6.2	UJ	NA
Barium	200	U	200	U	NA	200	U	200	U	NA	25.4		24.4	U	NA	74.3		93.7		16%
Cadmium	5.0	U	5.0	U	NA	5.0	U	5.0	U	NA	0.59	U	0.61	U	NA	0.52	U	0.52	U	NA
Chromium	10.0	U	10.0	U	NA	10.0	U	10.0	U	NA	1.7		2.0		11%	1.2		1.6		20%
Copper	25.0	U	25.0	U	NA	25.0	U	25.0	U	NA	3.0	U	3.0	U	NA	3.1		4.1		19%
Iron	100	U	100	U	NA	127		127		0%	6490		4730		20%	9420		11800		16%
Manganese	15.6		16.3		2.9%	51.6		51.2		0.5%	156		122		16%	333		420		16%
Silver	10.0	U	10.0	U	NA	10.0	U	10.0	U	NA	1.2	U	1.2	U	NA	1.0	U	1.0	U	NA
Zinc	60.0	U	60.0	U	NA	60.0	U	60.0	U	NA	20.4		17.7		9.2%	52.3		69.0		19%
Mercury	0.20	U	0.062	J	NA	0.20	U	0.20	U	NA	0.12	U	0.12	U	NA	0.10	U	0.10	U	NA

RPD = Relative Percent Difference =  $ABS(X1-X2)/((X1+X2)/2)$

X1 = Original Concentration

X2 = Duplicate Concentration

mg/kg = milligrams per kilogram

NA = not applicable

RPD goal of 20% for water, 35% for sediment (TerraGraphics 2017)

### **Section 3 Overall Assessment**

Based on this data quality review, the laboratory and field data are determined to be of acceptable quality and meet the data quality objectives for representativeness and comparability. Accuracy and precision are also considered acceptable, with the exceptions discussed above. Final data and qualifiers are included in Attachment A, as no additional qualifiers were applied during this data validation. No laboratory or field data were rejected based on this data quality review. Completeness for this sampling event is calculated at 100% according to the method in the SAP/QAPP (TerraGraphics 2017).

### **Section 4 References**

- TerraGraphics Environmental Engineering, Inc. (TerraGraphics), 2017. Sampling Analysis Plan (SAP) / Quality Assurance Project Plan (QAPP) for Atlanta Area Mines Additional Site Investigation Activities. Prepared for the Idaho Department of Environmental Quality; August.
- U.S. Environmental Protection Agency (USEPA), 2002. Guidance on Environmental Data Verification and Data Validation. USEPA QA/G-8; November.
- USEPA, 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85, EPA 540-R-08-005 prepared by the Office of Solid Waste and Emergency Response; January.
- USEPA, 2017. National Functional Guidelines for Inorganic Superfund Methods Data Review, EPA 540-R-2017-001. January.